PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

OF THE

LANDS AND SURVEYS BRANCHES

OF THE

DEPARTMENT OF LANDS

FOR THE

YEAR ENDED DECEMBER 31ST, 1944

HON. E. T. KENNEY, MINISTER OF LANDS

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1945.

VICTORIA, B.C., January 18th, 1945.

To His Honour W. C. WOODWARD,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the Lands and Surveys Branches of the Department of Lands for the year ended December 31st, 1944.

E. T. KENNEY,

Minister of Lands.

VICTORIA, B.C., January 18th, 1945.

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

SIR,—I have the honour to submit the Annual Report of the Lands and Surveys Branches of the Department of Lands for the twelve months ended December 31st, 1944.

I have the honour to be,
Sir,
Your obedient servant,

H. CATHCART,
Deputy Minister of Lands.

PART I.

DEPARTMENT OF LANDS.

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DEPARTMENT OF LANDS.

VICTORIA, B.C., January 17th, 1945.

H. Cathcart, Esq., I.S.O.,
Deputy Minister of Lands, Victoria, B.C.

SIR,—I have the honour to submit herewith statements containing details of land administration by the Lands Branch of the Department of Lands during the year ended December 31st, 1944.

Again, comparison with former tabulations shows a slight decrease in several items covered by our administration.

The outstanding feature in this connection is the annual decrease in pre-emption entries since the outbreak of war, which can no doubt be accounted for by service enlistments and general diversion of man-power to war industry.

The same causes may reasonably be applied to the slight decreases from other sources of revenue, and any marked upward trend could hardly be expected pending re-establishment following demobilization of armed forces and the release of those frozen in various branches of war production.

I have the honour to be,
Sir,
Your obedient servant,

NEWMAN TAYLOR,
Superintendent of Lands.

REVENUE STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1944.

LAND REVENUE—SUNDRY.

	Victoria Collections.	Agency Collections.	Total Collections.
Collections under "Land Act"—			
Lease fees	$845.00		$845.00
Sundry lease rentals	129,404.69		129,404.69
Assignment fees	530.00		530.00
Crown-grant fees—			
Land	14,130.00		14,130.00
Mineral	2,600.00		2,600.00
Sundry revenue	5,356.82	$600.64	5,957.46
Occupational rentals	1,316.50		1,316.50
Rent of property	57.67	322.00	379.67
Reverted mineral claims		2,771.96	2,771.96
Improvements	446.00	2,689.90	3,135.90
Royalty	5,416.94	258.66	5,675.60
United States premium and exchange	36.01		36.01
Former Dominion lands—			
Ranch leases	6,040.17		6,040.17
Coal and natural-gas leases	56.14		56.14
Quarry leases	74.34		74.34
Miscellaneous leases	800.69		800.69
Assignment fees	60.00		60.00
Collections under "Coal and Petroleum Act"—			
Licence fees	3,400.00		3,400.00
Lease rentals	3,304.60		3,304.60
Assignment fees	35.00		35.00
Lieu of work fees	929.00		929.00
Penalty fees	50.00		50.00

LAND REVENUE, SUNDRY—*Continued.*

	Victoria Collections.	Agency Collections.	Total Collections.
Collections under " Petroleum and Natural-gas Act, 1944 "—			
Permit fees	250.00		250.00
Licence fees	1,000.00		1,000.00
Lease rentals			
Collections under " Coal Act, 1944 "—			
Licence fees			
Lease rentals			
Totals	$176,139.57	$6,643.16	$182,782.73

LAND-SALES.

Collections under " Land Act "—Principal and interest—			
Country lands	$39,345.40	$123,033.88	$162,379.28
Pre-empted lands		1,425.48	1,425.48
Townsites	767.44	28,302.74	29,070.18
Former Dominion Railway Belt lands		14,769.16	14,769.16
Special regulations	6,124.35		6,124.35
Surface rights of mineral claims		1,640.95	1,640.95
Collections under " Coal and Petroleum Act "			
Totals	$46,237.19	$169,172.21	$215,409.40

SURVEY FEES, SALES OF MAPS, ETC.

Survey fees	$1,557.92	$7,406.05	$8,963.97
Blue-prints	4,718.09		4,718.09
Lithographed maps	3,690.56		3,690.56
Photostats	1,017.60		1,017.60
Miscellaneous	23.70		23.70
Totals	$11,007.87	$7,406.05	$18,413.92

SUMMARY OF REVENUE COLLECTIONS.

Land revenue—sundry	$176,139.57	$6,643.16	$182,782.73
Land-sales—principal and interest	46,237.19	169,172.21	215,409.40
Survey fees, maps, etc.	11,007.87	7,406.05	18,413.92
Totals	$233,384.63	$183,221.42	$416,606.05

SUMMARY OF CASH RECEIVED.

Revenue collections	$233,384.63	$183,221.42	$416,606.05
Collections under " Soldiers' Land Act "—			
South Okanagan Land Project—			
Principal	61,226.86		
Lease rentals	1,007.70		
Interest	38,485.70		
Oliver Domestic Waterworks	4,578.09		
Water rates—irrigation	32,076.01		
Improvements	595.59		
Miscellaneous	811.12		
Sundry rentals (Votes 112, 121)	260.00		139,041.07
Houses, South Vancouver—			
Principal	214.41		
Interest	340.13		
Administration	13.72		
Taxes and insurance	81.98		650.24
Collections under " Better Housing Act "—			
Principal	35,057.24		
Interest	2,953.21		38,010.45
Refunds—			
Advances	617.87		
Votes	191.93		809.80
Totals	$411,896.19	$183,221.42	$595,117.61

SALE OF TOWN LOTS, 1944.

Disposal of lots placed on the market after being offered at public auction:—

Atlin, 9 lots	$310.00
Fort George, 51 lots	510.00
Golden South, 7 lots	55.00
Kimberley, 3 lots	205.00
McBride, 4 lots	175.00
Prince George, 29 lots	4,070.00
Quesnel, 19 lots	2,800.00
Quesnel West, 19 lots	1,425.00
Terrace, 62 lots	5,405.00
Vanderhoof, 6 lots	200.00
Vancouver, 13 lots	9,580.00
Westview, 19 lots	2,815.00
Zeballos, 5 lots	220.00
Oliver, 88 lots	19,640.00
Osoyoos, 95 lots	16,880.00
Various townsites, 18 lots	1,480.00
	$65,770.00

In the University Hill (Endowment Lands) subdivision of Lot 140, Group 1, New Westminster District, 12 lots were sold at a sales price of $21,978.75.

Southern Okanagan Land Project, *nil.* (All Crown acreage in this area has been taken off the market and is being held for rehabilitation purposes.)

PRE-EMPTION RECORDS, ETC., 1944.

Agency.	Pre-emption Records allowed.	Pre-emption Records cancelled.	Certificates of Purchase issued.	Certificates of Improvements issued.
Alberni	-----	1	6	-----
Atlin	-----	-----	-----	-----
Clinton	15	19	19	10
Cranbrook	-----	2	18	-----
Fernie	-----	-----	9	-----
Fort Fraser	3	8	16	10
Golden	4	2	21	3
Kamloops	5	5	37	8
Kaslo	-----	1	15	-----
Nanaimo	-----	4	30	3
Nelson	1	-----	41	1
New Westminster	7	4	49	3
Penticton	7	6	32	2
Pouce Coupe	6	31	12	74
Prince George	3	9	34	11
Prince Rupert	2	-----	11	-----
Quesnel	23	10	33	13
Revelstoke	-----	4	16	2
Smithers	2	-----	12	1
Telegraph Creek	-----	1	-----	-----
Vancouver	1	3	56	-----
Vernon	4	3	12	5
Victoria		----	237	1
Totals	83	113	716	147

The Certificates of Purchase as above cover the period from January 1st, 1944, to March 31st, 1944, only. Since April 1st, 1944, all Certificates of Purchase are issued from Victoria, and cover only new sales. Certificates of Purchase issued from Victoria for the period from April 1st, 1944, to December 31st, 1944, total 724.

PRE-EMPTION AND HOMESTEAD EXCHANGES.

Year.	Under 1934 Amendment to "Land Act."	No.
1935		41
1936		21
1937		37
1938		10
1939		3
1940		6
1941		7
1942		4
1943		2
1944		----
	Total	131

LAND SALES, 1944.

	Acres.
Surveyed (first class)	6,073.32
Surveyed (second class)	5,891.75
Surveyed (third class)	7,049.99
	19,015.06
Unsurveyed	2,196.00
Total	21,211.06

INSPECTION REPORTS, 1944.

Agency.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
Alberni	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	2
Atlin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clinton	11	.....	.....	.....	.....	5	6	12	20	20	9	15	98
Cranbrook	.....	.....	.....	.....	6	.....	13	.....	.....	.....	.....	.....	19
Fernie	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Fort Fraser	1	.....	.....	.....	.....	.....	15	23	17	3	.....	7	66
Golden	.....	.....	1	.....	.....	15	18	4	.....	.....	.....	.....	38
Kamloops	7	5	1	1	3	10	4	11	9	16	11	8	86
Kaslo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Nanaimo	6	.....	1	1	1	.....	.....	.....	.....	.....	.....	16	25
Nelson	.....	.....	1	1	2	.....	.....	.....	.....	.....	.....	3	7
New Westminster	1	.....	.....	5	.....	12	2	7	7	18	4	1	57
Penticton	3	.....	.....	.....	.....	.....	1	.....	.....	3	8	9	24
Pouce Coupe	.....	.....	26	.....	.....	.....	140	.....	.....	160	.....	14	340
Prince George	.....	1	2	.....	3	4	52	23	8	14	11	9	127
Prince Rupert	.....	1	.....	.....	.....	.....	.....	3	.....	.....	.....	12	16
Quesnel	4	.....	.....	.....	1	6	.....	25	36	38	10	11	131
Revelstoke	.....	.....	.....	.....	.....	.....	9	1	18	22	2	.....	52
Smithers	4	2	1	.....	.....	.....	.....	3	1	.....	1	1	13
Telegraph Creek	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vancouver	2	.....	.....	.....	1	.....	.....	.....	.....	2	11	12	28
Vernon	5	1	.....	.....	.....	.....	.....	.....	5	14	5	3	33
Victoria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3
Totals	44	10	33	8	18	52	262	112	121	310	72	125	1,167

SUMMARY.

	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.
Pre-emption records	559	447	413	451	524	934	2,441	1,202	485	478
Certificates of improvements	245	276	217	208	172	124	113	80	63	86
Certificates of purchase	1,379	1,850	1,831	1,731	1,448	1,432	1,444	1,254	1,211	1,903
Crown grants	1,192	1,316	1,414	1,407	1,636	1,213	1,027	795	758	1,123
Total acreage deeded	81,110	84,442	71,018	74,175	109,451	62,823	69,542	58,470	58,782	61,296.50
Coal-prospecting licences	102	118	142	104	160	235	203	137	33	83
Sundry leases	121	157	190	195	196	149	175	154	225	168
Coal leases	5	17	2	15	19	33	6	23	70	32
Coal permit										
Revenue received	$339,053.79	$404,534.49	$434,213.55	$352,165.35	$618,435.93	$367,115.72	$346,339.89	$218,814.68	$201,213.80	$238,286.77
Letters received	16,901	17,739	19,213	19,140	18,751	21,834	26,304	26,620	25,106	26,699
Letters sent	12,378	15,475	15,537	17,806	14,839	16,581	19,153	34,402*	22,420*	22,217*

	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.	1943.	1944.
Pre-emption records	343	347	416	456	405	329	264	220	194	83
Certificates of improvements	76	107	152	188	172	208	162	140	190	147
Certificates of purchase	1,490	1,701	1,939	1,817	1,828	2,129	3,146	2,837	3,122	1,440
Crown grants	1,211	1,028	1,226	1,063	1,108	1,155	1,102	1,134	1,421	1,528
Total acreage deeded	77,373.41	68,608.10	93,709.10	66,344.29	59,921.79	59,621.77	64,462.30	64,340.62	65,469.73	65,346.53
Coal-prospecting licences	41	54	47	21	33	43	54	31	65	33
Sundry leases	200	194	195	229	196	237	241	256	194	180
Coal leases	37	45	18	17	20	10	4	23	9	6
Coal permit										1
Revenue received	$217,822.38	$275,415.45	$243,741.08	$242,076.00	$248,829.25	$294,505.23	$356,260.28	$352,628.72	$258,994.92	$233,384.63
Letters received	22,573	21,572	21,691	22,263	24,605	21,301	20,117	18,739	20,320	20,646
Letters sent	18,194	19,796	19,224	19,662	21,767	17,963	16,833	15,450	16,327	17,218

* Including circulars, statements, etc.

STATEMENT OF LETTERS INWARD AND OUTWARD, 1944.

Letters inward	20,646
Letters outward	17,218

MINING LICENCES, PERMITS, LEASES, ETC., 1944.

	No.	Area (Acres).
Licences under the "Coal and Petroleum Act"—		
Original licences issued	1	640.00
Renewal licences issued	32	19,354.90
	33	19,994.90
Leases under the "Coal and Petroleum Act"—		
New leases issued	5	2,886.00
Renewal leases issued	1	80.00
	6	2,966.00
Permits under the "Petroleum and Natural-Gas Act, 1944"—		
Original permits issued	1	9,018.00
Sundry leases under the "Land Act"—		
Number of leases issued	180	17,141.11

CROWN GRANTS ISSUED, 1944.

Pre-emptions	149
"Pre-emptors' Free Grants Act, 1939"	15
Dominion homesteads	14
Purchases (other than town lots)	629
Town lots	577
Mineral claims	55
Reverted mineral claims	49
Supplementary timber grants	7
"Dyking Assessments Act"	24
"Public Schools Act"	4
Miscellaneous	5
Total	1,528
Applications for Crown grants	1,716
Certified copies	3
Clearances of applications for leases of reverted mineral claims given	133

TOTAL ACREAGE DEEDED.

Pre-emptions	24,128.86
Dominion homesteads	1,599.70
Mineral claims (other than reverted)	2,584.09
Reverted mineral claims	1,420.68
Purchases of surveyed Crown lands (other than town lots)	34,106.78
Supplementary timber grants	1,506.42
Total	65,346.53

HOME-SITE LEASES (NOT EXCEEDING 20 ACRES).

	Number of Leases.	Rental Collections received during 1944.	Total Rentals received.
Total rentals received from April 1st, 1929, to December 31st, 1943, inclusive	.....	.....	$20,308.17
Leases issued, January 1st to December 31st, 1923	2	.....	
Leases issued, January 1st to December 31st, 1924	2	.....	
Leases issued, January 1st to December 31st, 1925	2	$10.00	
Leases issued, January 1st to December 31st, 1926	4	47.50	
Leases issued, January 1st to December 31st, 1927	5	39.40	
Leases issued, January 1st to December 31st, 1928	4	17.25	
Leases issued, January 1st to December 31st, 1929	5	20.34	
Leases issued, January 1st to December 31st, 1930	3	9.10	
Leases issued, January 1st to December 31st, 1931	3	.....	
Leases issued, January 1st to December 31st, 1932	15	115.00	
Leases issued, January 1st to December 31st, 1933	9	48.00	
Leases issued, January 1st to December 31st, 1934	19	108.50	
Leases issued, January 1st to December 31st, 1935	14	109.50	
Leases issued, January 1st to December 31st, 1936	11	55.13	
Leases issued, January 1st to December 31st, 1937	9	49.60	
Leases issued, January 1st to December 31st, 1938	23	123.75	
Leases issued, January 1st to December 31st, 1939	25	162.34	
Leases issued, January 1st to December 31st, 1940	29	177.50	
Leases issued, January 1st to December 31st, 1941	28	210.11	
Leases issued, January 1st to December 31st, 1942	22	163.19	
Leases issued, January 1st to December 31st, 1943	16	75.00	
Leases issued, January 1st to December 31st, 1944	10	78.50	
	260		1,619.71
Leases cancelled during 1944 7			
Leases paid up and Crown-granted, 1944 11			
	18		
Leases existing at December 31st, 1944	242		
Lease rentals paid in advance during 1944	.....	.....	542.40
Total revenue received, April 1st, 1929, to December 31st, 1944	.....	.....	$22,470.28

PART II.

SURVEYS BRANCH.

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REPORT OF THE SURVEYOR-GENERAL.

VICTORIA, B.C., January 2nd, 1945.

H. Cathcart, Esq., I.S.O.,
Deputy Minister of Lands, Victoria, B.C.

SIR,—I have the honour to submit the following report on the operations of the Surveys Branch for the year ended December 31st, 1944.

The Surveys Branch had, before the war, a permanent staff of about fifty, but war enlistments have reduced the present number to forty-two, including some beginners. It is organized into three divisions—Surveys, Geographic, and Topographic—each with distinct though related functions.

The Surveys Division deals with field-notes of all surveys of Crown lands, whether made by surveyors employed by the Government or surveyors employed by private applicants for lands; checks these field-notes and prepares plans therefrom; it keeps an up-to-date record of the standing of surveys and lands on some 276 large-scale reference maps drawn on tracing-linen, and covering all settled areas in the Province; the Division has a modern blue and ozalid printing department which serves all branches of the Government and supplies prints of reference and other maps to the public as required.

The Geographic Division is responsible for keeping the published maps of the Province truly representative of the latest information available. That information is collected from all sources, but has as its foundation the triangulation surveys and the work of the Topographic Division; aside from our Surveys and Topographic Divisions the main sources of information are the Forest and Water Rights Branches, the Public Works and Mines Departments, and also the Geodetic, Geological, Topographical, and Hydrographic Services of the Dominion Government, and prospectors and trappers. The Division draws the maps, secures tenders from all lithographers in the Province capable of handling the sheet size, and then supervises publication; the Division is also equipped with photostatic camera, etc., for enlargements and reductions, and this serves all Departments, as well as National Defence and, to some extent, the public.

The Topographic Division is the outdoor end of the Surveys Branch; it includes a staff of British Columbia Land Surveyors specially skilled in topographic mapping; these men spend their summers on field-work and their winters plotting contour maps based on that work; their results are permanent in character, as topography changes but little throughout the centuries, and their control-points on the ground are marked for future generations by brass bolts set in rock and cement. It is important to keep in mind the basic character of this work and the sure foundation it supplies for any future appraisal of land, timber, water-power, or minerals, or for the location of transportation routes.

Due to its general mountainous character only a small proportion of the area of the Province requires subdivision into farm-sites, but immense areas of mountain terrain are rich in resources of timber, mineral, and water-power, and the lowlands depend largely for their prosperity on the development of the resources of this upland; for the appraisal of these resources contour maps furnish by far the best and cheapest foundation, for in a country of such high relief contour-lines are as important as horizontal distances. Every effort has been made to keep our mapping costs low, this being essential with our large area and small population; we have developed a system

of using vertical aerial photographs, taken at an altitude of about 15,000 feet, controlled by oriented ground photographs taken from commanding positions and by a minimum of triangulation to fix ground camera positions; for these ground photographs a surveying camera of known focal length is used, and from the ground photographs the positions, horizontal and vertical, of any required number of points on the variable scale aerial photographs can be obtained. The cost is less than that of photo-topography, as comparatively few ground camera stations are required, the aerial photographs supplying most of the topographic information. The plotting scale is usually ½ mile to the inch with contours at 100-foot vertical intervals, but satisfactory larger scale maps with a 50-foot contour interval could be produced from this information. The cost, including aerial photography and everything up to the preparation of the map for lithography, is less than $25 per square mile, and this is apparently as low as any costs obtained for comparable maps in Canada; our rough topography is offset by the extensive views obtainable and this permits us to use the surveying camera for control rather than the slower ground methods. Areas over which maps are required by the Defence authorities, or by the Mines, Forest, or Public Works officials, are given priority, but a *sine qua non* is aerial photography.

It is the settled belief of the Surveys Branch that good maps are a most useful guard against costly errors in development. In British Columbia a large proportion of the cost of surveys is entailed in getting men to and from the ground and from place to place in the map area. With air photographs and with the triangulation and photo-topographic methods of control now in use here, it costs but little more to collect the information for plotting on a scale of ½ mile to the inch with 100-foot contours with the object of publishing on the 1-mile scale than it does to get the information for the 4-miles-to-1-inch map with 500-foot contours. A large proportion of the extra cost of producing the larger scale map is in office-work and printing. Topography is practically permanent, so our standard policy is to collect information for the large-scale maps but to publish on any smaller scale called for by present needs; large-scale maps can be produced as needed in future years without another costly ground survey and at short notice; moreover, even small-scale maps produced from complete information are better than are such maps produced from less dense control.

The completion of the Alaska Highway on a route largely east of the Rocky Mountains has made Edmonton the supply point for the Liard River country and Yukon. To reach these areas and Alaska, travellers from most of British Columbia, as well as from Washington, Oregon, and California, will have to cross the Rocky Mountains twice and add 500 miles to the one-way distance; the projected road from Prince George through the Pine Pass to the Peace River farming area has its value but does not change this condition; our topographic surveys have shown that, if occasion calls for it, both mountain crossings can be avoided, the route can be shortened by 500 miles and maximum altitude lowered over 1,000 feet by less than 400 miles of new construction along alluvial valleys. The United States Army later surveyed for a railway by this Finlay River-Kechika River route and found that their grades could be kept under 1½ per cent.

In 1944 our triangulation net extending from the northern boundary via Dease Lake, Telegraph Creek, Skeena, Sustut, and Driftwood Rivers was brought within one season of a connection with the geodetic survey net near Endako; this survey gives information as to the nature and height of the country a highway from Hazelton or Vanderhoof to Yukon would have to traverse and will be useful in any sizing up of the relative merits of different routes. A route in this general location is favoured by Alaska Panhandle interests.

At the request of the Dominion Government, topographical survey parties in charge of A. J. Campbell and N. C. Stewart carried a triangulation net along the Columbia

River and Arrow Lakes from the International Boundary to stations near Nakusp connected with the geodetic net in the former Railway Belt. This had to do with the examination of the Columbia Basin being jointly carried out by the United States and Canada, but as part of it was on our programme for the next few years it was arranged that the Dominion Government should bear half the cost.

Five additional latitude determinations were made by officers of the Dominion Geodetic Survey along the 60th parallel, this being the boundary between British Columbia and Yukon. Each position was fixed by observation on forty or more pairs of stars, and it is estimated that the average error in astronomic latitude will be under 10 feet. This work is a joint responsibility of Dominion and Province and each bears half the cost. The way is now cleared for running the boundary-line for the 200 miles between Teslin Lake and Smith River, all accessible from the Alaska Highway, and it is expected that this work will proceed in 1945 with British Columbia land surveyors doing part of it.

All topographical survey-work is still suffering from the absence of our younger partly trained assistants in the armed forces, and by the difficulty in getting helpers of the best age-group. The work involves much hard mountain-climbing and projects are being selected where the men available can be used with the best results.

A number of small surveys, not calling for specific mention, were carried out by local surveyors, temporarily employed by the Government, where called for throughout the Province.

Reports compiled by F. O. Morris and G. G. Aitken for the Surveys and Geographic Divisions respectively, giving details of the work carried on under their supervision and of the maps published, as well as reports from the surveyors employed on field-work, are attached hereto. Owing to enlistments and the lesser skill of those temporarily employed to fill the gaps, some of our basic reference maps lag, but are catching up. A new wall map of the Province has been delayed by amendments due to additional information becoming available, but should be ready for distribution in April, 1945. The Surveys Branch runs very smoothly and I can report the most whole-hearted co-operation from Messrs. Morris and Aitken, the topographic surveyors, and all members of the staff.

I have the honour to be,

Sir,

Your obedient servant,

F. C. GREEN,

Surveyor-General.

APPENDIX TO REPORT OF SURVEYOR-GENERAL.

SURVEYS DIVISION.

By F. O. Morris, Assistant Surveyor-General.

This Division deals with the general correspondence, the supply of survey information to land surveyors and the general public, preparation of instructions for surveying, checking survey field-notes and plotting official plans therefrom, clearing all applications, and many minor activities.

A blue and ozalid printing plant is maintained, rendering service to the various governmental Departments.

Aerial Photograph Library.—A considerable portion of the Province has been photographed from the air and an effort is made in this office to have on record one copy of each of these aerial photographs. These are available for inspection and at present total 108,614 views, consisting of 77,206 taken by Department of National Defence, 23,603 by B.C. Forest Service, and 7,805 by Western Canadian Airways. Index maps showing the position of these aerial photographs are also on record and available for inspection.

Departmental Reference Maps.—In order to keep a proper graphic record of alienations and inquiries, reference maps, generally on the scale of 1 mile to 1 inch, and mineral reference maps on the scale of 1,500 feet to 1 inch, drawn on tracing-linen, are maintained by the Surveys Division. There are now 196 reference maps and 80 mineral reference maps, making a total of 276 maps. The work of keeping these up to date—(1) by adding new survey information as it becomes available, and (2) by renewing same when worn out with constant use and handling in the blue-print machines—forms a considerable portion of the work of the Division. During the year one new reference map was made and six were recompiled. Tables B and C, attached hereto, give a list of these reference maps.

Table A, which follows, summarizes the main items of work.

Table A.—Summary of Office-work for the Year 1944, Surveys Division.

Number of	field-books received	196
,,	lots surveyed	204
,,	lots plotted	185
,,	lots gazetted	164
,,	lots cancelled	17
,,	mineral-claim field-books prepared	99
,,	reference maps compiled	7
,,	applications for purchase cleared	522
,,	applications for pre-emption cleared	106
,,	applications for lease cleared	273
,,	coal licences cleared	48
,,	water licences cleared	67
,,	timber-sales cleared	1,950
,,	free-use permits cleared	256
,,	hand-loggers' licences cleared	7
,,	Crown-grant applications cleared	1,555
,,	reverted-land clearances	925
,,	cancellations made	496
,,	inquiries cleared	703
,,	placer-mining leases plotted on maps	81

Number of letters received	5,194
„ letters sent out	3,439
„ Crown-grant and lease tracings made	775
„ miscellaneous tracings made	73
„ Government Agents' tracings made	78
„ blue-prints made	25,527
Revenue received from sale of blue-prints from other departments and public	$4,718.09
Value of blue-prints for Lands Department	$3,423.15
Number of documents consulted and filed in vault	26,769

Table B.—List of Departmental Mineral Reference Maps.

No.	Title of Reference Map.
10T215.	Stump Lake; Nicola Valley.
1T257.	Mt. Sicker.
2T257.	Cherry Creek, Iron Mask, and Peterson Creek, Kamloops.
3T269.	Portland Canal; Stewart; Marmot River to Bitter Creek.
4T269.	Premier Mine; Big Missouri; Rufus Argenta.
5T269.	Salmon and Dilworth Glaciers.
7T269.	Upper Kitsault River; Dolly Varden Mine.
8T269.	Lower Kitsault River and Alice Arm.
9T269.	Grand Forks and Granby River.
10T269.	Greenwood; Ingram Creek to Eholt.
11T269.	McRae Creek; Coryell and Paulson to Porcupine.
12T269.	Franklin and Burrell Creeks.
13T269.	Princeton and Copper Mountain.
14T269.	Headwaters of Boundary and Pass Creeks.
15T269.	Wallace Mountain, Beaverdell, and Carmi.
16T269.	Hedley Camp.
17T269.	Northerly Portion of Texada Island.
18T269.	Camp McKinney; Rock Creek.
19T269.	Owen Lake.
20T269.	Topley-Richfield Mine.
21T269.	Bridge River; Pioneer, Bralorne, and Minto Mines.
22T269.	Anyox; Hastings Arm to Portland Canal.
23T269.	Windfall (Lost) Creek to Kettle River.
24T269.	McGillivray Creek and Headwaters of Cadwallader Creek.
25T269.	Gun and Tyaughton Creeks.
1T280.	South Okanagan and Fairview Camp.
2T280.	Ymir and Porcupine Creeks.
3T280.	Rossland; Big Sheep Creek to Columbia River.
5T280.	Phillips Arm; Fanny Bay; Thurlow and Sonora Islands.
6T280.	Trail; Part of Rossland; Murphy Creek.
7T280.	Sheep Creek and Salmo.
8T280.	Taku Arm of Tagish Lake; Engineer Mine.
9T280.	Fort Steele and Wild Horse Creek.
10T280.	Castlegar and East to Erie Creek.
12T280.	Moyie Lake.
13T280.	Osoyoos and Vicinity.
1T286.	Lardeau River, Poplar to Gerrard.
2T286.	Sullivan Mine and Kimberley Area.
3T286.	Trout Lake and Lardeau Creek.
4T286.	Lardeau River, Poplar to Bosworth.
5T286.	Ferguson to Westfall River.
6T286.	Beaver Creek; Erie to Fruitvale.
7T286.	Camborne, Incomappleux River, and Poole Creek.
8T286.	Duncan River to Headwaters of Healy Creek.
10T286.	Summit Creek, Headwaters of Sheep Creek, and John Bull Mountain.
11T286.	Smithers; Hudson Bay Mountain; Duthie Mine.
12T286.	Britannia Mine, westerly portion; Howe Sound.
1T294.	Britannia Mine, easterly portion.
2T294.	Atlin; Pine and Spruce Creeks.
3T294.	Christina Lake to Big Sheep Creek.
4T294.	Coast Copper Mine; Elk River and Kathleen Lake.
5T294.	Keremeos; Olalla; Hedley Lake.
8T294.	Upper Bear Valley; George Copper Mine to Meziadin Lake.
9T294.	Williams Creek; vicinity of Barkerville.
1T300.	Nelson and South to Hall Creek.
2T300.	Ainsworth, Kokanee Park, and Slocan. (40 chains=1 inch.)
3T300.	Kaslo, Sandon, and Silverton. (40 chains=1 inch.)
4T300.	Horseshoe Mountain; Canyon Creek; Kettle River.
5T300.	Kootenay Lake, Midge Creek, and Headwaters of Ymir Creek.
6T300.	Kootenay River; Beasley to Thrums.
7T300.	South Fork of Salmo River and Priest River.
8T300.	Kootenay Landing and Cultus Creek.
9T300.	Reeves-McDonald Mine; Pend d'Oreille River.
10T300.	Poupore Creek, Castlegar, and West to Shields.
11T300.	Headwaters of Big Sheep Creek.
12T323.	Talsekwe River, Cassiar District.
1T332.	Monashee Creek; Cherry Creek (contoured).
2T332.	Lightning Peak and Headwaters of Granby River (contoured).
3T332.	Lightning Creek, Cottonwood and Swift Rivers.
4T332.	Upper Antler Creek, Cunningham Creek, and Swamp River (contoured).
5T332.	Caribou Mountain, Swift River, and Little Swift River (contoured).
6T332.	Swift River and Fountain Creek (contoured).
7T332.	Rock Creek, Westbridge, and Kettle River.
8T332.	Bridge River; Tyaughton Creek to Rexmount.
10T332.	Zeballos and Tahsis Rivers.
1T348.	Perry Creek and Marysville.
2T348.	St. Mary Lake and St. Mary River.
3T348.	Amberty and Sutter Creeks (Summit Camp), tributaries of Tulameen River.
4T348.	Moyie River and Upper Perry Creek.
5T348.	Kootenay River Valley; Lewis Creek (Wasa) to Lussier Creek.

Note.—These mineral reference maps show surveyed mineral claims. They are compiled from all available data and are constantly being amended, and their accuracy is therefore not guaranteed. They were prepared originally for departmental use, and, having proved of value to the public, prints of same are now on sale.

The above maps are on the scale of 1,500 feet to 1 inch, except where otherwise noted. Blue prints and Ozalid prints can be obtained for $1 each. (Ozalid prints have deep brown lines on a white background.)

Orders, or inquiries, should quote the map number, and be addressed to:—

Surveys Division, Lands Department, Victoria, B.C.

Victoria, B.C., January 1st, 1945.

TABLE C.—LIST OF DEPARTMENTAL REFERENCE MAPS.

No.	Title of Reference Map.
1.	West Coast, V.I. (Barkley Sound, Southerly).
1A.	West Coast, V.I. (Toquart Harbour and Great Central Lake).
1B.	West Coast, V.I. (Kennedy Lake and Clayoquot Sound).
2.	West Coast, V.I. (Nootka District).
3.	Belize and Seymour Inlets and Smith Sound.
3A.	Quatsino and West Portion of Rupert District.
3B.	Gilford, Cracroft, and Broughton Islands.
3C.	Nimpkish River Valley and Lake.
3D.	West Coast, V.I. (Quatsino Sound and Kyuquot).
4.	Knight and Loughborough Inlets.
4A.	Sayward District, Thurlow and Quadra Islands.
4B.	Bute Inlet.
5.	Texada Island and West Portion, New Westminster District.
5A.	Lower Fraser River; New Westminster City to Fort Langley, Pitt Lake, and Indian Arm.
5B.	Seechelt Inlet and Howe Sound.
5C.	Harrison Lake, Pitt River, and Lillooet River Valley.
5D.	Sumas, Alouette, and Stave Lakes.
6.	Redonda Islands, Powell Lake, and Toba Inlet.
6A.	Nicola Valley.
6B.	Aspen Grove and Tulameen.
6C.	Princeton, Ashnola, and South Similkameen River Valleys.
7.	North Okanagan and Vernon.
7A.	Penticton, Kelowna, and Okanagan Lake.
7B.	Oliver and South Okanagan.
8.	Greenwood, Rock Creek, and Beaverdell.
9.	Mission Creek and Kettle River Headwaters.
10.	Mabel Lake, Lumby, and Sugar Lake.
11.	Upper Horsefly River and Clearwater Lake.
11A.	Bonaparte River, North Thompson River Valley (Railway Belt to Mt. Olie).
12.	Dean and Burke Channels and Bella Coola Valley.
12A.	Dean (Salmon) River Valley.
12B.	Kimsquit and West Side of Dean Channel.
13.	Rivers Inlet and Fitzhugh Sound.
14.	Banks and McCauley and Porcher Islands.
14A.	Devastation Channel, Kitimat Arm and Kildala River.
14B.	Kitlobe River and West End of Eutsuk and Whitesail Lakes.
14C.	Grenville, Squally, and Douglas Channels.
15.	Moresby Island, Northern Portion.
15A.	Moresby Island, Southern Portion.
16.	Graham Island, North-east Portion.
16A.	Graham Island, South Portion.
16B.	Graham Island, North-west Portion.
17.	Portland Canal and Observatory Inlet.
17A.	Upper Skeena and Babine River Valleys.
17B.	Nass and Kitwancool River Valleys.
18.	Upper Fraser and Morkill River Valleys.
18A.	Upper Fraser River Valley and Robson Park.
18B.	McLennan and Albreda Rivers and Headwaters of North Thompson River.
19.	Skeena and Zymoetz River Valleys.
19A.	Skeena and Kitimat River Valleys.
19B.	Prince Rupert, Mouth of Skeena River.
20.	Skeena and Bulkley Valleys, vicinity of Hazelton.
21.	Barkerville, Willow and Bowron River Headwaters.
21A.	Fraser Lake, Endako River, and South End of Stuart Lake.
21B.	Endako River and South End of Babine Lake.
22.	Bowron and Upper Fraser River Valley (vicinity of Hutton).
22A.	Fraser River, Fort George, South.
22B.	Portion of Nechako, Stuart, and Salmon River Valleys.
22C.	Blackwater and Chilako River Valleys.
22D.	Fraser and Cottonwood River Valleys.
22E.	McBride, Goat, and Upper Fraser River Valleys.
23.	Quesnel Lake (North and East Arm).
23A.	Quesnel Forks and Swamp River.
23B.	Fraser River, Quesnel, South.
23C.	Nazko River Valley.
24.	150-Mile House and Harpers Camp.
24A.	Bridge River, Anderson and Seton Lakes, Lillooet District.
24B.	Lillooet District (Clinton and Green Lakes).
25.	Mainland Coast, Princess Royal and adjacent Islands.
25A.	Bella Bella and Milbanke Sound.
26.	Dundas and adjacent Islands.
27.	Fraser River Valley (Williams Lake and Soda Creek).
27A.	Lac la Hache and Lone Butte.
27B.	Fraser River Valley, Gang Ranch, North.
27C.	Fraser River, vicinity of Big Bar Creek.
28.	North Part of Babine and Takla Lakes.
28A.	Stuart, Pinchi, and Trembleur Lakes and Middle River.
28B.	Nation River and Lakes.
29.	Chilcotin and Chilanko Rivers, West of 124th Meridian.
29A.	Charlotte Lake and Bella Coola River Headwaters.
29B.	Chilcotin River Valley, vicinity of Alexis Creek.
29C.	Hanceville, Big Creek, and Taseko River.
30.	Canim Lake, North Thompson, and Clearwater Rivers.
31.	Bulkley Valley.
31A.	Central Part, Babine Lake.

TABLE C.—LIST OF DEPARTMENTAL REFERENCE MAPS—*Continued.*

No.	Title of Reference Map.
32.	Crooked River, McLeod Lake, and Upper Parsnip River.
32A.	Tatla, Tatlayoko, and North End of Chilko Lakes.
32B.	Homathko and Klinaklini River Valleys.
33.	Fraser River Valley, Fort George, North.
34.	Lot 4593, Kootenay District, Flathead River.
35.	North Saltspring, Ladysmith, and adjacent Islands. (2 in.=1 mile.)
36.	Upper Fraser River (vicinity of Hansard and McGregor River Valley).
36A.	Headwaters of Wapiti and Herrick Rivers.
37.	Nechako River, Cluculz and Bednesti Lakes.
38.	Murtle Lake, North Thompson River and Blue River.
38A.	Finlay River Valley. (½ in.=1 mile.)
38B.	Groundhog Coal Area and Upper Stikine River Valley. (½ in.=1 mile.)
38C.	Groundhog Coal Area and Upper Skeena and Nass Rivers. (½ in.=1 mile.)
39.	West End of Ootsa Lake.
39A.	Eutsuk Lake.
40.	Tetachuk and Natalkuz Lakes.
41.	Upper Nechako River and Tachick Lake.
42.	Columbia and Goldstream Rivers, Kinbasket Lake.
42A.	North Thompson River Valley and Adams River.
42B.	Columbia River (Big Bend) and Canoe and Wood Rivers.
42C.	Columbia River Valley (vicinity of Bush River).
43.	Pouce Coupé, Rolla, Dawson Creek, and Arras.
43A.	Blueberry River and Rose Prairie.
43B.	Peace River, Hudson Hope, and Fort St. John.
43C.	Moberly Lake, Pine River, and Cowie Creek.
44.	Kiskatinaw, Murray, and Sukunka Rivers.
44A.	Wapiti, Murray, and Head of Parsnip Rivers.
45.	Alberni District and Baynes Sound.
46.	Sooke, Malahat, and Metchosin Districts. (2 in.=1 mile.)
47.	Peace River, West of Dominion Block.
48.	Parsnip and Nation Rivers.
49.	Misinchinka River and Pine River Pass.
50.	Halfway, Peace, and Graham River Valleys.
51.	Fort Grahame and Finlay River.
52.	Atlin Lake and vicinity. (½ in.=1 mile.)
53.	Telegraph Creek and Stikine River Valley. (½ in.=1 mile.)
54.	Upper Nass River Valley and Meziadin Lake.
55.	Salmon River Headwaters and McLeod River.
56.	Driftwood River and North End of Tatla Lake.
57.	Headwaters of Omineca River.
58.	Finlay Forks and Parsnip River.
59.	Ingenika and Mesilinka Rivers. (½ in.=1 mile.)
60.	Taseko Lake and Head of Bridge River.
61.	South Fork of Bridge River and Head of Lillooet River.
62.	Head of Jervis Inlet and Squamish River.
63.	Lillooet Lake and Green River.
64.	Shawnigan and Sooke Lakes, and parts of Malahat, Shawnigan, and Helmcken Districts. (2 in.=1 mile.)
65.	Fraser River Mouth, Burrard Inlet, and Southern Part of Howe Sound.
66.	Fortress Lake and Bush River, East Kootenay.
67.	Dean River and Anahim Lake.
68.	Baezaeko and Chilcotin River Headwaters.
69.	Comox, Buttle Lake, and Strathcona Park.
70.	Cowichan Lake, Port Renfrew, and Jordan River.
71.	Klinaklini River Headwaters.
72.	Head of Knight Inlet.
73.	Dease Lake. (½ in.=1 mile.)
74.	Taku River, Cassiar District. (½ in.=1 mile.)
75.	Iskut River and Lower Stikine River. (½ in.=1 mile.)
76.	Klehini River and Rainy Hollow. (½ in.=1 mile.)
77.	Houston and Morice River.
78.	Teslin Lake. (½ in.=1 mile.)
79.	Dease River and McDame Creek. (½ in.=1 mile.)
80.	Burns Lake and West End of Francois Lake.
81.	Seymour Inlet and Wakeman River.
82.	Head of Rivers Inlet and Owikeno Lake.
83.	Bella Coola Valley.
84.	Work Channel and Nass Bay.
85.	Francois Lake and East End of Ootsa Lake.
86.	Lower Fraser Valley, Chilliwack to Hope.
87.	Yale to North Bend.
88.	Lytton, Spences Bridge.
89.	Ashcroft and Thompson River Valley.
90.	Kamloops and North Thompson River.
91.	South Thompson River, Salmon Arm, and Shuswap Lake.
92.	Sicamous, Shuswap Lake, and Mabel Lake.
93.	Adams Lake, Seymour Arm, and Shuswap Lake.
94.	Seymour River and Columbia River Valley North of Revelstoke.
95.	Illecillewaet River, Glacier Park, and Donald.
96.	Golden, Columbia River, and Kicking Horse River.
97.	Muskwa, Prophet, and Sikanni Chief Rivers. (½ in.=1 mile.)
98.	Nig Creek, Sikanni Chief, and Beatton Rivers. (½ in.=1 mile.)
99.	Headwaters of Moberly River and parts of Peace and Pine Rivers.

No.	Title of Reference Map.
100.	Skeena and Kitsumgallum River Valleys.
101.	Skeena River Valley, Vanarsdol, and Dorreen.
102.	Manson Creek and Omineca River.
103.	Victoria and vicinity. (2 in.=1 mile.)
104.	Saanich Peninsula and adjacent Islands. (2 in.=1 mile.)
105.	Galiano and Saturna Islands. (2 in.=1 mile.)
106.	Nanaimo, Gabriola Island, Roberts Creek, and Trail Bay.
107.	Headwaters of Elk and Palliser Rivers, East Kootenay.
108.	Nanaimo River, Nanoose and Qualicum Beach.
109.	Euchiniko and Batnuni Lakes.
110.	Kechika and Turnagain Rivers.
111.	Moose and Yellowhead Lakes.
112.	Lower Post, Liard, and Kechiko Rivers.
113.	Gardner Canal, Ursula Channel and Graham Reach.
15–0.	Upper Elk and White River Valleys.
15–9N.	Fernie and Crowsnest vicinity.
15–9S.	Elko and vicinity.
16–9N.	Kootenay River Valley and Cranbrook.
16–9S.	Moyie River Valley.
17–0N.	Duncan River and Gerrard.
17–0S.	Duncan Lake and North End of Kootenay Lake.
17–9N.	Kootenay Lake, vicinity of Kaslo.
17–9S.	Nelson, Salmon River Valley, and South End of Kootenay Lake.
18–9N.	Edgewood and Slocan River Valley.
18–9S.	Rossland and South End of Lower Arrow Lake.
18–20.	Nakusp and Upper Arrow Lake.
21–23.	Columbia and Windermere Lakes.
27–29.	Columbia River Valley, Wilmer and Spillimacheen.
30–32.	Columbia River and Upper Arrow Lake.

NOTE.—These reference maps show lands alienated and applied for, "Timber Limits," "Coal Licences," etc., surveyed and unsurveyed. They are compiled from all available data and are constantly being amended, and their accuracy is therefore not guaranteed. They were prepared originally for departmental use, and, having proved of value to the public, prints of same are now on sale.

The above maps are on the scale of 1 mile to 1 inch, except where otherwise noted. BLUE prints and OZALID prints can be obtained for the sum of $1 each. (OZALID prints have deep brown lines on a white background.)

Orders, or inquiries, should quote the map number, and be addressed to:—

SURVEYS DIVISION, LANDS DEPARTMENT, VICTORIA, B.C.

Victoria, B.C., January 1st, 1945.

REPORT OF AERIAL PHOTOGRAPH LIBRARY.

By W. J. H. Holmes.

Number of aerial views on file, December 28th, 1944:—

Royal Canadian Air Force (A.)	75,586
Royal Canadian Air Force (B.A.)	1,620
Western Canada Airways (W.C.A.)	6,238
Mackenzie Air Service (M.A.S.)	1,473
Canadian Airways, Ltd. (Alaska Highway obliques)	94
British Columbia Forest Branch (B.C.)	23,603
Total	108,614

Aerial views received and taken on file during 1944: Royal Canadian Air Force, *nil;* British Columbia Forest Branch (B.C.), 2,190; and, in addition, 443 (A.) and (B.C.) duplicate prints were received.

During 1944, 6,093 photos were issued on loan and 9,091 were returned.

There are at present (December 28th, 1944) 5,625 photos (aerial) out on loan.

Views were issued as required by the various branches of departments of the British Columbia Government and to the Royal Canadian Air Force and Royal Canadian Naval Service, and, to a limited extent, to surveyors and others of the general public.

Topographic Survey Ground Views.—There are on file the ground views taken by the Topographic Survey Branch from 1914 to 1944, and estimated to number something over 36,000, also the corresponding photographic plates.

Aerial photo index maps number 95 and Topographic ground photo index maps 73.

GEOGRAPHIC DIVISION.

By G. G. Aitken, Chief Geographer.

Maps.

Published.

Name.	No. of Copies.	Date of Issue.	Dept. Map No.	Scale.	Area in Sq. Mi.
Fort George Pre-emptors' Map	5,500	May, 1944	3A	3 m. to 1 in.	9,350
Highway and Travel Map of British Columbia	4,000	Sept., 1944	PWD	20 m. to 1 in.	.....
Peace River Block	1,000	July, 1944	3Q	4 m. to 1 in.	9,600

In Course of Printing.

Wall Map of British Columbia in four sheets	4,000	April, 1945	1A	1/1,000,000–15.78 m. to 1 in.	366,255
New Peace River Pre-emptors' Map	5,000	April, 1945	3E	4 m. to 1 in.	17,000

In Course of Preparation.

Nelson Degree Sheet	.....	.....	4B	2 m. to 1 in.	3,050
Duncan Degree Sheet	.....	.....	4F	2 m. to 1 in.	3,100
Fernie Degree Sheet	.....	.....	4D	2 m. to 1 in.	3,050
New Northern British Columbia	.....	.....	1H	1/1,000,000–15.78 m. to 1 in.	200,600

Geographic Board of Canada, Naming and Recording.

Number of map sheets checked	22
Number of names checked	1,928
Number of new names recorded	551

Geographical Work for Other Departments, National Defence and Public.

Thirty-seven items, receipts and value of work	$626.31

Map Stock and Distribution.

Maps issued to Departments and public	15,598
Maps received into stock	12,453
Total value of printed maps issued	$4,815.33
Revenue from printed maps	$3,690.56

Photostat.

Total number of photostats made	3,620
Revenue from Departments and public	$1,865.75
Value of photostats for Lands Department, etc.	$834.50

Letters.

Letters received and attended to	1,857

Standard Base Map.

Peace River Pre-emptors' Sheet, compiled complete	1
Nelson Degree Sheet, revision complete	4
Duncan River Degree Sheet, lots and topography complete	4
Standard Base Map, skeleton sheets compiled	5
School districts plotted from description	11

Triangulation.

Main, by least square adjustment, triangles adjusted	461
Secondary, by rectangular co-ordinates, stations	285
Triangulation index maps	10
Index-cards, records	715
Control nets supplied	44

Notes.

Fourteen control nets supplied in answer to requests from Canadian armed forces.

Fifty triangulation stations determined for Canadian Hydrographic Service.

At the close of the year 1944 there were 9,986 triangulation index-record cards on file.

Résumé.

C. R. W. Leak, D.L.S., returned veteran, was appointed as draughtsman, March 18th, 1944.

S. Wright, B.C.L.S., was appointed as temporary draughtsman, April 3rd, 1944.

D. B. Young was appointed as apprentice draughtsman (war replacement), July 1st, 1944.

R. H. Simmons, draughtsman, was retired on superannuation, July 31st, 1944. His service with the Department of Lands commenced June 7th, 1910.

Alan C. Horwood, apprentice draughtsman (war replacement), enlisted November 1st, 1944.

R. S. Butt, returned veteran, was appointed as apprentice draughtsman (war replacement), November 20th, 1944.

LIST OF LITHOGRAPHED MAPS.

Map No.	Year of Issue.	Title of Map.	Scale, Miles, etc.	Per Copy.	Per Dozen.
		GEOGRAPHIC SERIES—			
*1A	1944	Wall Map of British Columbia. In four sheets. Roads, trails, railways etc.	1 : 1,000,000 15.78 m. to 1 in.	$1.50	$14.00
1A	1933	Wall Map of British Columbia. In four sheets. Roads, trails, railways, etc. Showing Electoral Districts, Redistribution 1932, with 1934 Amendment	1 : 1,000,000 15.78 m. to 1 in.	2.00	20.00
1CX	1937	British Columbia. In one sheet. Showing Land Recording Districts	50 m. to 1 in.	Free	1.50
1E	1930	Kootenay, Osoyoos, and Similkameen	7.89 m. to 1 in.	.50	4.00
1G	1916	Cariboo and adjacent Districts	7.89 m. to 1 in.	.50	4.00
1H	1943	*Northern British Columbia, Special Mineralogical Data*	15.78 m. to 1 in.	.50	4.00
1JCA	1923	British Columbia. In one sheet. Showing rivers, railways, main roads, trails, parks, distance charts, etc., and precipitation	31.56 m. to 1 in.	.50	4.00
1JC	1937	Ditto ditto and Land Recording Districts	27 m. to 1 in.	.50	4.00
1JD	1937	Ditto ditto and Mining Divisions	27 m. to 1 in.	.50	4.00
1JE	1937	Ditto ditto and Assessment and Collection Districts	27 m. to 1 in.	.75	6.00
1JCF	1943	Ditto ditto and Electoral Districts, Redistribution 1938	27 m. to 1 in.	.75	6.00
1JGL	1937	Ditto ditto and Land Registration Districts	27 m. to 1 in.	.75	6.00
1JGC	1937	Ditto ditto and Counties	27 m. to 1 in.	.75	6.00
1K	1925	South Western Districts of B.C., Commercial and Visitors. (Economic Tables, etc., 1929.)	7.89 m. to 1 in.	.50	4.00
1L	1940	Central British Columbia (contoured 1,000-ft. interval)	15.78 m. to 1 in.	.50	4.00
		LAND SERIES—			
2A	1938	Southerly Vancouver Island	4 m. to 1 in.	.50	4.00
2B	1914	New Westminster and Yale Districts	4 m. to 1 in.	.50	4.00
2C	1929	Northerly Vancouver Island	4 m. to 1 in.	.50	4.00
2D	1923	Powell Lake	4 m. to 1 in.	.50	4.00
2E	1924	Bella Coola (preliminary)	4 m. to 1 in.	.50	4.00
2F	1927	Queen Charlotte Islands, Economic Geography (preliminary)	4 m. to 1 in.	.50	4.00
		PRE-EMPTORS' SERIES—			
3A	1944	Fort George	3 m. to 1 in.	One map of "series" free. Additional sheets, 25c. each.	2.00
3B	1942	Nechako	3 m. to 1 in.		2.00
3C	1940	Stuart Lake (contoured)	3 m. to 1 in.		2.00
3D	1937	Bulkley	3 m. to 1 in.		2.00
*3E	1945	Peace River (contoured)	4 m. to 1 in.		2.00
3F	1934	Chilcotin	3 m. to 1 in.		2.00
3G	1935	Quesnel (contoured)	3 m. to 1 in.		2.00
3H	1931	Tete Jaune	3 m. to 1 in.		2.00
3J	1942	North Thompson	3 m. to 1 in.		2.00
3K	1938	Lillooet	3 m. to 1 in.		2.00
3M	1929	Prince Rupert	3 m. to 1 in.		2.00
3P	1924	Grenville Channel (preliminary)	3 m. to 1 in.		2.00
3Q	1936	Peace River Block	4 m. to 1 in.		2.00
		DEGREE SERIES—			
4A	1927	Rossland (contoured)	2 m. to 1 in.	.50	4.00
†4B	1945	Nelson (contoured)	2 m. to 1 in.	.50	4.00
4C	1936	Cranbrook	2 m. to 1 in.	.25	2.00
†4D	1946	Fernie	2 m. to 1 in.	.....	.....
4E	1925	Upper Elk River	2 m. to 1 in.	.25	2.00
†4F	1945	Duncan	2 m. to 1 in.	.....	.....
4G	1943	Windermere	2 m. to 1 in.	.25	2.00
4H	1926	Arrowhead	2 m. to 1 in.	.25	2.00
4J	1921	Vernon (contoured)	2 m. to 1 in.	.50	4.00
4K	1923	Kettle Valley (contoured)	2 m. to 1 in.	.50	4.00
4L	1926	East Lillooet, Economic Geography (contoured)	2 m. to 1 in.	.50	4.00
4M	1927	Nicola Lake (contoured)	2 m. to 1 in.	.50	4.00
4N	1930	Penticton (contoured)	2 m. to 1 in.	.50	4.00
4P	1931	Lower Fraser Valley (preliminary)	2 m. to 1 in.	.50	4.00
4Q	1939	Hope-Princeton (contoured)	2 m. to 1 in.	.50	4.00
		TOPOGRAPHICAL SERIES—			
5A	1916	Omineca and Finlay River Basins, Sketch-map of	5 m. to 1 in.	.25	2.00
5B	1929	Howe Sound-Burrard Inlet (contoured), South sheet (special)	½ m. to 1 in.	.50	4.00
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		MINERAL REFERENCE MAPS—PRINTED.			
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MRM3	1928	Lardeau River	1 m. to 1 in.	.50	4.00
MRM4	1929	Nelson-Ymir	1 m. to 1 in.	.50	4.00
MRM5	1929	Rossland-Ymir	1 m. to 1 in.	.50	4.00
MRM6	1932	Grand Forks-Greenwood	1 m. to 1 in.	.50	4.00
MRM7	1934	Greenwood and Osoyoos	1 m. to 1 in.	.50	4.00
MRM8	1935	Barkerville and Lightning Creek	1 m. to 1 in.	.50	4.00
		MISCELLANEOUS—			
PWD	1944	Highway and Travel Map of B.C.	20 m. to 1 in.	.35	2.50
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	1930	GEOGRAPHICAL GAZETTEER OF BRITISH COLUMBIA	.....	1.50	12.00

* In course of printing. † In course of compilation.

NOTE.—To avoid misunderstanding, applicants for maps are requested to state the "Map Number" of map desired.

Maps listed above can be mounted to order in the following forms: Plain mounted; cut-to-fold any size; with wooden bars top and bottom to hang, etc. Prices upon application.

We can supply information concerning maps of British Columbia printed and published at Ottawa by the Department of Mines and Resources.

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Inquiries for printed maps—Address:—

CHIEF GEOGRAPHER, DEPARTMENT OF LANDS, VICTORIA, B.C. 3rd January, 1945.

TRIANGULATION AND TOPOGRAPHY, COLUMBIA RIVER AND LOWER ARROW LAKE.

By A. J. Campbell, B.C.L.S.

F. C. Green, Esq.,
Surveyor-General, Victoria, B.C.

Sir,—I have the honour to submit the following report of the triangulation and topographical surveys which were, under your instructions dated June 10th, 1944, carried out during the past season.

The primary object of the survey was to cover a gap in the triangulation network of the Province, and, in doing so, connect the geodetic triangulation network along the International Boundary near Trail, B.C., with the Dominion network along the Railway Belt, near Revelstoke. Our part in this was to carry a network northerly from two stations, Lake and Kelly of the International Boundary network, along the Columbia Valley and Arrow Lakes and, in co-operation with N. C. Stewart, B.C.L.S., working to the north of us, connect with a Provincial network in the vicinity of Nakusp, on Upper Arrow Lake, carried south from the Dominion triangulation in the Railway Belt.

Castlegar, being centrally located in the area, was selected as headquarters and the party was organized there on June 20th. The party, consisting of six men, including R. D. Fraser as assistant and H. Ridley of the topographical office, were established in a house at Castlegar, and, due to the difficulty of obtaining a cook, meals were obtained at a restaurant when working out from headquarters. A number of the stations required fly-trips of several days; on these we did our own cooking, taking along as much prepared food as possible.

The work was satisfactorily completed on September 20th, and the party was disbanded and we returned to Victoria.

The original plan, laid down in Victoria, had been to commence the triangulation from the base Kelly-Glory, two stations of the main network along the 49th parallel, established by the United States Coast and Geodetic Survey in 1925. But it was discovered, before leaving for the field, that the geodetic station mark on Old Glory Mountain had been reported lost. A peculiar history then came to light. The reconnaissance party establishing the station in 1925 planted a geodetic bronze tablet to mark the station and also a reference tablet. The observing party, in the same year, reported the station tablet was found but no reference mark. Hence no distance and bearing is given. In 1933 a party of the International Boundary Commission reported that the reference tablet was found but that the station mark must be under a British Columbia forestry lookout cabin built on the summit in 1930. The men who had built the cabin claimed there had been no tablet where it had been erected, but they had been careful not to disturb the reference mark. A search was instituted and the floor of the cabin removed, but no tablet found. On our first visit to Old Glory it was evident that the above was correct and as the reference was in a position to make it useless as a station, we established our own and set a British Columbia brass bolt somewhat north of the cabin. On occupation later we tied to the reference mark and the cabin, and it is certain that the site of the original station mark is under the cabin. This is the third geodetic station mark that the writer has encountered in three years affected, in some way, by forestry lookout cabins.

With this exception, the original main system was carried out to the letter. And with the addition of two points used as main stations, two ways of calculating from the base Kelly-Lake to our stations Union-Sangrida, half-way up and straddling Lower Arrow Lake. Included was our point on Glory Mountain given the station name of Glory A to distinguish from the geodetic and also the Provincial station on Mount

Faith, one of a net extending easterly from the Okanagan. The two stations, Union and Sangrida, were used by Mr. Stewart in carrying the triangulation northward.

From the main stations breakdown systems were laid out to tie to points in the valley and lake-shore. The hydrographic bench-marks at the bridge over the Columbia at Trail, Birchbank, and Castlegar were tied, as also precise level bench-marks on the Rossland Branch of the Kettle Valley Railway and several along the main line from Castlegar as far west as Coykendahl. The ties to the cadastral surveys mentioned in your instructions or suitable substitutions were all made, mostly by direct triangulation. In respect to iron posts set by Mr. McLatchie along the railway our information was that these have largely disappeared. We were fortunate in being able to locate a pair near Kinnaird in a position to be readily fixed by triangulation and also two posts of the same series, but not a pair, near Coykendahl. These were fixed by traverse from one of our stations close to the track.

British Columbia triangulation brass bolts cemented in holes drilled in solid rock were set at all the newly established main stations and at many of the minor ones. Where practical the points were further marked by one or more bearings trees. The geodetic bronze tablets on Kelly and Lake were found to be in perfect condition as was the British Columbia brass bolt on Mount Faith. Some of our stations occupied as camera stations were marked only by drill-holes in the solid rock.

At many of the stations and at stations established for the purpose photographs were taken with a survey camera. These views were taken to cover the Columbia Valley and that of Lower Arrow Lake and will be useful in any future mapping or work that may be undertaken. In all, some sixty stations were occupied and twenty-four dozen plates exposed.

Wild Universal theodolites, reading to seconds, were used exclusively and all angles at the main triangulation stations were read at least six times, and more often twelve, depending on visibility and the closures obtained. In the main system errors in any triangle were well under the ten-second limit.

The season was a wonderful one for our work. The visibility was generally very good and we were able to carry on with a minimum of delay. Much less rain and fewer electric storms were experienced than expected, and except for a hot spell during the latter part of July, during which the heat was rather overpowering, the temperatures were at a comfortable level. According to the residents it was a typical summer. If so, it is one of the best sections of the Province in that respect. We had been warned to expect much delay from the smoke of forest fires but had very little, due probably to good forest protection, as a number of lightning fires were started but were quickly brought under control.

For such a mountainous country it is well served with transportation facilities. Highway No. 3 reaches Rossland from the west over the Cascade Road, not a particularly good piece, but from Rossland the highway is over a good paved road down to Trail and up the east side of the Columbia to Castlegar and crossing the Columbia by cable ferry, up the Kootenay Valley to Nelson and the east. Rossland also is connected with Northport, in the State of Washington.

The main line of the Kettle Valley Railway passes through Castlegar on its way from Vancouver to Nelson and the east. A branch line runs down the Columbia Valley to Trail and on up to Rossland. Castlegar is a surprisingly busy junction due to the many freight trains to and from the Trail Smelter. For fifty years the S.S. "Minto" has been, and still is, plying the waters of the Arrow Lakes from Robson at the foot to Arrowhead at their head. This was the original transportation route into the country.

These are the main transportation routes—but there are other roads. Trail is connected by one down the east bank of the Columbia to the Pend d'Oreille Valley and on beyond. A branch from this runs up the Beaver River Valley to Fruitvale and on

to Salmo, Ymir, and Nelson. A 13-mile long road leads from the Castlegar ferry along the north shore of the lake through East Robson and on to Syringa. The original road connection between Castlegar and Nelson was by way of a road up Pass Creek and around north of Sentinel Mountain to the Slocan Valley, near its junction with the Kootenay, and hence to Nelson. This is somewhat neglected now but still passable.

These roads are all shown on existing maps but there are others which were of great assistance to us in reaching our stations. One such road, north from Rossland for 7 miles to an old mill, was used in reaching Old Glory Mountain. From the old mill a horse-trail leads to the summit, another 7 miles. There is no question of this route being kept open and improved, for, as well as the forestry lookout cabin occupied for three or four months, a meteorological station has just been completed, practically on the summit, to be occupied all the year. Another station was reached with the help of a road up China Creek, a very steep and rocky 5 miles. Aaron Hill, one of our main stations east of the Columbia, was reached from a road branching off the Beaver River Road at Ross Spur, 7 miles above Fruitvale. This road runs for 10 miles up Beavervale Creek to a small sawmill. Beyond the mill branch logging-roads reach out in different directions. One of these comes very close to our station. This is a remarkably good road of its kind. The logging-road of the Waldie & Sons mill at Castlegar running back north-westerly into the hills was, after obtaining permission, used and proved a great help in reaching the rather distant station on Ladybird Mountain.

This is and has long been a well-known area and there are forest, mines, agriculture, and other reports available to any one interested so, in this report, there is no attempt at such as is the usual practice.

In respect to game, a considerable number of deer were seen and seem to be plentiful in the back areas. Grouse were noted over the whole area but did not appear to be numerous. Some black bear were also seen, but the scarcity of the usual signs would indicate they were not numerous.

Good fishing is reported in the Arrow Lakes at some seasons, and also in the smaller lakes among the hills, but our attempts were not very successful.

A detailed description of the routes to the main triangulation stations, and of the more important minor, will be presented with the other returns.

TRIANGULATION AND TOPOGRAPHY, ARROW LAKES AND COLUMBIA RIVER, EDGEWOOD TO NAKUSP.

BY N. C. STEWART, B.C.L.S.

F. C. Green, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report on the triangulation and topographical surveys carried out under your instructions during the 1944 field season. The work consisted chiefly of the extension southerly of the existing Provincial triangulation network in the vicinity of Nakusp, on the Upper Arrow Lake, to join up with the triangulation surveys being extended northerly from the International system near Trail by Mr. A. J. Campbell, B.C.L.S. In addition to the main network, secondary stations were established along both the Upper and Lower Arrow Lakes and the river joining them. Ties were frequently made to the cadastral surveys, and photos covering the easterly side of the valley were taken, the purpose of the survey being to establish a certain amount of control within easy reach of the shores of the lakes as a preliminary to topographical work which will be required in the future hydro-development of the Columbia River drainage system.

Field headquarters were established at Edgewood, on the Lower Arrow Lake. The party consisted of R. C. Mainguy, B.C.L.S., five helpers, and a cook. A light delivery, six horses, and a small boat with an outboard motor provided ample means of transportation. Field-work commenced on June 22nd and ended on September 12th.

PHYSICAL FEATURES.

The area covered by the survey extends from Saddle Mountain, opposite Nakusp, to O'Leary Mountain, some 15 miles below Edgewood, with an east-west width of about 25 miles, 10 miles of which lies east of the Columbia River and its widenings, the Upper and Lower Arrow Lakes.

This is a very mountainous country. The mountain masses or ridges, lying generally in a north and south direction, are separated by three deep and narrow valleys; the most easterly valley contains the Upper Arrow Lake, the middle valley west of Saddle Mountain is drained by that part of the Columbia River from Arrow Park to Burton, and includes Arrow Park Creek on the north and Burton Creek on the south, and the westerly valley contains the Lower Arrow Lake and the Whatshan Lakes and River. The waters of the Columbia cross from the easterly to the westerly valley by almost right-angled bends. The more important tributaries of the Columbia in this area are Slewiskin, Cariboo, and Snow Creeks from the east, and Whatshan, Inonoaklin, Eagle, Worthington, and Johnston Creeks from the west. The mountains east of the Columbia are very rugged and reach a height well over 9,000 feet in the spectacular peaks of the Valhalla Mountains. West of the river the mountains are more rounded in character and of lesser height, rising at Mount Scaia to 7,425 feet above sea-level.

The altitude of the Upper Arrow Lake at Nakusp is 1,390 feet, the lower lake being about 7 feet lower. There is a difference up to 30 feet between high and low waters, and hence during most of the year there are extensive beaches along the lakes.

FORESTS.

Considerable areas of commercial timber are found along the Arrow Lakes. The forest-growth resembles that on the Pacific Coast, the varieties being the same but the trees do not grow as large. The undergrowth is quite dense, including devil's-club, but no salal. The commercial varieties are red cedar, Douglas fir, hemlock, white pine, balsam, birch, cottonwood, and spruce. In this area timber-line is around 7,000 feet above sea-level, so that commercial timber is found quite high up. I saw red cedar and Douglas fir over 4 feet in diameter at 5,000 feet altitude. Non-commercial varieties include aspen, poplar, alder, lodge-pole pine, maple, yew, and cypress. Willow, soopolallie, buck-brush, and wild rhododendron provide the underbrush. Wild fruits are plentiful—cherries, saskatoons, huckleberries, blueberries, elderberries, high-bush cranberries, salmon-berries, strawberries, and raspberries. Wild flowers are found everywhere and in great quantities, especially along the shore of the Arrow Lakes and in the alpine country near timber-line.

Logging operations here are usually on a small scale and selective; hence many of the logged-off areas when viewed from the mountain-tops show little signs of being denuded. However, the slopes of the mountains are scarred by many forest fires which are started by the numerous lightning storms in this vicinity.

MINERALS.

This area was thoroughly prospected during the late nineties, minerals of economic value (chiefly gold, silver, and copper) being discovered on Cariboo and Snow Creeks, near Burton, in the Lightning Peak country, and also around the headwaters of the Kettle River. Considerable work was done on a property across the lake from Edge-

wood. Some placer gold was taken from Cariboo Creek, but there was practically no mining in this area during the present year.

GAME.

This is a good game country. Deer were very plentiful, both white-tail and mule deer. We saw numerous black bear at low altitudes. Grizzlies were seen on Silver and Scalping Knife Mountains, and much evidence of them on or near the tops of other mountains. Considerable fur is trapped here, consisting of lynx, coyote, wolverine, marten, mink, and skunk. Other small animals such as squirrels, gophers, rabbits, chipmunks, marmots, and coneys were quite numerous. Game birds—blue and willow grouse, spruce partridge, geese, and ducks—were also quite plentiful. Good fishing is to be had in the Arrow Lakes, Whatshan Lakes, and tributary streams, especially Cariboo Creek, the varieties being Dolly Varden, rainbow trout, and red fish, or kokanees.

CLIMATE.

The weather was exceptionally good for our work, with sufficient rain-storms to keep down forest fires and to free the air from dust and smoke. The summer storms are usually accompanied by thunder and lightning, the latter often striking and setting the forests ablaze. The summer storms are evidently prevalent, for very little irrigation is practised in this valley. Although there are hot spells during daytime, the nights are always cool. In winter snow on the ground is around 18 inches deep along the lake and the temperature may go to zero or sub-zero for a short time. It is quite a good climate.

ACCESSIBILITY.

C.P.R. stern-wheel steamers have served the Arrow Lakes since the early nineties. The S.S. " Minto " has been about forty-eight years in service between West Robson and Arrowhead and is still going strong.

Highway No. 6 from Vernon over the Monashee Mountain crosses the Lower Arrow Lake by a good ferry at the Needles, and then continues up the east side of the valley to Nakusp and then on to Nelson. A branch road follows down the Inonoaklin Valley to Edgewood, on the Lower Arrow Lake, and then northerly along the lake, joining the main highway below the Needles. From the Needles a branch road follows the lake northerly for about 7 miles, but the last 4 miles are very difficult, and also from the Needles there is a good road into the summer resort on the lower end of Whatshan Lakes. From Burton an old mining-road leads up Cariboo Creek about 10 miles; the upper part of this road is in very poor condition, many of the small bridges being dangerous. Another ferry at Arrow Park connects the highway with a road extending along the west side of the valley from a point opposite Burton to West Demars, near the lower end of Upper Arrow Lake. An indifferent mining-road branches from Highway No. 6 about 22 miles west of Edgewood and goes to the mines in the Lightning Peak country.

There are numerous pack-trails in this area, some of these were built by the early prospectors and trappers and others by the Forestry Branch for forest-protection purposes. We used quite a number of these trails after doing some work on them, clearing fallen trees. Included in those used by us are the trail to Mount Scaia from the Lightning Peak road; the trail up the Kettle River from Highway No. 6 to Keefer Lake; the trail from Edgewood to Mount O'Leary, locally known as the Johnston Creek trail; forestry trails to Whatshan Lookout from the Needles, and Saddle Mountain Lookout from West Demars; another forestry trail to top of Scalping Knife Mountain from the highway about 2 miles north of Burton; and a trappers' trail from a point about 2 miles south of Burton to Alpine country on Naumulten Mountain. In addition, we used a

very good mining-trail up Cariboo Creek, from the end of the mining-road already mentioned, to the Black Bear mine, and then on to Silver Mountain.

INDUSTRIES.

Farming is the chief industry in this area. The lower part of the Inonoaklin Valley contains some very fine farms growing hay and grain, raising stock and dairy products. From Edgewood north to Nakusp on both sides of the Columbia Valley there are many farms, but south of Edgewood there is little or no land suitable for farming. These farms produce both dairy products and fruit, but many of the orchards have been neglected, the owners experiencing difficulty in marketing the fruit. On the other hand a cheese-factory at Edgewood and a creamery at Nelson provide a ready market for milk and cream. However, judging from the orchards that have been looked after, it is evident that this district is well suited for fruit-growing. Potatoes and other vegetables also grow well. More intensive farming could be undertaken, aided by irrigation, for there are numerous streams that could be harnessed for that purpose. There are still some areas that could be cleared and put under cultivation.

Logging is next in importance. Mills at Nakusp and Castlegar have been in operation since the nineties. Red cedar, white pine, Douglas fir, hemlock, and spruce are the chief varieties used for sawlogs. Red cedar poles and fence-posts and, since the war, birch and cottonwood logs, have been in demand.

The whole area is divided into trap-lines. Fair catches of marten and lynx are made.

There are many points of interest for tourists; splendid scenery, good fishing, hunting, and boating. Edgewood, on the Lower Arrow Lake, is nicely situated near the mouth of Inonoaklin Creek; it has two general stores, but no hotel, the hotel having recently burned down. A waterfall on the Inonoaklin, a short distance from Edgewood, is well worth a visit. There are stopping-places and a general store at the Needles. Here again on Whatshan River there are several picturesque waterfalls. Burton, originally called Burton City in the early mining-days, is now the centre of a considerable farming district. It has an hotel and two general stores. From Burton one can get a good view of some of the high peaks of the Valhalla Mountains to the east. At Arrow Park there are two stores; this is the centre of quite a farming area, and up Arrowpark Creek considerable logging operations are being carried on. Nakusp is a well-established place with, among other things, a good hotel, hospital, and high school. From Nakusp one gets a fine view of Upper Arrow Lake and of Saddle Mountain, which rises some 6,000 feet above the lake.

TRIANGULATION CONTROL SURVEY, FOLLOWING THE BEAR AND DRIFTWOOD RIVERS AND TAKLA LAKE, CASSIAR DISTRICT.

BY HUGH PATTINSON, B.C.L.S.

F. C. Green, Esq.,
Surveyor-General, Victoria, B.C.

SIR,—I have the honour to submit the following report on the above survey carried out by me, under your instructions dated May 29th, 1944.

The object of the survey as defined in your instructions was the extension south-easterly from stations " Twister " and " Mosque " of my season 1943 triangulation, for the purpose of obtaining a rigid connection with stations of the Geodetic Survey of Canada, situated in the vicinity of Endako.

At the same time, my instructions directed me to tie in existing cadastral surveys wherever economically possible and also to connect with at least one mile-post of the 55th parallel of latitude.

Further to the above, I was instructed to collect information having a bearing on a possible road route designed to connect Yukon and Alaska with the British Columbia road system.

The party, comprising my assistant, W. H. Forrest, B.C.L.S., and seven men, was organized at Fort St. James. Indians were employed at intervals for short periods and their knowledge of hunting-trails giving access to the mountains saved considerable travelling-time for the party. Twelve horses were obtained from J. O. (Skook) Davidson and the pack-train was in charge of J. Rasmussen, of Vanderhoof. For lake and river transportation a light 26-foot cedar boat was used. This boat was taken up the Driftwood River and skidded over the portage to Bear Lake. The boat was powered with a 16-horse-power Evinrude engine.

The party left Fort St. James on June 3rd and commenced survey operations on June 5th. It was noticed that many of the mountains to the north were still covered with snow, so it was decided to spend the first month of the season in the southern portion of the region before proceeding north across the Sustut River. The first main camp was located at Bulkley House, at the head of Takla Lake, and a number of main stations were established and occupied on the surrounding mountains. Survey operations were carried on continuously until September 29th, when heavy snowfalls in the mountains and general bad weather conditions made it advisable to terminate the field season.

The general direction of the triangulation was south-easterly, following the Bear and Driftwood Rivers and Takla Lake. The network, using a system of quadrilaterals, was extended approximately 120 miles, the last main stations occupied being in the vicinity of the 55th parallel of latitude, which crosses the Middle River near the mouth of Natazutla Creek. A tie was made to Mile-post 55 of said parallel, and existing stations Fulton, Nation, and Tsi-Tsult were cut in from several main stations. Fulton is a secondary station of the Geodetic Survey of Canada and is on Matzehtzel Mountain, west of Babine Lake.

Connections were made to existing cadastral surveys as follows:—

Lot 4701, Indian Reserve in vicinity of Bulkley House.
Lot 5849, Beatrice Mining Claim, Driftwood Mountain.
Lot 4699, Indian Reserve near mouth of Kastberg Creek.
Lot 4700, near mouth of Kotsine River.
Lot 4726, Indian Reserve at north end of Bear Lake.
Lot 5667, in vicinity of Takla Landing.

Nineteen mountain stations with average elevations between 6,000 and 7,000 feet were occupied. Only one station, " Kettle " (7,280 feet), topped the 7,000-foot contour. This station is on the highest point of the Kettle Glaciers, which is also the highest point of the divide between the Omineca River and Bear Lake. Ten low stations were occupied, these being established mainly for the purpose of obtaining connections to existing cadastral survey monuments and lake triangulation stations. These low stations are generally convenient to the main trails and should provide fairly precise elevations at intervals along the main valleys or probable future road routes to the region.

ACCESS.

A regular boat service is maintained between Fort St. James and Takla Landing by Dave Hoy, who handles mail, passengers, and freight. Canadian Pacific Airways planes made frequent calls at Takla Landing and numerous chartered flights to Thutade,

Bear, and other lakes scattered throughout the region, but as far as I have been able to ascertain there is no regular plane schedule.

The land route most generally used is by the road which connects Manson Creek and Germansen Lake with the Provincial highway system at Vanderhoof. There is a truck-road from Takla Lake to Old Hogem, on the Omineca River, and a good trail from Germansen Lake connects with this road at Tom Creek. A pack-trail used extensively by the Indians runs from Hazelton to Fort Babine and continues easterly to West Landing on Takla Lake. There are various other passable pack-trails giving access from Telegraph Creek, Fort Graham, and Ware, on the Finlay, and other points where trading-posts have been established for the convenience of the very scattered population of Indians, trappers, and prospectors.

PHYSICAL CHARACTERISTICS.

The area covered by the season's operations consists mainly of a series of short broken spurs and mountain ranges, the highest points of which are generally between 6,000 and 7,000 feet above sea-level. The principal rivers are the Driftwood and the Bear, which receive most of the run-off from these ranges. The Bait Range, Driftwood Mountains, and the Tsaytut Spur extend north-westerly along the west side of Driftwood River and Bear Lake, while on the east side are a number of disconnected mountains running north-westerly from Bodine Mountain and terminating with the Connelly Range at the Sustut River. The Kettle Glaciers are the highest and most rugged of these mountains. Bear Lake is about 12 miles long with an average width of about three-quarters of a mile. The mountains on each side are high and rugged, rising immediately from the shore to altitudes from 4,000 to 5,000 feet above lake-level.

The Bear River, which flows out of Bear Lake, is a short, swift-flowing stream and is not navigable even for canoes, except perhaps during the period of extreme high water. It flows into the Sustut River, about 8 miles below Bear Lake, and thence to the Skeena waters. The Driftwood River, which is the main feeder of Takla Lake, heads in the high glaciated mountains west of Bear Lake, the principal peaks of which are Mount Peteyaz and Mount Coccola. It is a fairly swift-flowing stream, but has no bad rapids and is navigable with canoes and light boats powered with outboard motors. There are stretches where the water is shallow with many boulders and some log-jams, and in such places it is better to resort to the more arduous method of poling, rather than risk damaging the engine. The straight-line distance from headwaters to mouth is about 40 miles, but at least 10 miles should be added to this distance to cover the extremely serpentine course which it pursues. Its main tributaries are Kotsine River and Kastberg Creek. The former heads in the Driftwood Mountains and Bait Range and empties into the Driftwood River from the west about 11 miles above Bulkley House. The latter heads near the Kettle Glaciers and flows south-westerly, emptying into the Driftwood near the Kastberg Indian Reserve. Another tributary, Lion Creek, has its head in Nanitsch Lake to the east of Scallop Mountain. It is a wild, turbulent stream with a large spring run-off and is difficult to ford at high-water periods, though quite easy at other stages of water. At the trail-crossing the bed is strewn with large boulders, making poor footing for horses. It enters the Driftwood from the east about 6 miles north of Takla Lake.

The largest body of water within the area of operations is Takla Lake. A triangulation of this lake was made by F. C. Swannell, B.C.L.S., and it has been described in several reports. It is some 56 miles in length with an average width of about 1¾ miles. Between the head of the lake and Takla Landing the mountains on each side are some distance back from the lake, leaving considerable areas of timbered flats and benches. Below the landing the mountains generally rise steeply from the shore-line and there is very little level country to be seen. The North-west Arm, 19 miles long,

joins the main lake about 11 miles above the head of Middle River. Between the main lake and the North-west arm the mountains are very precipitous and rise directly from the shore-line.

FOREST-COVER.

There is a fairly heavy coverage, consisting chiefly of the coniferous varieties, spruce being the most common, with jack-pine prevalent on the gravelly benches and drier areas. Alpine balsam predominate above the 4,000-foot contour. Among the deciduous varieties are aspen and cottonwood, with occasional patches of birch. Considerable areas have been ravaged by forest fires, the most extensive of these being east of the Driftwood River, between Scallop Mountain and a round-topped isolated mountain on the summit of which Station "Cougar" was established. The latter mountain is situated close to the Bates Creek trail, at the head of Bates Creek, and would make a good forestry lookout station, as it is easy to climb, handy to the trail, and commands a very fine panoramic view of the surrounding terrain.

Scattered stands of spruce of commercial dimensions were noticed along the valley of the Driftwood River, and also patches of jack-pine suitable for tie-timber. Scattered fir are found along Takla Lake and the North-west Arm of same, and some quite large cottonwood were noticed along the lake-shore.

VEGETATION.

There is a scarcity of pasture land between the Sustut River and Takla Lake, and overnight camps have to be spaced accordingly when travelling with pack-horses. There is an abundance of good feed at the Hudson's Bay Meadow, about 8 miles south of Bear Lake, and also at a camp known as the "Bluff Camp," situated at the foot of a high bluff beside the trail, a short distance south of Kastberg Creek. Good pastures are also found near the mouth of Kotsine River and at the mouth of Driftwood River, in the vicinity of Bulkley House. The above camps have been used extensively for a good many years as pack-train camps, as they are the only points between Takla Lake and Bear Lake where sufficient feed is available convenient to the trail. The alpine meadows and high plateau country produce a variety of wild grasses and the really extensive areas of good summer grazing land are generally above the 3,500-foot contour.

Wild berries were particularly plentiful last season and many hundreds of pounds of huckleberries were gathered by the Takla Lake Indians. Raspberries and both high- and low-bush blueberries were also quite plentiful. Among other varieties noticed were gooseberries, strawberries, black currants, red currants, cranberries, and saskatoons. Small patches of vetch and pea-vine were encountered but, generally speaking, the valley lands between the Sustut River and Takla Lake contain very little grazing land.

GAME AND FUR-BEARING ANIMALS.

Grizzly and black bear were encountered on several occasions. Goat were observed frequently on the higher levels of the mountains, but generally only in small herds of four or five. No sheep were seen during the season, but moose and caribou are plentiful and deer are seen occasionally. Of the more valuable fur-bearing animals trapped are beaver, mink, marten, fox, lynx, muskrat, and wolverine. Wolves roam the region and, although large numbers are trapped each year, they still seem to be on the increase.

Among the game birds found are willow and blue grouse, but these were less plentiful than usual. Ptarmigan are quite numerous in the mountains. Canada geese were noticed in large numbers on the numerous lakes and sloughs and large flocks were seen to alight around the mouth of the Driftwood River and along Middle River.

There is excellent fishing in the Bear and Driftwood Rivers, both of which are well stocked with rainbow trout. Salmon travel up the Skeena, Sustut, and Bear Rivers to Bear Lake, where large numbers are smoked by the Indians.

CLIMATE.

There are no records available giving the average annual rainfall over a period of years, but I think the annual precipitation for the last two years would run close to 35 inches. As a general rule, the rainfalls would not be considered particularly heavy when compared with those at the Coast, but showers occur with great frequency throughout the entire summer. On some days the rain was continuous, but usually intermittent showers occurred and the sky remained overcast, with the summits of the mountains obscured by clouds throughout the day.

The wet days, of which there were fifty-two, were distributed throughout the summer as follows: June, nine; July, thirteen; August, sixteen; and September, fourteen.

A fairly heavy snowfall reaching down to timber-line occurred on September 17th. Most of this snow melted quickly, but another fall came on September 24th and the summits were still white with snow when we left the country at the beginning of October.

GENERAL.

The meagre population consists mostly of Indians who are all congregated in two small Indian villages, one situated at the north end of Bear Lake and the other near the Hudson's Bay Post, Takla Landing.

There are two other trading-posts besides the Hudson's Bay Company; one at Bear Lake, run by Carl Hanawald, and another run by Mrs. Aiken at the old landing south of the Takla Indian Reserve. Mrs. Aiken also runs the post-office.

There is a regular weekly boat service during the summer between Fort St. James and Takla Landing.

The few white residents, consisting of trappers, prospectors, and miners, all reside in the vicinity of Takla Landing, close to the stores and Government radio telegraph station.

Pan-American Airways have a radio station situated on the east side of the lake, between the ferry-landing and the point where the road from Old Hogem touches the lake. The United States Army recently took charge of this station.

Canadian Pacific Airways planes alighted on the lake almost daily during the summer and made numerous trips to Thutade, Bear, and other lakes with supplies and equipment for miners and prospectors. Two parties of the Dominion Geological Survey were working in various portions of the region and had their supplies brought in by plane to Bear and Sustut Lakes.

The main source of revenue at present is from the fur, but this will undoubtedly be supplemented later with the development of mining and lumbering.

Consolidated Mining and Smelting Company and Bralorne Mines have mercury properties on Silver Creek, where considerable development-work was carried out during the summer; the former Company also had a party working at Thutade Lake.

No extensive areas of land suitable for agriculture were noticed. The surveyed Indian reserves included most of the good land adjacent to the trail.

Potatoes and all the common vegetables are successfully raised in the gardens in the vicinity of Takla Landing, and good potatoes are also grown by the Indians at Bulkley House and Bear Lake.

Generally speaking, the region is not suitable for agriculture, being for the most part mountainous, with fairly heavy forest coverage. Some scattered areas could be placed under cultivation, and no doubt will be, when road access has been attained and local markets are available, but the future prosperity of the country is more likely to come from the development of mining and lumbering industries than from farming.

There would appear to be no serious engineering difficulties to hinder road-construction along the valleys of the Driftwood and Bear Rivers. There are possibilities for power-development on some of the creeks, as Kotsine River, Kastberg Creek, and Lion Creek all have falls.

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