PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

OF THE

LANDS AND SURVEY BRANCHES

OF THE

DEPARTMENT OF LANDS

FOR THE

YEAR ENDED DECEMBER 31ST, 1939

HON. A. WELLS GRAY, MINISTER OF LANDS

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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1940.

VICTORIA, B.C., October 1st, 1940.

To His Honour E. W. HAMBER,
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 Survey Branches of the Department of Lands for the year ended December 31st, 1939.

A. WELLS GRAY,
Minister of Lands.

VICTORIA, B.C., October 1st, 1940.

The Honourable A. W. Gray,
Minister of Lands, Victoria, B.C.

SIR,—I have the honour to submit the Annual Report of the Lands and Survey Branches of the Department of Lands for the twelve months ended December 31st, 1939.

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., October 1st, 1940.

H. Cathcart, Esq.,
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, 1939.

From an analysis of the figures presented it will be noted that there is practically no difference in the volume of business transacted during the previous year.

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

NEWMAN TAYLOR,
Superintendent of Lands.

STATEMENT OF REVENUE, YEAR ENDED DECEMBER 31ST, 1939.

LAND-SALES.

		Victoria.	Agencies.	Total.
Under "Coal and Petroleum Act"		.....	.....	.....
Under "Taxation Act"—				
Special regulations		$4,404.40	.....	$4,404.40
Under "Land Act"—				
Townsites		390.76	$13,303.18	13,693.94
Country lands		12,196.52	12,599.38	24,795.90
Reverted lands		14,388.56	19,990.48	34,379.04
Pre-empted lands		.....	280.74	280.74
Former Dominion Railway Belt lands		.....	7,452.06	7,452.06
Surface rights of mineral claims		.....	1,489.08	1,489.08
Totals		$31,380.24	$55,114.92	$86,495.16

SUNDRY REVENUE.

Under "Land Act"—				
Sundry lease rentals		$87,989.71	.....	$87,989.71
Grazing rentals		5,870.29	.....	5,870.29
Survey fees—				
Under "Land Act"	$1,344.46			
Under former Dominion Railway Belt lands	235.02			
		279.25	$1,300.23	1,579.48
Sundry fees		16,185.19	1,239.00	17,424.19
Royalty		937.72	.....	937.72
Improvements		105.00	1,542.62	1,647.62
Rent of property		77.00	.....	77.00
Mineral claims		.....	2,147.98	2,147.98
Totals		$111,444.16	$6,229.83	$117,673.99

REVENUE UNDER "COAL AND PETROLEUM ACT."

Coal licences	$3,300.00	.....	$3,300.00
Coal rentals	3,788.43	.....	3,788.43
Sundry fees	6,118.65	.....	6,118.65
Lieu of work	1,450.00	.....	1,450.00
Totals	$14,657.08	.....	$14,657.08

Sundry Receipts.

	Victoria.	Agencies.	Total.
Maps, blue-prints, etc.	$8,445.90	.....	$8,445.90
Miscellaneous	284.44	.....	284.44
Interest, Southern Okanagan Land Project	8,515.37	.....	8,515.37
Revenue from lands transferred from Dominion	10,553.11	$2,204.20	12,757.31
Totals	$27,798.82	$2,204.20	$30,003.02

Summary of Revenue.

Land sales	$31,380.24	$55,114.92	$86,495.16
Land revenue	111,444.16	6,229.83	117,673.99
" Coal and Petroleum Act "	14,657.08	.....	14,657.08
Sundry receipts	27,798.82	2,204.20	30,003.02
Totals	$185,280.30	$63,548.95	$248,829.25

Summary of Cash received.

Revenue	$185,280.30	$63,548.95	$248,829.25
" Soldiers' Land Act "—			
Southern Okanagan Project	36,498.53	.....	36,498.53
Houses, South Vancouver	421.14	.....	421.14
" Better Housing Act "—			
Principal	58,550.00	.....	58,550.00
Interest	24,405.14	.....	24,405.14
Land Settlement Board—			
Land-sales	49,048.74	.....	49,048.74
Loans	39,780.65	.....	39,780.65
Refund of advances and refund to votes, etc.	772.57	.....	772.57
Totals	$394,757.07	$63,548.95	$458,306.02

SALE OF TOWN LOTS DURING 1939.

Disposal of lots placed on the market at previous auction sales:—

8 lots at Vancouver	$3,925.00
16 lots at Oliver	2,550.00
17 lots at Osoyoos	2,050.00
10 lots at Trail	2,080.00
11 lots at Quesnel	990.00
3 lots at Princeton	400.00
4 lots at Kimberley	345.00
9 lots at Atlin	340.00
5 lots at Clinton	225.00
And 49 lots in various townsites	2,044.00
	$14,949.00

During the year auction sales were held at Clinton, Oliver, and Vanderhoof, and in furtherance of same a few lots have since been sold and included in above figures.

Southern Okanagan Project sold 16 parcels, comprising 148.83 acres, the purchase price being $11,595.34.

In the University Hill Subdivision in Lot 140, Group 1, New Westminster District (Endowment Lands), 7 lots were sold at the list price of $12,070.

PRE-EMPTION RECORDS, ETC., 1939.

Agency.	Pre-emption Records allowed.	Pre-emption Records cancelled.	Certificates of Purchase issued.	Certificates of Improvements issued.
Alberni	.....	5	26	.....
Atlin	.....	.....	7	.....
Clinton	37	49	24	16
Cranbrook	6	5	18	2
Fernie	.....	1	13	.....
Fort Fraser	22	35	21	12
Golden	11	15	5	.....
Kamloops	25	40	63	10
Kaslo	.....	2	12	1
Nanaimo	9	16	68	1
Nelson	1	9	113	1
New Westminster	13	36	235	12
Penticton	9	58	49	7
Pouce Coupe	129	176	65	52
Prince George	36	66	48	31
Prince Rupert	7	14	22	.....
Quesnel	61	80	71	18
Revelstoke	18	20	18	3
Smithers	14	19	11	4
Telegraph Creek	.....	1	1	.....
Vancouver	3	15	108	2
Vernon	4	13	33	.....
Victoria	.....	4	797	.....
Totals	405	679	1,828	172

PRE-EMPTION AND HOMESTEAD EXCHANGES.

Under 1934 Amendment to "Land Act."

	No.
1935	41
1936	21
1937	37
1938	10
1939	3
Total	112

LAND-SALES, 1939.

"Land Act"—	Acres.
Surveyed (first class)	1,687.07
Surveyed (second class)	7,373.20
Surveyed (third class)	1,237.80
	10,298.07
Unsurveyed	900.00
Total	11,198.07

PRE-EMPTION INSPECTIONS, 1939.

Agency.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Alberni	3	2	2	.....	.....	1	.....	.....	.....	5	3	1	17
Atlin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clinton	29	.....	.....	.....	2	1	.....	7	20	22	7	49	137
Cranbrook	.....	.....	.....	.....	4	1	.....	6	.....	5	3	.....	19
Fernie	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	3
Fort Fraser	.....	.....	5	1	6	16	15	30	19	17	4	1	114
Golden	.....	.....	.....	.....	.....	13	25	16	3	.....	11	1	69
Kamloops	3	2	1	2	1	39	29	15	26	44	15	7	184
Kaslo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2	4
Nanaimo	20	1	.....	.....	.....	.....	.....	38	12	2	13	4	90
Nelson	5	.....	.....	.....	.....	4	1	1	.....	.....	.....	2	13
New Westminster	24	2	6	10	3	25	15	6	20	7	50	6	174
Penticton	4	.....	.....	3	4	6	8	.....	.....	3	2	5	35
Pouce Coupe	1	99	1	1	28	109	102	30	127	83	19	56	656
Prince George	3	1	3	2	13	29	84	86	41	52	5	2	321
Prince Rupert	.....	.....	.....	.....	.....	.....	.....	.....	9	.....	.....	9	18
Quesnel	5	.....	1	.....	2	18	45	37	5	88	8	43	252
Revelstoke	.....	.....	.....	.....	.....	3	1	.....	.....	56	26	1	87
Smithers	.....	4	.....	.....	1	2	1	8	20	3	.....	1	40
Telegraph Creek	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vancouver	10	2	.....	.....	.....	1	2	5	12	11	12	1	56
Vernon	2	.....	.....	4	8	19	3	1	3	18	12	.....	70
Victoria	1	.....	.....	.....	.....	1	.....	1	1	.....	.....	1	5
Totals	110	113	19	23	72	290	331	287	318	416	192	193	2,364

SUMMARY.

	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.
Pre-emption records	1,624	1,495	969	607	664	559	447	413	451	524
Certificates of improvements	328	217	154	123	196	245	276	217	208	172
Certificates of purchase	1,067	1,152	1,735	1,739	1,452	1,379	1,850	1,831	1,731	1,448
Crown grants	1,827	1,699	1,295	1,074	1,020	1,192	1,316	1,414	1,407	1,636
Total acreage deeded	215,364	163,161	116,990	68,945	173,632	81,110	84,442	71,018	74,175	109,451
Coal-prospecting licences	275	160	236	95	98	102	118	142	104	160
Sundry leases	113	104	122	92	92	121	157	190	195	196
Coal leases	12	6	17	.....	.....	5	17	2	15	19
Revenue received	$428,431.64	$381,860.60	$394,454.43	$346,299.34	$322,440.16	$339,053.79	$404,534.49	$434,213.55	$352,165.35	$618,435.93
Letters received	32,180	28,951	22,857	19,381	15,591	16,901	17,739	19,213	19,140	18,751
Letters sent	19,912	22,372	16,517	14,688	10,936	12,378	15,475	15,537	17,806	14,839

	1930.	1931.	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.
Pre-emption records	934	2,441	1,202	485	478	343	347	416	456	405
Certificates of improvements	124	113	80	63	86	76	107	152	188	172
Certificates of purchase	1,432	1,444	1,254	1,211	1,903	1,490	1,701	1,939	1,817	1,828
Crown grants	1,213	1,027	795	758	1,123	1,211	1,028	1,226	1,063	1,108
Total acreage deeded	62,823	69,542	58,470	58,782	61,296.50	77,373.41	68,608.10	93,709.10	66,344.29	59,921.79
Coal-prospecting licences	235	203	137	33	83	41	54	47	21	33
Sundry leases	149	175	154	225	168	200	194	195	229	196
Coal leases	33	6	23	70	32	37	45	18	17	20
Revenue received	$367,115.72	$346,339.89	$218,814.68	$201,213.80	$238,286.77	$217,822.38	$275,415.45	$243,741.08	$242,076.00	$248,829.25
Letters received	21,834	26,304	26,620	25,106	26,699	22,573	21,572	21,691	22,263	24,605
Letters sent	16,581	19,153	34,402*	22,420*	22,217*	18,194	19,796	19,224	19,662	21,767

* Including circulars, statements, etc.

STATEMENT OF LETTERS INWARD AND OUTWARD, 1939.

Lands Branch.

Letters inward	24,605
Letters outward	21,767

MINING LICENCES, LEASES, ETC., 1939.

	No.	Area (Acres).
Licences under " Coal and Petroleum Act "—		
Original licences issued	22	12,023.90
Renewal licences issued	11	5,502.00
	33	17,525.90
Leases under " Coal and Petroleum Act "—		
New leases issued	2	638.00
Renewal leases issued	18	9,217.50
	20	9,855.50
Sundry Leases under the " Land Act "—		
Leases issued	196	34,555.17

CROWN GRANTS ISSUED, 1939.

Pre-emptions	180
Dominion homesteads	65
Purchases (other than town lots)	179
Mineral claims	315
Town lots	212
Reverted lands (other than town lots)	37
Reverted town lots	28
Reverted mineral claims	69
Supplementary timber grants	4
" Dyking Assessment Act "	5
" Public Schools Act "	2
Miscellaneous	12
Total	1,108

Applications for Crown grants	1,262
Certified copies	6
Clearances of applications for leases of reverted mineral claims given	101

Total Acreage deeded.

Pre-emptions	25,396.88
Dominion homesteads	10,275.30
Mineral claims (other than reverted)	11,084.27
Reverted mineral claims	2,587.26
Purchase of surveyed Crown lands (other than town lots)	8,444.65
Purchase of reverted lands (other than town lots)	1,922.47
Supplementary timber grants	210.96
Total	59,921.79

HOME-SITE LEASES (NOT EXCEEDING 20 ACRES).

	No.		Total Annual Revenue.	Fiscal Year ended.
Leases existing on April 1st, 1929		67		
Leases issued, April 1st, 1929, to March 31st, 1930	8		$522.55	March 31st, 1930.
Leases issued, April 1st, 1930, to March 31st, 1931	12		636.45	March 31st, 1931.
Leases issued, April 1st, 1931, to March 31st, 1932	11		759.95	March 31st, 1932.
Leases issued, April 1st, 1932, to March 31st, 1933	31		980.05	March 31st, 1933.
Leases issued, April 1st, 1933, to March 31st, 1934	23		1,246.65	March 31st, 1934.
Leases issued, April 1st, 1934, to March 31st, 1935	24		1,302.52	March 31st, 1935.
Leases issued, April 1st, 1935, to March 31st, 1936	18		1,391.72	March 31st, 1936.
Leases issued, April 1st, 1936, to March 31st, 1937	26		1,440.25	March 31st, 1937.
Leases issued, April 1st, 1937, to March 31st, 1938	15		1,468.90	March 31st, 1938.
Leases issued, April 1st, 1938, to March 31st, 1939	29		1,557.40	March 31st, 1939.
Leases issued, April 1st, 1939, to March 31st, 1940	21		1,591.80	March 31st, 1940.
	—	218		
		285		
Leases cancelled during this period	10			
Leases Crown-granted	6			
	—	16		
Leases at present existing		269		
Total revenue received from April 1st, 1929, to March 31st, 1940			$12,898.24	

PART II.

SURVEY BRANCH.

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REPORT OF THE SURVEYOR-GENERAL.

VICTORIA, B.C., January 2nd, 1940.

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

SIR,—I have the honour to submit the following report on the operations of the Survey Branch for the year ended December 31st, 1939.

The Survey Branch, with a staff averaging forty-nine in number, is organized into three divisions—Surveys, Geographic, and Topographic. The Survey Division deals with field-notes of all surveys of Crown lands, whether made by Government or privately-employed surveyors; checks and plots from these notes and keeps an up-to-date record of the standing of such lands and surveys on some 261 large-scale reference maps drawn on tracing-linen; the division has a blue-printing department supplying the demands of the general public and of other branches of Government for copies of reference and other maps to the value of some $9,000 per annum. The surveyors of the Topographic Division spend their summers on field-work and their winters plotting contour maps based on that field-work; this work is permanent in character and furnishes a sound foundation for all planning having to do with the development of the natural resources of the Province. The Geographic Division is responsible for keeping the published maps of the Province truly representative of the latest information available. That information comes from triangulation surveys and from the Survey and Topographic Divisions, from the Forest and Water Branches, the Mines and Public Works Departments, from the Geodetic, Geological, Topographical, and Hydrographic services of the Dominion Government; as well as from prospectors and others having knowledge of out-of-the-way places. The division draws the maps, secures tenders from lithographers, and supervises publication.

The construction of a highway through British Columbia to Alaska seems to be a certainty of the near future. There are about four possible routes, each offering some advantages over the others; but owing to the small population of, and difficult access to, the northerly 300 miles in latitude, survey-work in the Province has been, until now, largely confined to the regions south of latitude 56°. The selection of a wrong highway route could easily cost the public millions of dollars, and the best insurance against a wrong selection is obviously complete contour information over all promising routes. In 1939 the Survey Branch started on one of the routes, diverting all available funds to the purpose. What is generally known as the Rocky Mountain Trench route was chosen for mapping. This route offered the shortest distance from United States points to Dawson and Fairbanks, was known to follow a wide, flat valley just west of the Rocky Mountains, and to reach a maximum altitude of only 3,150 feet—this being on the Liard-Yukon divide. A plane was chartered to photograph a strip 10 miles wide along the trench from Finlay Forks to the northerly boundary of the Province; but, owing to unfavourable photographic weather, only the southerly half of this photography was completed and the balance left for 1940; other work went ahead of schedule, only a short gap in the triangulation control being left for 1940. Contour mapping was completed for the first 150 miles from Finlay Forks and will be continued for the remaining 160 miles to latitude 60°, as funds permit. Three triangulation-survey parties and four topographical parties were employed on this work; one triangulation party worked from Liard Post, but the other six were supplied from Prince George, using boats for 350 miles along Peace River waters and pack-horses for 100 miles over the primitive trail through Sifton Pass; the twenty-two horses used were secured at Fort St. James and are being wintered on the open range north of Sifton Pass, in latitude 58°, where bunch-grass is plentiful and snowfall light.

Since the start of the war in September, Major Aitken, Chief Geographer, has rejoined the Army, and Mr. Firth, long with the Survey Branch, is capably acting in his stead. J. F. Stevens has enlisted in an Overseas battalion and most of the other younger members of the staff have volunteered for the Air Force or other Overseas units, and are awaiting calls.

Reports compiled by F. O. Morris and W. G. H. Firth for the Survey and Geographic Divisions respectively, and reports by the surveyors who headed the parties working in Northern British Columbia are attached hereto.

The methods devised by our topographic surveyors for the economical control of aerial photographs in this country of high mountains have been detailed in previous annual reports, so will not be again described. It may be said, however, that these methods, combining the strong features of both aerial and ground pictures, are original and effective and yield perfectly satisfactory contoured maps at little more than half the cost of even ten years ago.

I have the honour to be,

Sir,

Your obedient servant,

F. C. GREEN,

Surveyor-General.

APPENDIX TO REPORT OF SURVEYOR-GENERAL.

SURVEY BRANCH.

This Branch 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. In the average day's work it is found necessary to secure and consult 100 documents from the vault. An efficient blue and ozalid printing plant is maintained.

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 Survey Branch. There are now 188 reference maps and 73 mineral reference maps, making a total of 261 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 Branch. During the year eight reference maps 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 1939, SURVEY BRANCH.

Number of field-books received	378
,, lots surveyed	406
,, lots plotted	359
,, lots gazetted	635
,, lots cancelled	1,800
,, mineral-claim field-books prepared	343
,, reference maps compiled	8
,, applications for purchase cleared	165
,, applications for pre-emption cleared	504
,, applications for lease cleared	301
,, coal licences cleared	40
,, water licences cleared	144
,, timber-sales cleared	1,782
,, free-use permits cleared	493
,, hand-loggers' licences cleared	8
,, Crown-grant applications cleared	1,045
,, reverted-land clearances	886
,, cancellations made	1,664
,, inquiries cleared	1,959
,, placer-mining leases plotted on maps	523
,, letters received	5,656
,, letters sent out	4,033
,, Crown-grant and lease tracings made in duplicate	1,380
,, miscellaneous tracings made	206
,, Government Agents' tracings made	173
,, blue-prints made	23,554
Revenue received from sale of blue-prints from other departments and public	$4,355.29
Value of blue-prints for Lands Department	$4,198.15
Number of documents consulted and filed in vault	35,473

Table B.—List of Departmental Mineral Reference Maps.

No.	Title of Reference Map.
10T215.	Stump Lake; Nicola Valley.
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 and Pine Creek.
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.
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.	Cariboo 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.
3T348.	Amberty and Sutter Creeks (Summit Camp), tributaries of Tulameen River.

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 Branch, Lands Department, Victoria, B.C.

Victoria, B.C., January 2nd, 1940.

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 Sound 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.	Sechelt 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.	Clearwater and Murtle River Valleys.
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.	Graham Reach, Gardner Canal, and Kitimat Arm.
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.	Tête Jaune, Swift Creek, and Albreda.
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) and Headwaters of North Thompson River.
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 and North Thompson River, vicinity of Vavenby.
31.	Bulkley Valley.
31A.	Central Part, Babine Lake.
32.	Crooked River, McLeod Lake, and Upper Parsnip River.
32A.	Tatla, Tatlayoko, and North End of Chilko Lakes.

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

No.	Title of Reference Map.
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.
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.	Euchiniko and Tetachuck Lakes.
41.	Upper Nechako River and Tachick Lake.
42.	Big Bend, Kootenay District.
42A.	Adams Lake and River.
42B.	Canoe and North Thompson River Valleys (Blue River).
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.	Nanaimo, Alberni, and adjacent Districts.
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 Moberley River and parts of Peace and Pine Rivers.
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.

No.	Title of Reference Map.
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.	Trout and Upper Arrow Lakes.

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 BRANCH, LANDS DEPARTMENT, VICTORIA, B.C.

Victoria, B.C., January 2nd, 1940.

GEOGRAPHIC DIVISION.

MAPS.

Published.

Name.	No. of Copies.	Date of Issue.	Dept. Map No.	Scale.	Area in Sq. Miles.	Remarks.
1. Southerly Vancouver Island Land Series	10,000	May, 1939	2A	4 mi. to 1 in.	16,000	.....
2. Hope-Princeton Degree Sheet, contoured	6,000	Oct., 1939	4Q	2 mi. to 1 in.	3,100	.....
3. Highway and Travel Map of British Columbia	5,000	June, 1939	P.W.D.	20 mi. to 1 in.	.....	.....
4. B.C. Mining Division	5,000	July, 1939	M.D.	50 mi. to 1 in.	366,255	.....

In Course of Printing.

Central British Columbia	7,000	Approximate date of issue, May, 1940	1L	8 mi. to 1 in.	175,000	Tenders called, but not yet accepted.

In Course of Preparation.

1. Stuart Lake Pre-emptors' Map	.....	.....	3C	3 mi. to 1 in.	9,000	Tenders called, but not yet received.
2. Big Bend Pre-emptors' Map	.....	.....	3R	3 mi. to 1 in.	11,000	.....
3. Windermere Degree Sheet	.....	.....	4G	2 mi. to 1 in.	3,100	Nearly completed, but held up; priority of Stuart Lake sheet.
4. Geological Map, P.G.E. Railway Resources Survey, 1929–30	.....	.....	.....	Special proposed scale, 10 mi. to 1 in.	30,500	Held up; lack of definite geological survey information.

GEOGRAPHIC BOARD OF CANADA, NAMING AND RECORDING.

Number of map-sheets, names reviewed	17
Recommendations to Geographic Board	325
New names recorded	294
New post-offices, schools, and hospital locations recorded	150

GEOGRAPHICAL WORK FOR OTHER DEPARTMENTS.

Thirty-seven items, receipts and value of work	$1,469.90

MAP STOCK AND DISTRIBUTION.

Maps and Gazetteers issued to departments and public	10,274
Maps received into Geographic stock	29,343
Total value of printed maps and Gazetteers issued	$3,681.36
Revenue from printed maps and Gazetteers	$3,457.08

PHOTOSTAT.

Total number of photostats made	2,488
Revenue from departments and public	$635.55
Value of photostats for Lands Department, etc.	$1,504.90

LETTERS.

Letters received and attended to	1,975

STANDARD BASE MAP.

Big Bend Pre-emptors' Sheet, compiled, complete	6
Big Bend Pre-emptors' Sheet, compiled, not complete	8
School districts plotted from description	47
Control nets supplied	50

TRIANGULATION.

Main, by least-square adjustment, triangles adjusted	151
Secondary, by rectangular co-ordinates, stations	487
Index-cards records	670
Triangulation index-maps	6
Plan of triangulation, Kitimat to Terrace sheets drawn	1

Major G. G. Aitken, M.C., Chief Geographer, joined His Majesty's Forces on September 5th, 1939, and Mr. W. G. H. Firth was placed in temporary charge of this division from that date.

Mr. J. F. Stevens, apprentice draughtsman, joined His Majesty's Forces on September 28th, 1939.

Over a period of eighteen months an important and efficient card filing system of all Dominion, Provincial, and other map publications has been completed. This work has been undertaken as the opportunity presented itself and apart from the normal work of the staff.

TABLE D.—LIST OF LITHOGRAPHED MAPS.

Map No.	Year of Issue.	Title of Map.	Scale, Miles, etc.	Per Copy.	Per Dozen.
		GEOGRAPHIC SERIES—			
1A	1933	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. Special edition 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	1933	Northern British Columbia, Special Mineralogical Data	1 : 1,000,000 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	31.53 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
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 Districts of B.C., Commercial and Visitors	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	1930	Fort George	3 m. to 1 in.	One single sheet of "series" free. Each sheet additional 25 cents, or	2.00
3B	1926	Nechako	3 m. to 1 in.		2.00
†3C	1940	Stuart Lake (contoured)	3 m. to 1 in.		2.00
3D	1937	Bulkley Valley	3 m. to 1 in.		2.00
3E	1928	Peace River (reissue 1930)	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	1932	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 Sheet (contoured)	2 m. to 1 in.	.50	4.00
4C	1936	Cranbrook Sheet	2 m. to 1 in.	.25	2.00
4D	1913	Fernie Sheet	2 m. to 1 in.	.25	2.00
4E	1925	Upper Elk River Sheet	2 m. to 1 in.	.25	2.00
4G	1914	Windermere Sheet	2 m. to 1 in.	.25	2.00
4H	1926	Arrowhead Sheet	2 m. to 1 in.	.25	2.00
4J	1921	Vernon Sheet (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
	1929	Howe Sound–Burrard Inlet (contoured), North sheet (special)	½ m. to 1 in.	.50	4.00
5C	1929	Stikine River (contoured)	5 m. to 1 in.	.50	4.00
	1930	**GEOGRAPHICAL GAZETTEER OF BRITISH COLUMBIA**		2.00	18.00
		MINERAL REFERENCE MAPS—PRINTED.			
MRM1	1927	Slocan and Ainsworth	1 m. to 1 in.	.50	4.00
MRM2	1928	Trout Lake	1 m. to 1 in.	.50	4.00
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	1939	Highway and Travel Map of B.C.	20 m. to 1 in.	.35	2.50
MD	1939	B.C. Mining Divisions and Mineral Survey Districts	50 m. to 1 in.	Free	On ap.
9	1907	Northern Interior. (A. G. Morice)	10 m. to 1 in.	.10	.50
5	1898	Kootenay District, East, Triangulation Survey of	6,000 ft. to 1 in.	.10	.50
2	1896	Kootenay District, West, Portion of	1 m. to 1 in.	.10	.50

† In course of compilation.

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

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

Unless otherwise requested, maps will be sent folded.

Inquiries for printed maps—Address:—

CHIEF GEOGRAPHER, DEPARTMENT OF LANDS, VICTORIA, B.C. 3rd January, 1940.

TOPOGRAPHICAL SURVEYS, FINLAY RIVER VALLEY.

By R. D. McCaw.

Victoria, B.C., December 18th, 1939.

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

Sir,—I have the honour to report upon topographical surveys which I carried on during the past season in the Finlay River Valley.

Mr. A. J. Campbell, B.C.L.S. (whose work adjoined mine on the north), and I left Summit Lake, some 32 miles north of Prince George, on July 3rd. For the transportation of our parties and equipments we had three river-boats powered by outboard motors. The usual water route to Finlay Forks was followed by way of the Crooked River, MacLeod Lake, and the Pack and Parsnip Rivers. From Finlay Forks we went up the river some 55 miles (by water distance) to the approximate dividing-line of our proposed surveys. The Parsnip, which was still in flood, gave us a fast ride down to the Forks, while the Finlay, also swollen, slowed us down going up-stream. No trouble was experienced, and credit must be given the boatmen for the efficient manner in which they navigated the boats.

The area to be mapped by my party was the southerly portion of that being done this season along the Finlay River. The main triangulation control had been laid down by Mr. L. S. Cokely, B.C.L.S., in 1930. Arrangements had been made for coverage by aerial photography to be done during the summer by Mr. G. S. Andrews, of the Forest Branch. Our ground work consisted of establishing sufficient control for the air photographs for the purpose of the ultimate production of a map suitable for publication on a scale of 1 inch to 1 mile, with contour-lines at 100 feet vertical intervals. Particular attention was devoted to the portion where it might be possible to construct a road up the river from Finlay Forks.

For the purpose of aerial control, the photo-topographical system was used almost entirely, being supplemented at times by distances measured from triangulation stations to points which could later be identified on the air views. All triangulation stations were read with a Wild transit, with a few exceptions early in the summer. All important stations were marked either by standard brass bolts or B.C.L.S. bars. At times, on cut-banks, these marks were off-setted back from the instrumental stations for preservation. For photography the usual survey cameras were used with Ilford panchromatic and infra-red plates. While it was possible to obtain sufficient results for control-work, the area was very poor from a photo-topographical standpoint. There was very little smoke, but haze gave trouble continually, especially for distant views, of which there had to be many, owing to the valley being wide and most of the main stations on the rim east or west of same.

For general remarks on the Finlay River Valley as to history, geology, and physiography, I would refer to the report of Mr. L. S. Cokely, of January 27th, 1931, and to that of Mr. Frank Swannell, B.C.L.S., concerning his triangulation survey during the past summer. It is sufficient to say here, for the portion under survey, that the floor of the valley rises from the extremely winding river and its myriads of side channels in terraces about 50 to 300 or 400 feet (in parts) above it before the general slope of the mountain is reached. These series of benches from one side of the valley to the other extend in width from about 5 to 10 miles in the widest part. On the east side of the valley four main streams join the Finlay. From north to south these are Deer, Collins, and Deadman Creeks, and the Ospika River. The last is a fair-sized stream and is navigable for small boats for more than 20 miles. On the west side of the valley and in the same order are Olson, Ruby, Mica, and Cache Creeks, comparatively small streams. Farther south is the Omineca River, joining the Finlay opposite the mouth of the Ospika River. The lower Omineca is quite fast and pushes through the Black Canyon some 8 miles up from the Finlay, breaking up into many channels on its way down to the latter stream. At high water boats cannot make the canyon, but when not in flood the river is navigable for many miles. South of the Omineca is a very extensive and more or less flat bench land extending far to the south and approximately 20 miles in width.

The soil in general is a sandy loam, or silt, with parts appearing gravelly and, judging from wild vegetation, is very fertile. Nearly every trapper has his patch of potatoes at the home cabin. Some have other garden vegetables. Strawberries do well at Finlay Forks, where there is a large patch under cultivation. Unfortunately, summer frosts occur which

have their effect on garden growth. Quite a severe frost occurred early in August this year. Some small oat-fields were noticed at the Forks, probably used for hay. In our area there was not a great deal of wet weather. Rain fell on about nine days in July, three days in August (with some light showers), nine days in September up to the 19th (and some light showers). Spruce and open swamps are quite common, some being of large size. An occasional "bottomless" muskeg is encountered.

Fires have pretty well cleaned up the original spruce, and usually jack-pine and poplar have taken its place. Birch is much in evidence seen from boats on the river. The Butler Range on the west side of the valley is thickly timbered from valley-bottom to timber-line, which is approximately 5,300 feet. Some spruce and balsam on these slopes reach a diameter of over 2 feet. South of the Omineca repeated fires have occurred and scrub poplar, willow, and alder, with a few evergreens, have grown up. Windfalls are plentiful in this section. Thick windfalls and standing fire-killed timber are prevalent near the mouths of Mica and Ruby Creeks, and on the east side of the river for many square miles north of Moodie Mountain.

A small amount of placer-mining was being done on the bars in the Finlay River and at the Black Canyon on the Omineca. There are about six or eight white trappers in the area, and we found their trails of great value when man-packing back from the river. Finlay Forks post-office is about 5 miles up-stream from the Finlay, Parsnip, and Peace Junction. Besides the post-office there is a store, small sawmill, and Government radio station.

The old pack-horse trails built years ago have fallen into disuse as such and many parts have filled in with brush and windfalls. There are only a few horses in the country besides the work-horses at Finlay Forks. All traffic in and out is by water or plane in summer and by plane or dog-team in winter. Dogs are also used as pack-animals.

Moose, caribou, black bear, and deer were seen during the summer, but do not seem to be as numerous as one would expect. There are very few game birds. Fishing in the creeks is fair, but poor in the Finlay, owing to the fact that the river never fully clears up. Wolves are said to be numerous, although none were seen.

Work on the map-sheets is now in progress. These are being drawn on a scale of 2 inches to 1 mile.

I have, etc.,

R. D. McCaw, B.C.L.S.

TOPOGRAPHICAL SURVEY, VICINITY OF FORT GRAHAME, FINLAY RIVER VALLEY.

By A. J. Campbell.

Victoria, B.C., December 31st, 1940.

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

Sir,—I have the honour to submit the following report on the topographical control surveys carried out by me, under your instructions, during the past field season.

The party was one of four topographical parties working under a plan to compile a map of the Finlay River Valley from near Finlay Forks to Fort Ware, and of the Fox River to Sifton Pass. R. D. McCaw, B.C.L.S., covered the lower portion up to Deer Creek, my party from Deer Creek to Rubyred Creek. From there G. J. Jackson, B.C.L.S., carried on to Paul Creek, and N. C. Stewart, B.C.L.S., to Sifton Pass.

Our area, from Deer Creek to Rubyred Creek, extends 35 miles in an air-line along the valley, or 45 miles following the river, and the map will cover approximately 400 square miles.

As in former years, our work consisted in providing control for mapping from aerial pictures, using the photo-topographical method where feasible and any other method that would give the necessary information. The wide valley of the Finlay River with its extremely

flat floor, but having plenty of detail, such as meadows and swamps, burnt patches, small lakes, cut-banks along the river, etc., was readily covered by photographs taken from the mountains and hills on either side. Also, a series of points in the valley-bottom were located by triangulation from the higher stations. These were chosen at places naturally identifiable, or marked by cutting lines or crosses in the small timber so that they could be located definitely on the aerial pictures. The main triangulation control had been laid down by Leroy S. Cokely, B.C.L.S., in 1930, and in part by F. C. Swannell in the same year. Most of the cairns that had been erected at that time were still standing and this aided materially in carrying forward our own work.

It is not the intention of this report to repeat what has already been said in the many reports that have been made on the Finlay River Valley. For historical information, a general description of the valley, access to and mode of transport, the reader is referred to reports of Mr. Cokely and Mr. Swannell, published in the Annual Report of the Land and Surveys Branches 1931, and also to R. D. McCaw's report of this year. The report of Dr. Victor Dolmage, contained in the Summary Report 1927, Part A, Geological Survey of Canada, gives an extremely interesting and detailed description of the geology of the Finlay River District, with particulars of the mica deposits near Fort Grahame and the lead, zinc, and silver deposits up the Ingenika River.

PHYSICAL FEATURES.

The Finlay River, from Fort Ware to the Forks, flows through the Rocky Mountain Trench, and the remarkable straightness of the valley is the most striking feature. From the mountain-tops the valley can be followed in either direction until it disappears in the haze of the distance. The river channel is also remarkably straight in that, while there are many bends and, in places, high-water channels and backwaters, it makes few swings across the valley-floor. From the southerly end of our section, near Deer Creek, to its junction with the Ingenika River, the river is closer to the west side of the valley. From there it swings across to the east side until, at Rubyred Creek, the slopes rise directly from the river-bed. Along this 45-mile stretch of the river there is a total rise of 152 feet—or about 3½ feet to 1 mile—with no falls and few riffles, and can be readily navigated, given the proper equipment. An interesting calculation, based on a trip from the mouth of the Ingenika down to Fort Grahame and back, gives the average water speed as just over 4 miles per hour.

The only tributary of the Finlay, in our section, is the Ingenika River, which joins, from the west, about 18 miles above Fort Grahame. It is a clear, swiftly flowing stream, about 200 feet wide at its mouth, and is navigable for a distance of 40 miles, according to Mr. Swannell's report of 1930. We were there late in the season, but had no difficulty in getting up about 12 miles. The other streams are much smaller and most of them, joining the valley from the east, enter through such large gaps in the hills the impression is given they should carry more water than they do. Davis Creek, a few miles below Fort Grahame, and Big Creek, a similar distance above, are much the biggest, with a width of approximately 30 feet each.

The mountains flanking the valley on the east are around 5,000 feet high near Deer Creek, and gradually increase in height, going up the valley to Deserter Peak, which has an altitude of 7,430 feet and lies just north of our boundary at Rubyred Creek. Those on the west side are higher at the southerly end. In the Butler Range, south of Fort Grahame, they go over 7,000 feet and between Factor Ross Creek and the Ingenika River up to 6,000 feet, but north of the Ingenika the mountains are 10 to 15 miles back. Inside this area there are only two somewhat isolated hills that are over 3,000 feet in height. Lower rolling hills, large stretches of flat bench land closer to the river, and many small lakes cover the rest.

The floor of the valley is flat and, with the exception of the part north of the Ingenika, is about 5 miles wide. To the east of the river there are large areas of bench land, sometimes miles in width, stretching along the whole length of our section. These are from 100 to 300 feet above the water and keep more or less to that throughout. The edge of this bench, where it falls rather steeply to the river-flat, is generally bare and can be seen for miles from the mountains opposite, broken only by the small creeks on their way to the river. Along this stretch, close to the slopes, swamps are prevalent, some very wet and others fairly dry. Back of Fort Grahame a very large and very wet open, grassy swamp stretches for some miles. On

Police Creek, opposite the mouth of the Ingenika River, an open, grassy meadow is included in a surveyed lot and is used by the Indians for cutting hay to feed their few horses through the winter.

FOREST-COVER.

The benches and slopes are covered principally with jack-pine and polar. Spruce is found along the river-flats and in the wetter spots, surviving the extensive fires that have burned a large proportion of the valley. Extensive burns of later date were seen in the mountains east of the Finlay, particularly around the headwaters of Davis Creek, where there is little green bush to be seen. The timber is small, averaging around 12 inches, and rarely going over 2 feet.

MINERALS.

The known deposits of mica have been described in detail by Dr. Dolmage in his report. They lie in the hills some 5 to 10 miles south of Fort Grahame and, while there has been little or no work done of late years, interest is still maintained in some of them, and it is quite probable that, with the advent of cheaper transportation, further development will take place. This also applies to lead, silver, and zinc properties 16 miles up the Ingenika River, which closed down in 1930 after considerable development-work had been done. Discoveries of copper have also been reported and with better transportation, more intensive prospecting would follow in what is apparently promising ground.

AGRICULTURAL POSSIBILITIES.

Along the valley there are thousands of acres that could be easily cleared and cultivated, and from the evidence given by the small plots of garden vegetables that are to be found at every cabin there is no doubt that much larger acreage of such crops could be grown, and, as has been the case in many parts, the danger of summer frosts would be much reduced or eliminated entirely by the opening and cultivating of large areas. Wild small fruits are general but not plentiful, and huckleberries were thick on some of the burnt-over and partially open slopes.

GAME.

Moose, caribou, black bear, and deer were seen during the season, but were far from being as numerous as would naturally be expected so far away from civilization, but as it has been the hunting-ground of the Indians around Fort Grahame for many years, and their principal diet is meat, it is not surprising. Few grouse and rabbits were seen, but are reported as being plentiful at times. The whole area is covered by registered trap-lines, mostly held by Indians.

TRAILS.

A good horse-trail follows along the bench land on the east side of the valley from between Deer and Rubyred Creeks, generally well back from the river but touching it at Fort Grahame and again at Rubyred Creek. Branch trails connect with the river-bank in a few places. Other trails include the old Police trail from Fort Grahame to Hazelton, up Factor Ross Creek, and a trail up the Ingenika River. Horses were brought into the valley during the summer over the Hazelton trail.

The usual map-sheets are being prepared.

I have, etc.,
A. J. Campbell, B.C.L.S.

TOPOGRAPHICAL SURVEY, VICINITY OF FORT WARE.

By N. C. Stewart.

Victoria, B.C., December 30th, 1939.

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

Sir,—I have the honour to submit the following report on the topographical survey carried out by me under your instructions during the field season of 1939.

The area controlled is situated in that portion of the Rocky Mountain Trench which extends from Paul Branch Creek, on the Finlay River, to Sifton Pass, a distance of approximately 52 miles along the trench. A map is being prepared at a scale of one-half mile to 1 inch, with a contour interval of 100 feet, and will cover 475 square miles.

The field party consisted of W. J. Moffatt, B.C.L.S., assistant; A. G. Slocomb, instrumentman; four helpers, two river boatmen, a cook, and a horse packer for part of the season. The party was organized at Prince George on June 22nd and disbanded there on October 2nd.

The area being suited to control by photo-topography, that method was almost solely used. The camera stations were tied by triangulation to points established during the season by F. C. Swannell, B.C.L.S. The area was photographed from the air by G. Andrews, of the Forestry Service.

PHYSICAL FEATURES.

The Rocky Mountain Trench is remarkably straight from Paul Branch to Sifton Pass, its direction being N. 300° W. At Paul Branch the valley from mountain-top to mountain-top is about 6 miles wide and at Sifton Pass it is 8 miles wide. The altitude at Paul Branch is 2,400 feet and at Sifton Pass 3,273, giving a gradient of about 17 feet to the mile. The trench is drained by the Finlay River, which breaks into the trench from the mountains to the west, about 12 miles above Paul Branch, and by its tributary the Fox River, which rises at Sifton Pass. Two streams of considerable importance enter the trench from the east: the Kwadacha, or Whitewater, River joins the Finlay 9 miles above Paul Branch and a stream out of Weissner Lake, which joins the Fox about 15 miles north of Fort Ware. These streams all have clear water except the Kwadacha, which rises in a very large ice-field, visible from any of our camera stations.

The mountains on the west side of the trench are more rugged and higher than those on the easterly side; the westerly range presenting an almost unbroken wall, except for the entrance of the Finlay, already mentioned, and for Fox Pass, which is about 16 miles farther north. The mountains on the easterly side are divided by numerous valleys of considerable width; in one of these is Weissner Lake, the largest in the area. The highest peak in the westerly range has an altitude of 7,873 feet, but on the east side the mountains only attain a height of 6,900 feet.

The floor of the trench is composed of glacial and alluvial deposits. It is not smooth. Cut-banks up to 200 feet in height are found along the Finlay and Fox Rivers, suggesting that a higher floor existed, probably before Deserters Canyon was cut through. Again, it has been suggested that the Finlay River may have entered the trench at Fox Pass, its passage having been blocked by glacial action, for moraine material now fills the pass. As is to be expected from a terrain formed by glacial action, there are numerous small lakes and swampy areas, separated by gravelly ridges and benches extending generally in the direction of the trench. Fox Lake, about 1½ miles long, is the largest in the valley.

FOREST.

The ridges and benches of the trench floor are wooded with jack-pine and poplar, quite open in places. The swamps and meadows are usually surrounded by a fringe of small spruce. The slopes of the mountains are covered with jack-pine, poplar, and some spruce and balsam, with a dense undergrowth of willow, alder, and soapallie. The area has been repeatedly burnt over; consequently, there is little merchantable timber. Grassy meadows and swamps provide feed for horses. Wild flowers abound and on the gravelly benches and open hillsides are patches of wild fruits, mostly huckleberry and strawberry. At Sifton Pass there is a long, narrow grassy meadow with sidehills rising 150 feet to wide wooded benches on either side. Timber-line is at an approximate altitude of 5,000 feet above sea-level.

MINERALS.

Many years ago placer gold was taken in considerable quantity from 80-Mile Bar, located in this area about 6 miles below Fort Ware. Colours can be panned almost everywhere along the Finlay River and up the Kwadacha, as far as we went. We also obtained colours in a few places on the Fox River. Little evidence of mineralization was seen in the mountains adjacent to the trench, and on the valley floor bed-rock shows in very few places. Quartz veins with slight oxidation were found west of Sifton Pass.

GAME.

Wolves and the Indians have almost exterminated the game, not one moose was seen by our party during the entire season. A few goat, sheep, and bear were seen high up on the mountains. In the valley there are grouse, ducks, and some geese, and a few porcupines and squirrels. We saw some beaver. There is very good fishing. Rainbow trout, Dolly Varden, and grayling, in the rivers and lakes, provided the camp with the only fresh food we had. The whole area is divided into trap-lines, which provide the sole means of livelihood of the Fort Ware Indians.

CLIMATE.

We experienced showery weather all through the season, with occasional snow-storms on the mountains after September 15th. Frost occurred on August 7th and on clear nights after September 1st. From a study of the forest-growth it is evident that there is a good precipitation, both in summer and winter. I would estimate that the average depth of snow at Sifton Pass is about 4 feet, and considerably less at Fort Ware.

ACCESSIBILITY, ETC.

The Finlay River provides the chief means of access. Flat-bottom boats up to 45 feet in length, powered with gas-motors, make the round trip from Summit Lake to Fort Ware in ten days. Twice a month there is a plane service from Prince George to Fort Ware. The freight rate to Ware is 8 cents per pound by boat and 26 cents by airplane. From Ware to Sifton Pass, and beyond, there is a pack-trail on which we did quite a lot of work during the season. This trail is poorly located, but is passable for pack-horses. The Indians use dogs as beasts of burden, hence do not require much of a trail. We were able to navigate, with some difficulty, the Fox River to Fox Pass, some 16 miles. A road of easy gradient and straight alignment could be cheaply and swiftly constructed through this section of the Rocky Mountain Trench.

Fort Ware, established by the Hudson's Bay Company about 2 miles below the mouth of the Fox River, is the only settlement in the area. It consists of a well-stocked store, with caches, a residence for the factor, and a bunk-house; the free use of the latter during the season I wish to acknowledge with thanks. The Company has installed a broadcasting and receiving set, with a wind-driven motor. The Sikanni Indians have a few buildings on their reserve at Fort Ware and at various places in the Fox Valley. These Indians, some eighty in number, make good cabins; they are good axemen and use the whip-saw for making lumber.

This is an area of apparently few resources; no merchantable timber, little land suitable for agriculture, no lode-mining yet discovered, a scarcity of game; but yet it was a pleasant place in which to work and live, due to pleasant surroundings. Here are scenic spots that rival those of other sections of the Province; and in the fall, when the leaves turn to gold, the long vistas down the trench are truly wonderful.

I have, etc.,

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

PHOTO-TOPOGRAPHICAL SURVEY, FINLAY RIVER.

G. J. JACKSON.

VICTORIA, B.C., December 31st, 1939.

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

SIR,—I have the honour to submit the following report on the photo-topographical survey carried out by me during the past summer.

The area covered was on the Finlay River, and consisted of a strip approximately 10 miles wide along about 35 miles of the river. The south boundary was at Rubyred Creek, about 4 miles below Deserters Canyon, and the north boundary was at Paul Creek, about 10 miles

below Fort Ware. This connected with the work of A. J. Campbell, B.C.L.S., on the south, and the work of N. C. Stewart, B.C.L.S., on the north.

The work was controlled by a triangulation net laid down by F. C. Swannell, B.C.L.S., during the summer. Elevations were based on those carried up the river from Finlay Forks by R. D. McCaw, B.C.L.S., and A. J. Campbell, B.C.L.S., to my southern boundary. Aerial views were taken by G. S. Andrews, of the Forestry Service, from an elevation of about 16,000 feet.

The party was organized at Prince George on June 22nd, and disbanded September 15th. It consisted of R. C. Mainguy, B.C.L.S., as assistant; a cook, two boatmen, and four axemen. The area was reached by river-boat, with outboard motor, from Prince George, by way of Summit Lake, down the Crooked, Pack, and Parsnip Rivers to Finlay Forks; then up the Finlay River. During the summer one boat was used for work and moving camp and supplies. The main camps were all on the river, from which the mountains on each side were reached by fly-camps. Supplies, gas, and mail were brought in from Prince George, several times during the season, by Dick Corless and his freight-boats. Everything arrived when expected and in perfect order.

Views were taken and angles read from fifty-one stations; ten of these were on cut-banks along the river, the rest were on the mountains on each side of the valley. All stations were marked by iron bars or brass bolts.

The valley of the Finlay is part of the Rocky Mountain Trench and is very straight, bearing about 30 degrees west of north. In this section the valley is from 5 to 7 miles wide. It is fairly flat and rises from the river in a series of benches to the foot-hills of the mountains on each side. In many places there are high cut-banks of 200 to 300 feet in height along the river. The river meanders from side to side of the valley, so that it is nearly twice as long as a straight line up the valley. It is constantly changing its course, as there are many side channels, which were evidently the main river at one time. The changes are caused by log-jams, which are extensive on some parts of the river. On the benches back from the river there are a number of small lakes and swamps. There are several large creeks flowing into the river from each side. One river, the Akie, which is quite wide at the mouth and for several miles up it, comes in from the east, about 12 miles above Deserters Canyon.

The Finlay River is from 500 to 700 feet in width and has an average current of about 4 miles per hour. It is good for river-boats, except at Deserters Canyon. This is navigable at lower stages of water, but at very high water a half-mile portage has to be made.

The mountains on each side vary from 4,000 to 7,500 feet in elevation and are timbered to about 5,000 feet.

This summer was cloudy and showery, with snow-flurries on the mountains during each month; but it was, apparently, wetter than usual. There were several frosts during August and September. The winters are said to be cold and bright, with comparatively little snowfall. The freeze-up generally comes in November and the break-up in April.

Judging from the vegetation, the soil is productive and suitable for hardy vegetables and fruits, but the summer frosts would make other crops very uncertain. There are many areas of level ground suitable for agriculture, which could be easily and cheaply cleared.

There is very little timber of commercial value. Most of the valley and side-hills have been badly burnt over—probably the majority during the days of the Klondike rush—but some burns are of more recent date. The valley is timbered now with jack-pine and poplar, with patches of spruce in river-bottoms and around the lakes and swamps. On the mountain-sides the timber is jack-pine, poplar, spruce, and balsam, with considerable underbrush in places.

There is no lode-mining in the area, but traces of gold can be found on most of the bars in the Finlay. Two prospectors were working them this summer and claimed to be making fair wages.

The only industry is trapping. All the area is taken up by registered trap-lines; half a dozen by white men, the rest by Indians. The chief furs are beaver, marten, fox, fisher, and mink.

Practically all transportation is by river; in summer by river-boat and in winter by dog-team. There is a fair horse-trail on the east side of the river as far as Russel Creek, where it crosses the river and continues up the west side to Fort Ware. There are trap-trails up most of the side creeks; some of which could be used by horses, but most are only suitable for dogs.

There is a plane service twice a month from Prince George to the posts of the Hudson's Bay Company at Fort Grahame and Fort Ware. This is discontinued for a few weeks during freeze-up and break-up. All heavy supplies are brought in by river-boat.

Game was scarce in the valley, but is probably more plentiful back in the hills. Moose, caribout, goat, and bear were seen during the summer. Moose were the most plentiful. Wolves and the Indians are blamed for the scarcity of game. Game birds were also scarce, although a few willow, spruce, and blue grouse and ptarmigan were seen. A few geese nested in the swamps and lakes.

The Finlay is a poor river for fish, as the water is always full of silt, but the creeks and some of the lakes are better. Some rainbow, Dolly Varden, and arctic trout, or grayling, were caught during the summer.

A contour map of the area is now being prepared on a scale of 2 inches to 1 mile, with a contour interval of 100 feet.

I have, etc.,

G. J. JACKSON, B.C.L.S.

TRIANGULATION SURVEY, CASSIAR DISTRICT.

BY FRANK SWANNELL.

VICTORIA, B.C., November 13th, 1939.

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

SIR,—I have the honour to submit the following report on the triangulation survey carried out by me, with Messrs. W. H. Forrest, B.C.L.S., and A. H. Phipps as assistants, during the summer of 1939.

The primary object of this triangulation was to provide the main control for the photo-topographical surveys made this same season by Messrs. Stewart and Jackson. It was an extension northward of the British Columbia Government triangulation net, based on geodetic survey positions at Prince George, which had, by various surveyors, been carried from that point northerly to the confluence of the Finlay and Ingenika Rivers during 1929–30. Opposite the mouth of the latter river a base some 2¼ miles long was very carefully laid out and measured by LeRoy Cokely, B.C.L.S., and myself during the summer of 1930. Our results, independently obtained and in each case double-checked, were in very close coincidence and agreed well with the value carried down on to this base from geodetic data. This base is being adopted for the extension of the triangulation northward to Sifton Pass and its further continuance this season down the Kechika River, by Mr. Hugh Pattinson, B.C.L.S.

Universal Wild theodolites were used and angles of the main system usually read eight times, which, owing to the optical arrangement of the Wild is equivalent to sixteen values for each angle. All photo-topographical stations visible were also read into. Twenty-three main stations, including the initial two of Mr. Pattinson's triangulation, were occupied.

A secondary triangulation was also carried up the Finlay River from Deserters Canyon to the foot of Long Canyon, and several points fixed up Fox River. This was to provide control for traverses made by Col. Rolston, who was investigating the Finlay and Fox Valleys for the Public Works as a possible route for the proposed Alaskan Highway. In addition, Weissner Lake was partially triangulated. Some fifty secondary stations in all were read, of which about ten had originally been set by the photo-topographical survey.

PREVIOUS EXPLORATIONS—FINLAY AND FOX RIVERS.

The first white man to see the Finlay was Mackenzie, who, ascending the Peace, reached Finlay Forks on May 31st, 1793. The river is shown on his map as "Finlay's Branch." No actual ascent of the river, however, appears to have been made until 1824; in which year

Samuel Black, Chief Trader of the Hudson's Bay Company, with a crew of voyageurs and Indian hunters and guides ascended to the headwaters. The first part of Black's journal was seen at Cumberland House, in 1894, by Mr. J. B. Tyrrell, but has since disappeared. From a précis made by Mr. Tyrrell we know that Black left the Rocky Mountain portage establishment on May 13th, 1824, and reached the foot of Deserters Canyon on the 27th. Here two of his canoe-men decamped; hence the name given the canyon. Black reached the mouth of Fox River on June 1st; his estimate of the air-line distance from "deserters' portage" to Fox River is 36–40 geographical miles, which is quite close to the actuality. Black's journal of his explorations around the headwaters of the Finlay is preserved in the British Columbia Archives; it is very prolix and abounds in florid descriptions of the scenery. As he was not a trained surveyor and had no means of fixing his positions, his expedition was barren from the mapping point of view.

Fort Grahame, first known as "Bear's Lake Outpost," was founded about 1869, about which date the first prospectors pushed up the river. R. G. McConnell, of the Geological Survey, spent the season of 1893 on the Finlay and its tributaries. He appends a map of the region to his report. In 1897 the first parties of Klondikers taking the Edmonton route reached Fort Grahame and wintered there; pushing on through Sifton Pass next season. Inspector J. D. Moodie, of the N.W.M.P., sent with a patrol to investigate this route, more particularly as to the feasibility of constructing a wagon-road to the Yukon, also spent this winter at Fort Grahame. Moodie's report, published in the Sessional Papers for 1899, gives an excellent description of the country from this point of view.

In 1912 Mr. A. W. Harvey, B.C.L.S., made surveys up as far as Deserters Canyon; and in 1914 I made a rapid reconnaissance of the Ingenika River and the Finlay to about 15 miles above the Fishing Lakes. Mr. Victor Dolmage in 1927 made a geological survey, utilizing my 1914 map for the topographical features. Outside of the sketch-map accompanying Inspector Moodie's report, no information was available regarding the Fox River and the Kechika until Mr. E. C. W. Lamarque, B.C.L.S., and myself passed through with the Bedaux expedition in 1934.

THE ROCKY MOUNTAIN TRENCH SECTION, INGENIKA RIVER TO SIFTON PASS.

The "Rocky Mountain Trench," or great intermontane valley, crosses the International Boundary in longitude 115° 10′ W. and runs N. 33° W. for some 800 miles; being bordered on the east by the Rocky Mountains and to the west by many different ranges. It is quite independent of and was formed antecedent to the present drainage system of the country, being traversed in turn by the Kootenay, Columbia, Canoe, Bad, Parsnip, Finlay, and Fox Rivers, and continuing northward into the blue distance beyond the Sifton Pass Divide.

The straightness of this ancient trough-valley is remarkable. The line of peaks along the eastern side of this great depression which were used this year in extending the triangulation lie very nearly in the same straight line for 90 miles up to Sifton Pass. The peaks similarly used to the west are also nearly in one line, the distance across the trench from peak to peak being about 9 miles.

The flattish valley-bottom is from 5 to 7 miles in width, floored by glacial deposits of silts and gravels, rising in benches and terraces. The Finlay meanders tortuously from side to side of the valley-bed, often expanding into an intricate system of high-water channels; this being noticeably the case above the confluence of the Akie River. Old channels are blocked by log-jams and silt and new ones are cut each high water. High cut-banks of cemented gravel are a feature of the river above the Akie; the unequal hardness of the strata in places producing a peculiar bastion-like effect. Some of these cut-banks tower over 200 feet above the river and are being continually undermined by the impinging current. Elsewhere the banks are generally low. Very little bed-rock obtrudes along the river except at Deserters Canyon, 15 miles above the Ingenika, where the river cuts for one-half mile through a belt of conglomerate. The river, usually 200–250 yards in width, here contracts to 160 feet at the head of the canyon. This canyon is dangerous at high water.

Between the Ingenika River and Fort Ware, a distance, by river, of 73 miles, no stream of any size enters from the west. On the east, or Rocky Mountain side, the Akie comes in 12 miles above the canyon through a wide deep-cut valley which forks some 14 miles up. The

Akie (or Akieca) is heavily laden with glacial silt, has a wide flood-bed through which it twists tortuously in many channels for 2 miles up, where, reaching the rim of the main Finlay Valley, it emerges from a gorge. Above this it wanders at low water through a wide flood-bed.

It is 36 miles from the Akie to Paul Creek, 40 feet wide and 2½ feet deep, which breaks through a gneissic range paralleling the main Rockies. Why this was styled Paul Branch on old maps is a mystery as it is only a large creek.

KWADACHA AND WARNEFORD RIVERS.

Fifty-six miles above Deserters Canyon the main fork of the Finlay, the Kwadacha, comes in; its turbid, whitish, silt-laden waters flowing without mingling alongside the clear Upper Finlay water for some miles below the confluence. It contributes one-third of the Finlay and at its mouth is 50 yards wide at low water, five feet deep, and very swift. At high water its width here is 70 yards. Four miles up is a short canyon above which the river is much cut up into many channels with bars and drift-piles. About 17 miles up, the river forks, the main Kwadacha coming in from the east. Sixty-five miles up, the Bedaux trail from the Muskwa River to Fort Ware crosses, the river here being 30 yards wide at low water and just fordable. Above the ford the river emerges from a very deep-cut rock gorge and 15 or 20 miles due north is reported to issue from a large ice-field. The left-hand fork, known as the Warneford or Wolverene River, comes in from the north-east and forks 20 miles up. The North Fork heads in Quentin Lake, the East Fork in Haworth Lake at a reported altitude of 4,300 feet.

UPPER FINLAY RIVER.

Above the confluence with the Kwadacha the Finlay abruptly changes direction, cutting transversely the wide valley in which its lower course runs. It comes in from the west through a narrow gap in the first range, bordering the Rocky Mountain Trench. A few miles farther up commences the long succession of canyons and rapids characterizing the remainder of its course.

FOX RIVER VALLEY.

The Fox River (or Tochieka), although an insignificant shallow stream, only 30 yards wide where it enters the Finlay 3 miles above the Kwadacha, now is the sole occupant of the wide intermontane valley for so many miles occupied by the Finlay. The Fox forks about 22 miles up. The main branch, which just below the crossing of the Sifton Pass trail is completely blocked by a log-jam, continues for some 10 miles in the Rocky Mountain Trench; at the eastern edge of which it again forks, one branch heading to the N.N.E. in a deep, wide valley.

The other branch heads in Weissner Lake, about 7 miles long, lying due east and west in a transverse valley which continues through to the Warneford River. This transverse valley again appears to the west of the Rocky Mountain Trench as the Fox Pass. In 8 miles the Finlay River is reached; the river occupying this valley for 25 miles westward. It seems obvious that, anciently, before cutting south into the narrow cleft of Cascade Canyon, the Finlay reached the Rocky Mountain Trench through the Fox Pass.

The left-hand and smaller branch of Fox River parallels the main branch of the Fox for 10 miles, keeping to the western side of the trench, rapidly diminishes in volume, passes through Fox Lake, 1¾ miles long, and heads near Sifton Pass.

At Sifton Pass, 44 miles above Fort Ware on the Finlay, the mountains narrow in and a swampy meadow marks the actual divide between Finlay and Liard waters. This 44-mile section of the Rocky Mountain Trench has a bottom width varying from 3 to 5 miles. It is completely floored with glacial-drift deposits, contains numerous small lakes and muskeg-filled depressions, and is characterized by longitudinal moraine ridges down the valley centre. This formation is especially noticeable in the area between the parallel courses of the branches of the Fox. It is here the pack-trail should have run instead of following, in typical Indian fashion, the line of least resistance through the string of muskeg meadows to the west of this central elevation.

NATURAL RESOURCES AND CLIMATIC CONDITIONS.

There is at present no lode-mining in the Ingenika-Sifton Pass section of the Rocky Mountain Trench. Fine gold may be found, but seldom in paying quantities, on nearly every bar along the Finlay; but none of the easterly tributaries, except the Kwadacha, carry any trace of gold. A bar above Deserters Canyon was being worked last September by Messrs. Blanchard and Miller, who reported that $4 to $5 a man was being made. No other mining was being done.

Timber resources are scanty. Most of the country was burnt over during the Klondike rush, or even earlier, and pine and poplar have replaced the original spruce. Spruce intermixed with cottonwood now occurs in scattered areas, mostly on the rich alluvial bottoms between river-loops.

Clearing would be light and many areas of good agricultural land could be picked, but the whole valley is subject to summer frosts. Fox River Valley being floored with glacial drift is barren and valueless, and such meadows as exist are almost invariably swampy. Potatoes and other vegetables have been raised at Fort Grahame and garden-truck by Del Miller at his place, 28 miles below Fort Ware. Small fruits such as strawberries, raspberries, and cranberries would yield well. Wild strawberries were particularly plentiful this year.

The winters are cold, but the weather reported to be mostly clear and bright and the snowfall light. No recent figures are available, but at Fort Grahame in 1898 the lowest temperatures recorded were: In January, −38°F.; February, −50°; March, −6°. The summer of 1939 was rainy, rain falling on twelve days in July, fourteen days in August, and on six days in the first half of September. Several summer frosts were recorded. In 1914, a more normal season, average noon temperatures were: June, 68°; July, 62°; August, 68°; and September, 51°.

MEANS OF ACCESS AND SETTLEMENT.

In this whole area there are only half a dozen white trappers and a few dozen Sikanni Indians. There are no settlements and only the one trading-post—that of the Hudson's Bay Company at Fort Ware, 1½ miles above Kwadacha Forks. The river provides the means of access, supplies being brought up in large boats. Fort Ware is 370 miles from Prince George. The route comprising 32 miles by road to Summit Lake; thence down-stream by the Crooked River to McLeod Lake; and down the Pack and Parsnip Rivers to Finlay Forks, 210 miles from Prince George. The remaining 160 miles up the Finlay is only interrupted by one obstacle—Deserters Canyon—which, however, except at extreme high water, is easily negotiated by the large powerfully-engined freighting-boats. An easier route, particularly for going out in the fall, is to go down the Peace River from Finlay Forks to the head of the Peace River Canyon and from there by road to the railway at Dawson Creek. We made from the Ingenika River to the railway in three days, travelling two by boat and one by truck. During the summer months there is a fortnightly mail service to Fort Ware by aeroplane.

GAME AND WILD ANIMALS.

There is very little game, which is attributed to wolves being numerous. The Sikannis frequenting Fort Ware are, however, probably responsible for the scarcity of moose. Not a dozen goat were seen the whole season and fewer caribou. This lack of large game was typical of conditions as far back as my exploration in 1914. We saw very few black bear and no grizzly. Small game was also scarce; grouse few and the coveys small, while the rabbits, exceedingly numerous in 1914, are now seemingly completely gone. Trout to a large size were caught in the Finlay as well as grayling, and in a few of the numerous small lakes trout and whitefish were plentiful.

I have, etc.,

FRANK SWANNELL, B.C.L.S.

TRIANGULATION SURVEY, KECHIKA RIVER VALLEY, CASSIAR DISTRICT.

By Hugh Pattinson.

Victoria, B.C., November 13th, 1939.

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 of June 22nd:—

The object of the survey, as defined in your instructions, was to extend a triangulation network north-westerly along the valley of the Kechika River as far as possible, from stations to be set in the vicinity of Sifton Pass, the triangulation to be utilized later as control for mapping from aerial and ground photos.

The party, consisting of A. T. Holmes, B.C.L.S., assistant; and five men, was organized at Prince George and left for Fort Ware, near the mouth of the Whitewater River, on June 30th, arriving at the latter place on July 7th. The pack-train of twenty-two horses, in charge of J. O. Davidson, which was to meet me at Fort Ware, had not arrived. It was therefore decided that A. T. Holmes, with three of the party, should await the arrival of the horses, utilizing the intervening time by clearing trail; while the remainder of the party proceed to Sifton Pass, establish a camp and commence field operations. One horse was obtained and the services of its Indian owner. The horse was packed with one week's food-supplies and the party of four, including myself, left Fort Ware on July 11th, arriving at Driftpile, our first main camp, on July 14th. The remainder of the party arrived with pack-train and supplies on July 19th, five days later.

Before leaving Prince George, arrangements had been made with Dick Corless, Junior, river freighter, to have additional supplies landed at Fort Ware on the 10th days of August and September respectively. From the latter point we were entirely dependent on our pack-train for the relaying of the supplies to our various camps, and although the average return trip was approximately 200 miles, over a trail which was anything but good, the pack-train each time arrived on schedule.

Our first work consisted of locating and erecting signals on four prominent mountain-peaks; thus forming the first quadrilateral of the triangulation network to be continued north-westerly along the valley of the Kechika River. The most southerly points—△ " Sifton " and △ " Scarcity "—were located on the west and east sides respectively of the valley of the Fox River, and the straight line joining them cuts that river near its head about 2½ miles southerly from the height of land between the Fox and Kechika Rivers. △ " Sifton " and △ " Scarcity " were later occupied by F. C. Swannell, B.C.L.S., and N. C. Stewart, B.C.L.S.

Twenty-six stations were set and monumented during the season, extending the network approximately 100 miles north-westerly from Sifton Pass; the last station being within a few miles of the mouth of the Turnagain River.

PHYSICAL CHARACTERISTICS, KECHIKA RIVER VALLEY.

The valley of the Kechika River is remarkably straight throughout its entire length. The river follows a serpentine course and divides itself at intervals into numerous channels. During the period of low water extensive sand- and gravel-bars appear. The floor of the valley is generally fairly level, but occasionally broken by low knolls or ridges. Usually, access to the river is easy, but there are high cut-banks at intervals caused by encroachment of the river during high water, on the timbered bench lands. To the north of the Gataga and Black Rivers the mountains gradually become lower and more rounded on top and the valley widens out considerably. The main tributaries entering the Kechika River between its head and the Turnagain River are the aforementioned Gataga and Black Rivers. The former is swift and the water of a muddy grey colour, due to glacial silt brought down from the high mountains where it has its source. It empties into the Kechika River from the east side, flowing in a north-westerly direction. The width at the part where the trail crosses is about 180 feet across the flow at low water, but the bed is very much wider, probably 500 or 600 feet from bank to bank.

The Black River empties into the Kechika River from the west at a point approximately 48 miles north-westerly from Sifton Pass, its mouth being only 5 or 6 miles above the mouth of the Gataga River. The current is quite fast but the river is fordable during periods of low water. Unlike the Gataga River the water is crystal clear. The width from bank to bank would probably average about 250 feet, but varies considerably at different points.

The volume of the Kechika is increased greatly by the waters of the Black and Gataga Rivers, and below the confluence of the Kechika with the latter river fording became impracticable and rafts had to be resorted to.

FOREST-COVER.

There is a medium coverage of Canada spruce and jack-pine below the 4,000-foot level, but owing to the high latitude and high average elevation above sea-level the timber is generally small, even when mature. Some spruce was noticed up to 2 feet in diameter, but it is doubtful if the average would exceed 8 inches. There is a good stand of jack-pine covering a park-like area on the west side of the Kechika River, between the Black River and Denatiah Creek. Timber-line lies slightly above the 5,000-foot contour, but for 500 feet below that contour there are only scattered clumps of alpine balsam. In the valley and on the lower slopes of the mountains aspen, cottonwood, and occasional birch are found intermixed with the coniferous varieties. Some tamarack was noticed in the swamps. A very small proportion of the wooded areas has been burnt over, and this fact is probably partially due to the remoteness of the region and lack of population.

VEGETATION.

Meadows, large and small, are found at intervals, varying in size from two or three to several hundred acres in area. Some of these meadows are swampy and others dry, and the quantity and quality of the grass varies accordingly. The swamp meadows produce a heavy growth of swamp-hay, while the others produce a variety of good cured grasses which afford excellent feed for horses. North of the Gataga River there are some long stretches of open and semi-open hillside sloping from the bench lands to the floor of the valley. These slopes support a variety of bunch-grass very similar to that found in the Dry Belt of British Columbia. Tufts of sagebrush and deadwood were also noticed on these open hillsides.

GAME.

Goat are very plentiful and almost any day herds ranging from two or three to a dozen or more can be seen, with the aid of field-glasses, grazing on the short grass on the higher levels of the mountains. Occasionally some of them wandered down into the valley, where their long almost snow-white hair made them clearly visible against the green background.

Sheep were also quite plentiful and were generally seen grazing in flocks, six or seven in number. Unlike the bighorn they are grey in colour and are probably of the species known as Fannin's, although they bear a marked similarity to the Stone's, which roam the mountains from the Stikine River north through the Atlin District.

Moose and caribou were scarce during the summer, but the former began to appear in fair numbers towards fall.

A few black bear and several wolves were seen. The latter are apparently quite numerous and are probably responsible to some extent for the scarcity of deer and the dwindling herds of moose and caribou in this region. On several occasions the remains of recently killed moose were noticed.

The presence of fresh beaver-cutting was observed at several points along the river-banks, and several fox were seen during the season.

Of the game birds, willow grouse were quite numerous and ptarmigan were generally to be seen high up on the mountains.

CLIMATE.

According to information obtained from Indians in the locality, and others living adjacent to it, the climate is generally fairly dry with moderate precipitation, probably not exceeding 20 inches. The average depth of snow during the winter months is about 1½ feet. During the past season light showers were very frequent, but there were few heavy rainfalls until

near the end of September. Light snowfalls occurred early in August on the summits, but the snow melted within twenty-four hours. On September 5th there was a fairly heavy snowfall which extended down to timber-line and covered some of the higher stations for the balance of the season. The first really cold weather was experienced on October 5th while en route to Fort Ware; when there was a sudden change from comparatively mild weather to zero temperature. The cold spell lasted less than forty-eight hours and when we took our departure from Fort Ware on October 10th the weather was still mild.

ACCESSIBILITY.

There are the two main water routes. One starting from Summit Lake north of Prince George follows the Little Crooked, Pack, and Parsnip Rivers to their confluence with the Peace and Finlay Rivers at Finlay Forks, and then up the last-named river to Fort Ware near the mouth of the Kwadacha River. The remainder of the journey is made by trail, following the valley of the Fox River to its head, at Sifton Pass. The distance by river from Summit Lake to Fort Ware is approximately 350 miles, and the distance by trail from the latter place to Sifton Pass is about 50 miles.

The other water route is by way of Wrangell and follows the Stikine River to Telegraph Creek, where a road connects with Dease Lake. The route then follows the Dease River to its confluence with the Liard River, near Lower Post. There was a bi-monthly aeroplane mail and passenger service between Prince George and Fort Ware during the past summer. The plane, equipped with pontoons, alighted on the Finlay River opposite the Hudson's Bay Post. Unfortunately, there are long distances where it is not possible for a plane to land in safety; however, one lake approximately 2 miles in length, situated near the mouth of the Turnagain River, would probably comply with the necessary requirements.

GENERAL.

The country has no permanent residents at present, although Indian trap-lines extend as far north as the Gataga River.

The visible resources consist chiefly of the timber, the future value of which it would be difficult at this time to estimate. Though generally small in size compared with the timber in more southern latitudes, there is probably sufficient commercial timber to take care of most local and domestic requirements in case of future settlement. Specimens of soft coal float were noticed along the bars of the Kechika River and were probably washed down from the seam referred to in the Moodie report as discovered by two of his party who went prospecting from his camp No. 49.

Conditions are favourable for stock-raising on a moderate scale. There are many large meadows north of the Gataga River from which a considerable tonnage of hay could be cut, and there is good open hillside grazing at intervals along the river.

Due to the remoteness of the region and absence of roads or good trails, the country is still unprospected and likely to remain so until easier and less expensive means of access are obtained. The expenditure of time and money required is far beyond the means of the average prospector. Vast areas of rugged mountainous country extending from the Kechika River easterly, across the main range of the Rocky Mountains and including the watersheds of the Rabbit, Gataga, and Toad Rivers still remain virgin territory for the prospector. Other areas extending westerly to the Stikine mountains still await the ring of the prospector's pick and the sound of the woodman's axe, and it is quite within the bounds of possibility that riches, now undreamed of, may be brought to light by the coming generation of prospectors.

I have, etc.,

HUGH PATTINSON, B.C.L.S.

TRIANGULATION SURVEY, KECHIKA AND LIARD RIVERS.

BY PHILIP M. MONCKTON.

VICTORIA, B.C., November 8th, 1939.

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

SIR,—Acting under your instructions of June 20th, I organized part of my survey crew in Victoria and proceeded to the starting-point of the work at Lower Post, on the Liard River. We left Victoria on June 22nd and arrived at Wrangell, Alaska, on June 26th; left Wrangell the same day and reached Telegraph Creek on June 28th. Here we arranged for a packer, a cook, and horses; then proceeded to Dease Lake by truck over a rough road, 73 miles. From this point small boats are operated down Dease Lake and Dease River. The lake is 28 miles long and the run to Porter Landing at the foot (north end) of the lake takes half a day. In the early evening we reached McDame Creek, a further 60 miles, and tied up for the night. All of July 3rd was taken up with the 120-mile stretch to Lower Post, situated on the Liard River, one-half mile up-stream from its confluence with the Dease River. Here we were given a hearty welcome by the Hudson's Bay Company storekeeper and were put up at his residence.

Lower Post (or Liard Post, as it is sometimes called) is the most northerly settlement in British Columbia, being only 2 miles from the Yukon border. It consists of a few log buildings, including three stores, and (in July) quite a large number of visiting trappers, both white and Indian. Prices are naturally very high, as would be expected, with a freight rate of 14 cents a pound from Vancouver; but the stores are quite well stocked, nevertheless. The only industry at Liard is fur, and the trappers here seem to do quite well. Most of them trap across the boundary, in the Yukon Territory, and spend one month a year in Liard. We saw one or two small gardens, in which a few small spindly potatoes and other truck were waging a losing battle with nature. In August severe frosts killed them. Only rhubarb seemed to thrive. Some years they get a crop of potatoes of poor quality and these sell at $8 a sack, in competition with "outside" ones at around $20. The soil is sandy and dry. From Lower Post trails radiate in all directions. North up the Liard River, 25 miles to Watson Lake, Y.T., where the air-mail calls once a week, each way, on its run between Vancouver and White Horse. This plane formerly called at Lower Post, but the latter is now condemned as an airport. By following this trail about 3 miles, one leaves British Columbia near the foot of the canyon of the Liard, and by following the Liard another 5 or 6 miles, the monument set by Dr. Dawson in 1887 can be seen on a rock on the right bank of the river. The original was taken away and a new one made of concrete set in the same spot in 1927.

Another trail goes eastward to Hyland River and up this river; and one goes south to McDame, on the left bank of the Dease River. But the most used one is the "Davy" trail, which comes in from the south-east and leads to the Muddy (Kechika) River, Fort Nelson, Fort Ware, and all points east. This we followed.

Our programme consisted of picking out a suitable base-line, chaining it, and triangulating thence to Dawson's monument (previously referred to), and after that south-easterly as far as time would allow.

There are no mountains near the Lower Post, nor exposure of rock. The only elevations on which a station can be built are at the edges or angles of the various benches and moraines. These are from 200 to 800 feet above the river; flat-topped, and densely timbered. Open lookout spots are few and face only in one direction. The highest one of these hills is locally known as Canyon Mountain; it is 6 miles by trail north of Lower Post and 800 feet above the river. From it (with some clearing) one can see through about 180 degrees from south-east to north-west. This gives a view into the Yukon Territory of perhaps 50 or 60 miles of perfectly level jack-pine flats.

The Liard River at Lower Post is about 600 feet wide, flowing 5 miles per hour, and 8 or 10 feet deep in the channel. It is muddy and impregnated with lime. It is navigable (with obstructions here and there) for small boats with plenty of power, up-stream to

Frances Lake, and up the main fork more than 100 miles; also down-stream to Cranberry Rapids, where there is a portage to the Kechika, of a mile or so. The Hyland, too, is said to be passable with a light boat and a strong "kicker" for 250 miles.

We located and cut out a base-line (1¼ miles long) with one end near the Post; tied in some old surveys there, and had a good deal of difficulty in getting satisfactory quadrilaterals to expand from the base in such a position that we could see over the surrounding benches to the higher hills beyond. Almost half the season was spent on this; but finally, on August 8th, we left the Post with everything behind us completed and pointed ourselves toward the south-east.

The Davy Trail commences about a mile from the Post, across the Liard and Dease Rivers, and some 66 miles to the Kechika River. It splits there; one fork crosses the Kechika River and goes to Fort Nelson; the other keeps to the left bank and goes to Sifton Pass and Fort Ware. This trail is of purely Indian construction, but is passably well located and has very few swamps or unnecessary up-and-downs in it. It is well cut out and not much cluttered up with fallen trees.

Our first halt was at the 6-Mile post, where we had a station called "Black Mountain." From here we moved to Mile 20 and read two stations. About Mile 18½ is probably the highest point on the trail. Assuming Liard to be 2,150 feet, this point is around 2,800 feet. From Mile 10 to Mile 20 there has been a great deal of fire, and from quite a few of the bare benches extensive views can be had; but from Mile 20 to Mile 46 the country is excessively flat and covered with dense timber and nothing can be seen. The odd hills (like the Station "Dome," 4 miles north-east of Mile 27) have nearly level tops and will need many acres cleared to give a 360-degree field of view. To the south-west of Mile 19 the first mountain of the Cassiar Range is seen, about 4 miles from the trail, and on this a station was set; and as one proceeds to the south-east the Cassiar Range gradually increases in height and prominence, but it is not until opposite Mile 50 that any point reaches timber-line, and as far as we went the highest was only 5,200 feet, or 3,000 feet above the valley. On the north-east of the trail, a low mountain appears at Mile 47 and continues to Mile 62, but it is an isolated one and not connected to any range. Just to the east of this low hill (3,800 feet) is the Kechika River, which flows about 5 miles per hour and is 500 feet wide. It pursues an extraordinary serpentine course until, at about 15 miles east of Mile 40, it leaves the Rocky Mountain Trench and cuts through the hills to join the Liard.

We finished the field-work on September 26th near the Turnagain and left for Telegraph Creek on September 27th, arriving there on October 14th and at Victoria on October 28th.

CLIMATE.

At Lower Post and in the flat country near it, there seems to be a dry area. No records have ever been kept either of rainfall, snowfall, or temperature. But the summer of 1939 was said to be the wettest in memory at Dease Lake; yet around Liard it was very dry but cloudy, and during the whole season there were only six nights when the stars were visible. Last winter, at Watson Lake, the coldest was 64° below; so in all likelihood Lower Post was much the same. One day in July it was over 90°. The main feature of the climate is the continual wind, no doubt being drawn into the Rocky Mountain Trench. Severe summer frosts were noted, 17° in August. A few flakes of snow fell on August 4th; no more until September 13th; again on September 26th; on October 6th at Boulder Creek (elevation 3,400 feet) it was zero, and after that a great deal of snow fell all over Cassiar.

TIMBER.

The two main species are spruce and jack-pine. These grow to a diameter of 12 inches and 70 feet high. In the swamps the commonest tree is the tamarack; it does not exceed 1 foot in diameter. Along the rivers there is some cottonwood. Interspersed with the others is a fair amount of birch, poplar, alder, and different varieties of brush. There is good feed at many places along the Davy Trail and many good creeks at which to camp. The best feed is at the following mile-posts (from Dease River): At Mile 6, Mile 12, Mile 16, Mile 20, Mile 29, Mile 36, Mile 48, Mile 54, Mile 61, and along the banks of the Kechika from Mile 66 on.

GAME.

In the flat country, game is very scarce and no reliance should be put in obtaining any. We got one moose in August on a mountain-top in the Cassiar Range, and never even saw another one. No caribou were seen; a few sheep and goat on the high peaks in the Cassiar Mountains, west of Birch Lake. A fair amount of grouse were obtained however.

There is no shortage of wolves, which howled constantly around our camps at Mile 54 and Mile 61. Also a few coyotes and many black bear.

After leaving the work and travelling up the Turnagain, in mountainous country, the situation was quite different. Many moose, caribou, etc., were observed.

GEOLOGY.

The whole area consists of sedimentary rocks; sandstone, shale, limestone, conglomerate, and mica schist. No igneous rock was seen in place, nor was it, on the way out, until a belt of granite was encountered at the head of Mosquito Creek. Some coal was seen on Dease River, near the mouth, and on the Liard, near the Canyon. We heard rumours of oil seepage, but saw none. However, no doubt, the rocks are the right formation for oil.

I have, etc.,

PHILIP M. MONCKTON, B.C.L.S.

VICTORIA, B.C.:
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