PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

OF THE

LANDS AND SURVEY BRANCHES

OF THE

DEPARTMENT OF LANDS

FOR THE

YEAR ENDED DECEMBER 31ST, 1935

HON. A. WELLS GRAY, MINISTER OF LANDS

PRINTED BY
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1936.

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VICTORIA, B.C., March 20th, 1936.

To His Honour JOHN WILLIAM FORDHAM JOHNSON,
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, 1935.

A. WELLS GRAY,
Minister of Lands.

VICTORIA, B.C., March 20th, 1936.

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, 1935.

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., February 25th, 1936.

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, 1935.

An additional feature to this year's report will be observed in respect of figures on the sale of reverted lands by a deferred-payment system devised in 1933 as a partial relief measure with the idea of encouraging those on relief to supplement their allowance by growing foodstuffs. Principal payments without interest were deferred for two years, and during that period the settler was only obligated to pay taxes and do improvements, including buildings, fencing, or cultivation, in each of the two years of not less than 10 per cent. of the appraised value of the land.

It will be of interest to note that 4.8 per cent. of the original entrants abandoned locations after a short trial, and that 27½ per cent. of those who have completed the first two years made their first deposits of principal.

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

NEWMAN TAYLOR,
Superintendent of Lands.

STATEMENT OF REVENUE, YEAR ENDED DECEMBER 31ST, 1935.

LAND-SALES.

		Victoria.	Agencies.	Total.
Under "Coal and Petroleum Act"		.....	.....	.....
Under "Taxation Act"—				
General	$28,483.52			
Special regulations	1,211.06			
		$29,694.58	.....	$29,694.58
Under "Land Act"—				
Townsites		72.15	$12,401.89	12,474.04
Country lands		8,577.08	11,893.80	20,470.88
Pre-empted lands		.....	337.93	337.93
Former Dominion Railway Belt lands		.....	5,568.82	5,568.82
Surface rights of mineral claims		442.75	1,397.40	1,840.15
Totals		$38,786.56	$31,599.84	$70,386.40

SUNDRY REVENUE.

Under "Land Act"—				
Sundry lease rentals		$70,593.24	.....	$70,593.24
Grazing rentals		5,204.80	.....	5,204.80
Survey fees—				
Under "Land Act"	$1,547.09			
Former Dominion Railway Belt lands	140.91			
		106.50	$1,688.00	1,794.50
Sundry fees		10,624.00	787.00	11,411.00
Royalty		204.93	.....	204.93
Improvements		249.10	360.72	609.82
Rent of property		103.50	8.00	111.50
Under "Taxation Act"—				
Mineral claims		43.51	7,940.41	7,983.92
Totals		$87,129.58	$10,784.13	$97,913.71

Revenue under "Coal and Petroleum Act."

	Victoria.	Agencies.	Total.
Coal licences	$4,100.00	.....	$4,100.00
Coal rentals	15,096.04	.....	15,096.04
Sundry fees	3,475.00	.....	3,475.00
Lieu of work	200.00	.....	200.00
Totals	$22,871.04	.....	$22,871.04

Sundry Receipts.

Maps, blue-prints, etc.	$7,779.86	.....	$7,779.86
Miscellaneous	244.42	.....	244.42
Interest, Southern Okanagan Project	7,831.34	.....	7,831.34
Revenue from lands transferred from the Dominion	8,757.36	$2,038.25	10,795.61
Totals	$24,612.98	$2,038.25	$26,651.23

Summary of Revenue.

Land-sales	$38,786.56	$31,599.84	$70,386.40
Land revenue	87,129.58	10,784.13	97,913.71
"Coal and Petroleum Act"	22,871.04	.....	22,871.04
Sundry receipts	24,612.98	2,038.25	26,651.23
Totals	$173,400.16	$44,422.22	$217,822.38

Summary of Cash received.

Revenue	$173,400.16	$44,422.22	$217,822.38
"Soldiers' Land Act"—			
South Okanagan Project	6,797.81	.....	6,797.81
Houses, South Vancouver	579.02	.....	579.02
"Better Housing Act"—			
Principal	45,190.00	.....	45,190.00
Interest	42,339.64	.....	42,339.64
Land Settlement Board—			
Land-sales	9,559.51	.....	9,559.51
Loans	32,316.70	.....	32,316.70
Refund of advances and refund to votes, etc.	603.84	.....	603.84
Totals	$310,786.68	$44,422.22	$355,208.90

SALE OF TOWN LOTS DURING 1935.

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

5 lots at Barkerville	$350.00
5 lots at Clinton	450.00
18 lots at Oliver	3,025.00
16 lots at Osoyoos	3,275.00
2 lots at Powell River	300.00
4 lots at Quesnel	575.00
1 lot at Bella Coola	100.00
1 lot at Terrace	200.00
And 18 lots in various other townsites	584.00
	$8,859.00

During the year auctions were held at Creston, Duncan, and Kimberley, disposing of ninety-one lots for $14,160.

Southern Okanagan Project sold thirty-four parcels, comprising 120.92 acres, the purchase price being $9,557.75.

In the University Hill Subdivision in Lot 140, New Westminster District (Endowment Lands), no new transaction during the year, but collections have been maintained slightly in advance of previous year.

PRE-EMPTION RECORDS, ETC., 1935.

Agency.	Pre-emption Records allowed.	Pre-emption Records cancelled.	Certificates of Purchase.	Certificates of Improvements.
Alberni	-----	-----	5	-----
Atlin	-----	-----	2	-----
Clinton	28	28	31	12
Cranbrook	7	2	59	1
Fernie	-----	-----	7	-----
Fort Fraser	37	37	3	10
Fort George	32	54	27	9
Golden	12	7	4	-----
Kamloops	25	31	13	2
Kaslo	-----	-----	1	1
Nanaimo	1	1	-----	-----
Nelson	2	1	76	1
New Westminster	13	20	147	-----
Penticton	8	5	7	6
Pouce Coupe	103	429	21	6
Prince Rupert	2	22	26	-----
Quesnel	46	58	57	19
Revelstoke	7	12	-----	-----
Smithers	9	7	1	6
Telegraph Creek	-----	1	11	-----
Vancouver	8	18	43	1
Vernon	2	5	24	2
Victoria	1	1	925	-----
Totals	343	739	1,490	76

LAND-SALES, 1935.

	Acres.
"Land Act"—	
Surveyed (first class)	267
Surveyed (second class)	3,619
	3,886
Unsurveyed	993
Total	4,879
"Taxation Act"—	
Cash and conditional sales	6,831
Deferred-payment settlement plan	8,312

SALE OF REVERTED LANDS UNDER DEFERRED-PAYMENT SETTLEMENT PLAN TO DECEMBER 31ST, 1935.

	No.	Acreage.	Appraised Value.	Deposits due.
Applications allowed	605	50,977.00	$204,006.00	$7,268.91
Less abandonments	29	2,053.73	11,508.00	1,427.00
Totals	574	48,923.27	$192,498.00	$5,841.91

Deposits due, 178	$5,841.91
Deposits paid and partly paid, 49	1,230.22
Instalments in arrear	$4,611.69

LAND INSPECTIONS, 1935.

Agency.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Alberni	-----	-----	-----	-----	-----	-----	3	-----	-----	3	8	8	22
Atlin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Clinton	5	-----	-----	1	1	6	6	36	37	46	25	3	166
Cranbrook	-----	-----	-----	-----	-----	13	2	6	3	10	7	5	46
Fernie	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	-----	-----	1
Fort Fraser	1	2	4	4	4	2	61	63	14	-----	31	29	215
Fort George	-----	-----	-----	-----	2	71	48	86	57	2	169	8	443
Golden	-----	-----	-----	-----	1	15	27	32	6	3	-----	-----	84
Kamloops	8	1	-----	-----	1	15	22	83	68	40	13	22	273
Kaslo	-----	-----	-----	-----	-----	-----	-----	6	4	-----	-----	2	12
Nanaimo	-----	-----	-----	-----	-----	1	9	1	2	-----	-----	-----	13
Nelson	-----	-----	-----	-----	2	2	5	3	3	2	1	-----	18
New Westminster	3	13	10	1	2	27	11	52	16	24	33	6	198
Penticton	3	-----	2	1	4	14	7	8	2	11	-----	-----	52
Pouce Coupe	2	-----	4	-----	32	404	303	476	324	500	302	279	2,626
Prince Rupert	-----	-----	-----	-----	-----	1	-----	1	10	1	3	3	19
Quesnel	22	-----	-----	3	2	5	2	52	41	59	143	8	337
Revelstoke	-----	-----	1	-----	9	5	42	32	24	1	3	1	118
Smithers	2	2	-----	-----	-----	1	-----	2	1	1	12	-----	21
Telegraph Creek	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Vancouver	3	-----	-----	-----	-----	3	26	21	14	22	13	15	117
Vernon	-----	-----	-----	1	11	25	3	13	5	1	3	-----	62
Victoria	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	7	9
Totals	50	18	21	11	71	610	577	973	631	727	737	396	4,852

SUMMARY.

	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.
Pre-emption records	1,167	824	823	1,752	1,624	1,495	969	607	664	559
Certificates of improvements	465	541	379	326	328	217	154	123	193	245
Certificates of purchase	729	778	592	747	1,067	1,152	1,735	1,739	1,452	1,379
Crown grants	847	1,167	1,512	1,806	1,827	1,699	1,295	1,074	1,020	1,192
Total acreage deeded	98,452	187,111	260,321	512,844	215,364	163,161	116,990	68,945	173,632	81,110
Coal-prospecting licences	120	71	72	112	275	160	236	95	98	102
Sundry leases	86	73	83	51	113	104	122	92	92	121
Coal leases	31	7	3	1	12	6	17	----------	----------	5
Revenue received	$159,213.65	$194,435.17	$339,392.51	$251,471.25*	$428,431.64	$381,860.60	$394,454.43	$346,299.34	$322,440.16	$339,053.79
Letters received	13,779	15,780	22,500	53,835†	32,180	28,951	22,857	19,381	15,591	16,901
Letters sent	8,432	12,632	12,500	18,063	19,912	22,372	16,517	14,688	10,936	12,378

	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.
Pre-emption records	447	413	451	524	934	2,441	1,202	485	478	343
Certificates of improvements	276	217	208	172	124	113	80	63	86	73
Certificates of purchase	1,850	1,831	1,731	1,448	1,432	1,444	1,254	1,211	1,903	1,490
Crown grants	1,316	1,414	1,407	1,636	1,213	1,027	795	758	1,123	1,211
Total acreage deeded	84,442	71,018	74,175	109,451	62,823	69,542	58,470	58,782	61,296.50	77,373.41
Coal-prospecting licences	118	142	104	160	235	203	137	33	83	41
Sundry leases	157	190	195	196	149	175	154	225	168	200
Coal leases	17	2	15	19	33	6	23	70	32	37
Revenue received	$404,534.49	$434,213.55	$352,165.35	$618,435.93	$367,115.72	$346,339.89	$218,814.68	$201,213.80	$238,286.77	$217,822.38
Letters received	17,739	19,213	19,140	18,751	21,834	26,304	26,620	25,106	26,699	22,573
Letters sent	15,475	15,537	17,806	14,839	16,581	19,153	34,402‡	22,420‡	22,217‡	18,194

* Cash received at Victoria only. † This included letters received by entire Department. ‡ Including circulars, statements, etc.

STATEMENT OF LETTERS INWARD AND OUTWARD, 1935.

Letters inward	22,573
Letters outward	18,194

Included in the above total of letters inward are general inquiry letters for the months of:—

January	200	August	154
February	202	September	108
March	229	October	101
April	197	November	143
May	111	December	147
June	110		
July	153	Total	1,855

MINING LICENCES, LEASES, ETC., 1935.

Licences under the "Coal and Petroleum Act."

Original licences issued	28;	area, 16,726.20 acres.
Renewal licences issued	13;	area, 8,334.00 acres.
Totals	41;	area, 25,060.20 acres.

Leases under the "Coal and Petroleum Act."

New leases issued	9;	area, 5,493.00 acres.
Renewal leases issued	28;	area, 16,082.20 acres.
Totals	37;	area, 21,575.20 acres.

Sundry Leases under the "Land Act."

Number of leases issued	200;	area, 26,474.59 acres.

CROWN GRANTS ISSUED, 1935.

Pre-emptions	108
Dominion homesteads	218
Purchases (other than town lots)	109
Mineral claims	207
Town lots	49
Reverted lands (other than town lots)	105
Reverted town lots	158
Reverted mineral claims	236
Supplementary timber grants	8
"Dyking Assessment Act"	3
"Public Schools Act"	2
Miscellaneous	8
Total	1,211
Applications for Crown grants	1,214
Certified copies	2
Clearances of applications for leases of reverted mineral claims given	329

TOTAL ACREAGE DEEDED.

Pre-emptions	17,173.20
Dominion homesteads	32,522.15
Mineral claims (other than reverted)	7,696.85
Reverted mineral claims	8,374.32
Purchase of surveyed Crown lands (other than town lots)	4,820.83
Purchase of reverted lands (other than town lots)	5,012.35
Supplementary timber grants	1,773.71
Total	77,373.41

B.C. GOVERNMENT RELIEF LAND SETTLEMENT PLAN, 1932.

VICTORIA, B.C., January 6th, 1936.

To the Deputy Minister of Lands,
Parliament Buildings, Victoria, B.C.

SIR,—I have the honour to submit my Third Annual Report on the operation of above plan, as follows:—

No families were placed on the land during the year 1935 in addition to the fifty families sent out in the spring of 1933.

At the close of the year thirty-six families were still in occupation of their locations, twenty-four from the City of Vancouver and twelve from the City of New Westminster.

In addition to the ten families who gave up their locations in 1933 and 1934, three others returned to the city of origin (Vancouver) in 1935, and one settler from New Westminster moved his family to another part of the Province where he is said to have secured a steady job.

The remaining settlers, with one or two exceptions, have made good progress considering the limited amount of capital with which they started out. Accident and ill-health have prevented two of the settlers from making as good a showing as they might otherwise have done. The lack of a ready market for farm produce has proved a very severe handicap to the success of this scheme.

The contract between the Dominion Government, Provincial Government, and the municipalities was extended in the spring of 1935 to provide for a third-year allowance of $100 per family for subsistence only. It was found necessary to supplement this allowance by means of direct relief as said amount proved insufficient for the needs of the majority of the settlers, especially those with larger families and those who were located on raw undeveloped bush land.

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

W. S. LATTA,
Secretary, B.C. Government Relief Land Settlement Committee.

PART II.

SURVEY BRANCH.

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REPORT OF THE SURVEYOR-GENERAL.

VICTORIA, B.C., March 16th, 1936.

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, 1935:—

The field-work of the Survey Branch may be divided into three main classes: (1) Triangulation, this being the best and cheapest means of determining the true position of main features and of placing a rigid foundation under all other surveys; (2) topographical surveys, now mostly carried on with the aid of aerial photography, with ground control supplied by minor triangulation and the surveying camera; (3) cadastral surveys, in preparation for settlement. Theoretically, surveys should be made in the above order, but with appropriations dependent on annual revenues, surveys for settlement must often be put first.

The appropriation made for surveys, though small in comparison with the average of the past twenty years, took care of all urgent needs in connection with settlement, permitted a full season for the staff on the very important aero-phototopographical work, and enabled us to close the gap lying between Peace and Skeena River Stations in an 800-mile triangulation circuit. The closing error proved notably small, with the result that all stations in this long circuit can now be used, with confidence in their accuracy.

Some gaps remain in the main triangulation system that should be closed as soon as funds can be provided, for until this is done the full benefit of large past expenditures cannot be reaped. Aerial photography has revolutionized topographical surveying and our survey staff is keeping well abreast of the times in developing new methods to increase performance and to reduce costs in our rugged country. The results being secured are interesting and well worthy of study by those interested in the development of the Province on economically sound lines.

Altitude and slopes place definite limits to our agricultural areas; geological formations govern the occurrence of the various minerals; watershed areas and the drop therefrom limit power; while the potentialities of our forests are closely bound up with latitude, altitude, slopes, and drainage. Altitude and slope have a far more important bearing on economic development here than in any other Province of Canada; hence the necessity for contour-lines. With contour maps and a soil examination it can with full confidence be determined whether an area should be reserved for forest, grazing, or other purposes, or whether there is a sufficient area of suitable land to make a successful community possible, and to warrant the consequent provision of roads, schools, etc.

So that there may be no duplication of effort, the closest co-operative contact is maintained with the various Dominion Government survey organizations operating in this Province. These include the Topographical and Air Surveys Bureau, Geological Survey, Geodetic Survey, Department of National Defence, and the Hydrographic Survey. In the belief that accurate mapping, no matter by which Government carried out, is wholly beneficial, we give all possible assistance in the way of information, land-ties, etc., to all, and in turn we have had much help from the photographic units of the Royal Canadian Air Force and from the other Ottawa departments. The year 1936 will probably see the publication by the Federal departments of a dozen contoured map-sheets largely based on the work of the Provincial topographical surveys and with forestry data supplied by our Forest Branch.

GENERAL REVIEW OF FIELD-WORK.

Four survey parties were engaged on aero-phototopographical control-work, two of these parties mapping in the Cariboo District west of Quesnel and Horsefly Lakes, one near Courtenay and Strathcona Park, and the fourth in the Quatsino Sound area, in all of which districts we had the advantage of aerial photographs taken without cost to us by the Royal Canadian Air Force.

One triangulation party closed the gap above referred to, west of the headwaters of Peace River, while advantage was taken of the presence of a surveyor on private work in the Two Brothers Lake region to have ties made thence along the Omineca batholith to our triangulation net on the Ingenika River. The cost of this northern work was greatly reduced by the use of air transport for men and supplies.

About forty lots suitable for settlement were laid out on logged-over lands near Campbell River, and it is expected that these will all be occupied at an early date. Some inspection-work was carried out on mineral-claim surveys in Bridge River where faulty work by one surveyor was suspected and found much worse than expected.

A few additional minor items were attended to, but, speaking generally, land surveys are well in advance of demand by settlers.

OFFICE-WORK.

The office staff is divided into two main sections—namely, the Survey Division and the Geographic Division. Reports compiled by F. O. Morris and by G. G. Aitken, who are respectively in charge of these Divisions, follow.

The tables show a very marked increase in office-work over the deep depression years. Improvement in the mining industry has been mainly responsible for this. About 90 per cent. of the land surveyors of the Province are in private practice, and these surveyors are responsible for the surveys of mineral claims and other classes of Crown lands. The field notes and plans of such surveys are filed in this office, and a considerable proportion of the staff is engaged in checking and replotting these surveys.

During the year a new map of the Pre-emption series, covering the Chilcotin area, was published and a preliminary edition of the new Quesnel sheet made. The final edition of the latter, with contour-lines on about 2,500 square miles of its area, will appear about June, 1936. A new issue of the Bulkley Pre-emptors' sheet and a degree sheet covering the Cranbrook area are nearing the publication stage.

A concerted effort has been made by officials of the various departments of the Government to get some order into the boundaries of the various district subdivisions of the Province. There are at least forty-three of these systems of subdivision in use by the various departments and each department has, until the last few years, been accustomed to drawing its own descriptions. It often happens that the boundaries in different systems, such, for instance, as land recording and mining divisions, differ by only a mile or two where obviously they should coincide. Again, boundaries follow unrun meridians and parallels of latitude where perfectly good natural boundaries, recognizable by all, exist, and where, owing to the cost, there is no justification for the survey of the meridians and parallels. The Survey Branch, as the clearing-house for this effort, has prepared hundreds of maps and descriptions in connection with it and confidently expects that the year 1936 will see the whole situation simplified, with a great saving in maps and descriptions and in the cost of compiling statistics. The Dominion census authorities are already compiling their statistics in conformity with the Provincial scheme, as they previously expressed themselves as lost in our maze of conflicting boundaries.

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 185 reference maps and 66 mineral reference maps, making a total of 251 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 new reference maps and four new mineral reference maps were prepared. 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 1935, SURVEY BRANCH.

Number of field-books received	735
„ lots surveyed	740
„ lots plotted	949
„ lots gazetted	401
„ lots cancelled	27
„ mineral-claim field-books prepared	736
„ reference maps compiled	12
„ miles of right-of-way plans dealt with	18
„ applications for purchase cleared	102
„ applications for pre-emption cleared	439
„ applications for lease cleared	376
„ coal licences cleared	67
„ water licences cleared	199
„ timber-sales cleared	1,690
„ free-use permits cleared	360
„ hand-loggers' licences cleared	45
„ Crown-grant applications cleared	1,214
„ reverted-land clearances	1,338
„ cancellations made	1,566
„ inquiries cleared	2,464
„ placer-mining leases plotted on maps	851
„ letters received	5,694
„ letters sent out	4,378
„ Crown-grant and lease tracings made in duplicate	1,016
„ miscellaneous tracings made	102
„ Government Agents' tracings made	401
„ blue-prints made	26,258
Revenue received from sale of blue-prints from other departments and public	$3,146.70
Value of blue-prints for Lands Department	$3,272.65
Number of documents consulted and filed in vault	29,815

Table B.—List of Departmental Mineral Reference Maps.

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

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:—

Surveyor-General, Lands Department, Victoria, B.C.

Victoria, B.C., January 2nd, 1936.

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, Alberni Canal, and Great Central Lake).
1B.	West Coast, V.I. (Barkley Sound, Northerly, 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.	Central Portion of Rupert District.
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.	Burrard Inlet and South Part, New Westminster District.
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).
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.

No.	Title of Reference Map.
32.	Crooked River, McLeod Lake, and Upper Parsnip River.
32A.	Tatla, Tatlayoko, and North End of Chilko Lakes.
32B.	Homathko and Klinaklini River Valleys.
33.	Fraser River Valley, Fort George, North.
34.	Lot 4593, Kootenay District, Flathead River.
35.	North Saltspring, Ladysmith, and adjacent Islands. (2 in.=1 mile.)
36.	Upper Fraser River (vicinity of Hansard and McGregor River Valley).
36A.	Headwaters of Wapiti and Herrick Rivers.
37.	Nechako River, Cluculz and Bednesti Lakes.
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.

No.	Title of Reference Map.
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.	Boundary Bay, Fraser River Mouth, and Burrard Inlet. (2 in.=1 mile.)
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.
98.	Nig Creek, Sikanni Chief, and Beatton Rivers.
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.)
15–0.	Upper Elk and White River Valleys.

No.	Title of Reference Map.
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.

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

SURVEYOR-GENERAL, LANDS DEPARTMENT, VICTORIA, B.C.

Victoria, B.C., January 2nd, 1936.

GEOGRAPHIC DIVISION.

MAPS.

Published.

Name.	No. of Copies.	Date of Issue.	Dept. Map No.	Scale.	Area in Sq. Miles.
Chilcotin Pre-emptors' Map, with descriptive and economic detail	4,000	Jan., 1935	3F	3 m. to 1 in.	9,000
Nechako Pre-emptors' Map (reprint)	2,500	Feb., 1935	3B	3 m. to 1 in.	9,000
Mineral Reference Map No. 8, Barkerville and Lightning Creek	3,000	June, 1935	M.R.M. 8	1 m. to 1 in.	1,200
Quesnel Pre-emptors' Map, with descriptive and economic detail ("advance" edition)	800	Dec., 1935	3G	3 m. to 1 in.	9,500
In Course of Printing.					
Peace River Block Pre-emptors' Map	3,200	March, 1936.	3Q	4 m. to 1 in.	9,600
In Course of Preparation.					
Quesnel Pre-emptors' Map, with standard contouring, final edition	.....	.....	3G	3 m. to 1 in.	9,500
Bulkley Pre-emptors' Map	.....	.....	3D	3 m. to 1 in.	11,000
Cranbrook Degree Sheet	.....	.....	4C	2 m. to 1 in.	3,100

GEOGRAPHIC BOARD OF CANADA, NAMING AND RECORDING.

Map-sheets, namings reviewed	5
Recommendations to Geographic Board	194
New names recorded	100

GEOGRAPHICAL WORK FOR OTHER DEPARTMENTS.

33 items, receipts and value of work	$4,117.81

MAP-MOUNTING.

Work done, items	847
Revenue from departments and public	$546.55
Value of map-mounting for Lands Department, etc.	$698.72

MAP STOCK AND DISTRIBUTION.

Maps and Gazetteers issued to departments and public	14,791
Maps received into Geographic stock	15,724
Total value of printed maps and Gazetteers issued	$3,967.60
Revenue from printed maps and Gazetteers	$2,802.22

PHOTOSTAT.

Total number of photostats made	2,387
Revenue from departments and public	$1,271.89
Value of photostats for Lands Department, etc.	$1,284.61

LETTERS.

Letters received and attended to	1,829

STANDARD BASE MAP.

Standard Base Map sheets (skeleton) produced	5
Bulkley Pre-emptors' Map, sheets compiled	2
Quesnel Pre-emptors' Map, contours, drawn and compiled, sheets	2
Department of the Interior sheets, Fraser Valley	11
School districts, plotted from description	341
Control nets supplied	40
Plan of Cadastral Surveys, vicinity of Courtenay and Comox Lake	1

TRIANGULATION.

Main, by least-square adjustment, triangles adjusted	82
Secondary, by rectangular co-ordinates, stations	454
Index cards, records	603

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	1931	British Columbia. In one sheet. Showing Land Recording Divisions	50 m. to 1 in.	Free	1.50
1EM	1930	Kootenay, Osoyoos, and Similkameen. Showing Mining Divisions	7.89 m. to 1 in.	.50	4.00
1G	1916	Cariboo and adjacent Districts. Showing Land Recording Divisions	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	1923	Ditto ditto and Land Recording Divisions	31.53 m. to 1 in.	.50	4.00
1JD	1923	Ditto ditto and Mining Divisions	31.53 m. to 1 in.	.50	4.00
1JE	1923	Ditto ditto and Assessment Districts	31.53 m. to 1 in.	.75	6.00
1JGL	1923	Ditto ditto and Land Registry Districts	31.53 m. to 1 in.	.75	6.00
1JGC	1923	Ditto ditto and Counties	31.53 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	1929	Central Districts of B.C., Commercial and Visitors	15.78 m. to 1 in.	.50	4.00
		LAND SERIES—			
2A	1920	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 free. Each sheet additional 25 cents, or	2.00
3B	1926	Nechako	3 m. to 1 in.		2.00
3C	1923	Stuart Lake	3 m. to 1 in.		2.00
†3D	1936	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	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	1932	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	1931	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.	.....	.....
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
4F	1913	Duncan 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
		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	1934	Highway and Travel Map of B.C.	20 m. to 1 in.	.35	2.50
MD	1930	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 Canadian Geological Survey, or the Dominion Department of the Interior, etc., etc.

Inquiries for printed maps—Address:—

CHIEF GEOGRAPHER, DEPARTMENT OF LANDS, VICTORIA, B.C. 1st January, 1936.

TOPOGRAPHICAL SURVEYS, CARIBOO DISTRICT.

By R. D. McCaw.

Victoria, B.C., December 31st, 1935.

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

Sir,—I beg to report upon the topographical surveys carried on by me during the past season in the Cariboo District. In your letter of instructions bearing date of July 12th, I was directed to work in an area embraced in Map-sheets 93 A/5 and 93 A/6 in the above district, with the specification that I should work in the western part of the area, A. J. Campbell, B.C.L.S., doing the eastern portion, with the dividing line to be decided between ourselves. The area had been covered by vertical aerial photographs and the object was to obtain sufficient information for the ultimate preparation of a topographical map on a scale of 1 mile to 1 inch, with contours at 100-foot vertical intervals. I may say that Mr. Campbell and I worked in co-operation to such an extent that each will do a single map-sheet, mine being 93 A/5. The boundaries of this sheet might here be stated as being latitude 52° 15′ and 52° 30′ and longitude 121° 30′ and 122° 00′, and embracing such features as Beaver Creek (in part), Peavine Ridge, Big Lake, Antoine Lake, part of the Likely Road, and part of the Horsefly Road. Miocene Post-office and Beaver Lake Post-office are located within the area.

I left Victoria on July 13th with the light Ford truck used by me in previous seasons and arrived in Williams Lake the day following. We were under canvas at Big Lake along the Likely Road on the 16th. Owing to the system of roads in the locality we were able to reach practically all of our work by motor-car, and for this reason it was unnecessary to move camp more than a few times.

The greater part of the western portion of the sheet was covered from the Big Lake Camp. The nature of the country required different methods of control for the aerial views. The horizontal control is dependent upon ground photographs, instrumental traverse, triangulated points, and, to some extent, upon the land surveys. Vertical control or elevation is dependent upon ground photographs, vertical angles, and barometric differences, all being based upon the elevations of main and other triangulation stations as derived from prior work and checked by a line of levels extending from Williams Lake into the area. Early in the work two former main triangulation stations were visited, the signals reconditioned, and further clearing done. These were the McInnes and Polley Mountain Stations used by N. C. Stewart, B.C.L.S., some years ago. Four new main triangulation stations were selected at this time, as follows: Big Lake Station, elevation 3,960 feet, on a timbered ridge about 3 miles south-west of Big Lake; Baldy Mountain Station, elevation 3,775 feet, on a timbered ridge about 3 miles north of Miocene Post-office; Gavin A, elevation 4,109 feet, on a burnt ridge (northerly end) south of Gavin Lake; Gavin B, elevation 4,106 feet, on the same ridge (southerly end) south of Gavin Lake.

The Gavin Station, established by Mr. Stewart previously, was between these latter stations and was not used. Other new photographic and secondary triangulation stations were occupied where possible. These are located on Guy Mountain, Limestone Mountain, on the ridges north and south of Beaver Creek, and on ridges east and west of the Likely Road south of Big Lake. A transit and chain traverse was run along that portion of the Likely Road within the sheet and connections made to triangulation stations where possible, as well as to several land-survey corners. A similar traverse was extended along a road westerly to Marguerite Lake. A stadia traverse was run westerly down Deep Creek to the west edge of the sheet. A great deal of barometric vertical control was done over the area, with the exception of the south-west corner, which was left to be completed later. Land-survey corners were also connected to triangulation stations where convenient.

Camp was moved to Gravel Creek, on the Horsefly Road, August 19th, and from this point operations were extended over the eastern portion of the sheet and sufficient work done to connect with Mr. Campbell's surveys in Sheet 93 A/6. This eastern portion flattens out very materially and photo-topographical control was very limited, the other methods being used extensively. One other main triangulation station was selected to the south-east of Ochiltree Post-office. This is on a timbered ridge known as Spokin Mountain. There is a possibility of

this station being used in the net of the Geodetic Survey of Canada. Mr. Campbell also established a triangulation station within my area and close to the eastern boundary. A transit and chain traverse was done along the Horsefly Road from Rose Lake easterly to Beaver Creek, and then down the Beaver Creek Road about 6 miles. Connections were made to triangulation stations. South of the Horsefly Road the area within the sheet is very flat and the control is dependent on traverse and aneroid readings. Several farm-roads were a basis for control traverse. Land-survey corners were tied in throughout the eastern portion where convenient. Before leaving the Gravel Creek Camp a fly-trip was made to the Polley Mountain Station for main triangulation readings. The main triangulation stations Baldy, Spokin, and Gavin B were also occupied for final readings.

From the Deep Creek Camp, established off the Likely Road on September 24th, the remaining control in the western area was done. This included much barometer-work west of the Likely Road and south of Big Lake Creek, and the final occupation of the main triangulation stations Big Lake, McInnes, and Gavin A. A line of levels with bench-marks about every half-mile was also commenced, connecting with the triangulation system and extending southerly along the Likely Road. Camp was broken on October 4th and my assistant and I, with one man, completed the levels to the water-level of Williams Lake, which was connected with bench-mark 673-J of the Geodetic Survey. The season's surveys completed, I left Williams Lake October 9th for Victoria.

GENERAL.

The triangulation system has been arranged to fit with Mr. Campbell's and the whole is an expansion southerly from the Polley-Brew side of the net done previously. Main triangulation stations are marked by brass bolts set in rock, except in two cases where conditions did not warrant. In these, galvanized-iron bars 18 inches long and ½ inch square were used, driven flush with the ground. Photographic and secondary triangulation stations are marked by the iron bars also, and the position of all calculated and represented by rectangular co-ordinates with origin at latitude 52° 00′ and longitude 121° 00′.

For photography, Ilford panchromatic plates were used generally and supplemented by infra-red under certain light and atmospheric conditions. The results with the infra-red were not as good as in the previous year. The triangulation stations were read with a new Zeiss instrument with micrometer attachment reading approximately to 2″ for horizontal angles and fifths of a minute for vertical angles.

While considerable rain fell during the season, there was practically no time lost from this. Atmospheric conditions were generally hazy, but there was little smoke in evidence at any time. A most beautiful spell of weather occurred between September 24th and the time we concluded the survey. Exceedingly bright sunshiny days with frosty nights upheld the traditional weather for that time of year in the Cariboo.

The chief industry in the area is ranching, cattle and sheep being the export. There are a few mineral prospects, but they seem to be at a standstill. Antoine Creek, a tributary of Beaver Creek from the north-east, has been the scene of rather vigorous prospecting-work recently for placer gold, and this brings in some rather interesting geological information which may some day give rise to very extensive development in the eastern portion of the area covered by our work. From investigations by the geologists of the Pacific Great Eastern Resources Survey and investigations by officials of our Department of Mines, the probable course of the buried ancient Horsefly River, geologically called the Tertiary Horsefly River, has been traced. This follows more or less the general course of the present Horsefly River, but instead of continuing into Quesnel Lake turns westerly to Antoine Lake and down Antoine Creek to Beaver Creek. The conjectural outlet may be on the Fraser River some miles below Quesnel. Again, the deeply buried Tertiary Moffat Creek, instead of following the lower reaches of the present Moffat Creek, probably cut north-westerly to the present Gravel Creek in the area under our survey, and continued down the course of this stream to Beaver Creek. I am not going further into this matter in the present report, but would refer to the geological reports by the Pacific Great Eastern Resources Survey and the reports of the Minister of Mines over the past five or six years, which will indicate the possibility of placer occurrence within this area.

The whole area is made easily accessible from the system of roads. The Likely Road leaves the main Cariboo Highway at Mountain House and passes northerly through the west

portion of the sheet. During the past few years this road has been much improved and last season was in very good shape. The Horsefly Road branches from the main highway a little north of the 153-Mile House and enters the area being mapped at Rose Lake. It then continues easterly within the area and beyond to Horsefly Post-office on the Horsefly River. Owing to clay surface in parts this road is rather heavy in extremely wet weather, but it is being improved continually and will no doubt have a good surface very soon. These two roads are the means of reaching the sources of transportation to the vast areas tributary to Quesnel Lake, Horsefly Lake, Horsefly River, Cariboo Lake, etc., and are valued by prospector, miner, hunter, fisherman, lumberman, etc., to an extent not realized by the outsider. Of course it must not be forgotten to mention their value to the settler adjacent, who depends on them for all of his freighting. The Beaver Valley Road follows Beaver Creek from the Horsefly Road near Horsefly Post-office to the Likely Road at Beaver Creek Post-office. The old Alexandria–Beaver Creek Road is practically in disuse and in very bad shape. The Peavine Road extends along Peavine Ridge from the Likely Road north-westerly and gives access to a rather compactly settled farming area. The course of the old Polley Lake Road from Polley Lake–Horsefly River cuts across the north-east corner of the area, but has not been used in years and at present is no better than a trail for back-packing. Numerous farm-roads exist in different parts.

The surface is generally timbered or scrub-covered, with some small open areas in parts. Jack-pine, fir, and poplar are the main species, but from an economic standpoint is of little use, although in some areas there may be some merchantable value. North of Beaver Creek fire has destroyed much of the growth. The north-east portion has been covered with large cedar and occasional fir, all of Coast size, but fire has killed most of it and there are extensive areas of standing and fallen dead trees.

The large game of the district consists of moose, deer, and black bear. Moose may be seen almost anywhere. While no bears were seen, they are pretty well distributed. Game birds seem to be getting scarce, due, no doubt, to the easy accessibility of the area for the hunter. Most of the larger streams have trout and Big Lake is well known for its fishing.

The area of the map-sheet is approximately 365 square miles and the information secured is now being plotted on a scale of 40 chains to 1 inch. The detail will be sufficient for a mile-to-the-inch reproduction.

I have, etc.,

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

TOPOGRAPHICAL CONTROL SURVEYS.

By A. J. Campbell.

Victoria, B.C., December 31st, 1935.

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

Sir,—I have the honour to submit the following report upon the topographical control surveys carried out by me during the past season:—

Your instructions, dated July 5th, 1935, describe the area to be surveyed as Map-sheets 93 A/5 and 93 A/6 in the Cariboo District, and that in covering this we were to work in co-operation with R. D. McCaw, B.C.L.S., particularly in respect to the production of the main triangulation system. Mr. McCaw was to work in the westerly portion of the area, leaving to us the easterly portion, with the dividing line somewhat indefinite, depending on the nature of the country. It has developed that each was able to cover one of the map-sheets, ours being 93 A/6, which includes the area between latitudes 52° 15′ and 52° 30′ and longitudes 121° 00′ and 121° 30′. This will be known as the Horsefly sheet. The village of Horsefly is the hub from which all parts may be reached. The Horsefly River enters the area at the south-easterly corner and travels westerly and then northerly to empty into Horsefly Bay on Quesnel Lake. The greater portion of Horsefly Lake lies in the area and extends several miles beyond the easterly limits.

We had vertical aerial pictures covering the area and the main object of the survey was to provide such horizontal and vertical control for them as to permit the preparation of a topographical map on the scale of 1 mile to 1 inch, with contours at 100-foot vertical intervals. In the easterly portion of the area it was possible to provide such control by photo-topographical methods, but in the westerly portion, which is much less hilly, the ground photographs were supplemented with traverses and considerable barometric vertical control.

The main triangulation system was projected southerly, using the formerly established triangulation stations, Polley and Brew, as a base. Four main stations were established, descriptions of which will be filed later. These stations are competely tied with those established by Mr. McCaw and are so chosen as to readily permit the extension of the system in any required direction. The main stations are marked with brass bolts cemented in rock. Other triangulation points are marked with the galvanized B.C.L.S. bars, also with bearing trees, where considered advisable. A series of ties, mostly by triangulation, were made to surveyed lot corners. These ties are well scattered over the area and will give good connection with the surveys there.

The party was organized at Williams Lake on July 9th and proceeded to Horsefly, where a camp was established. From Horsefly roads run out in several directions, and with our light trucks we were able to reach the greater part of the area from this camp. Only two moves of the main camp were made during the season, over to Horsefly Bay on Quesnel Lake to reach stations in the vicinity of that lake and one to Horsefly Lake. While on Horsefly Lake, through the co-operation of the Forest Branch, we had the use of their boat. This was very much appreciated, as, while there are several boats on the lake, none of the others would have been as suitable for our purpose. Besides these two main moves, only three others of light camps were found necessary to reach all the required points.

Photographically, from a weather standpoint, it was an exceptionally good year, considerably better than 1934, when we were working in an adjoining area. Comparatively little time was lost on account of bad weather, due partly, of course, to the fact that we were able to do other work during periods not suitable for photography. At times throughout the season there was considerable haze in the atmosphere, but it was only during the last few days in the field that there was sufficient smoke to make photography impossible. Panchromatic plates were used generally, with infra-red being used when conditions warranted.

PHYSICAL FEATURES.

The Horsefly River and Lake form the main water system in the district. Among other features, we have Moffat Creek, in the south-west, running northerly to join the Horsefly River near the village of Horsefly, and the headwaters of Beaver Valley along the west boundary. Besides these, there are numerous small lakes, probably as many as fifty, dotted over the area and many small creeks.

The altitudes on the sheet range from 2,380 feet above sea-level at Quesnel Lake to around 5,600 feet on the Black Creek Mountain Ridge, which lies between the Horsefly Lake and the Horsefly River Valley close to the east boundary. North of Horsefly Lake and over to Quesnel Lake and extending west to the Horsefly River are found a series of small rocky hills with many small lakes lying between them. Of these hills, Observation Mountain, with an altitude of 4,352 feet, is much the highest; the remainder average around 3,300 feet in height. Not much flat land is to be found in this part, nor are meadows, such as occur in other parts of the area, to be seen. South of Horsefly Lake, slopes rise directly to the Black Creek Mountain Ridge, which drops rapidly to a series of low rocky hills near the westerly end of the lake; southerly of these hills and towards the Horsefly River is a considerable area of bench land with a few meadows and small lakes here and there. This area is included in the surveyed lots. The Horsefly River Valley above Woodjam Creek is a very attractive wide valley, with much meadow land along the river-bottom. To the north gentle slopes rise from 2 or 3 miles to the steeper slopes of Black Creek Mountain Ridge. To the south it is quite flat in part, back to the steep slopes of Woodjam Ridge, rising to over 5,000 feet altitude. Below Woodjam Creek the river-valley narrows into a canyon, opening out once again in the vicinity of the village. On the right bank, along this canyon, the slopes rise to the bench land mentioned above, while to the left they rise to a series of small hills. Beyond these hills, to the south, is found a considerable area of meadow-dotted and lake-

spotted, comparatively flat land, which reaches to Moffat Creek and southerly beyond the limits of the sheet. A few miles below Horsefly Village the river again enters a narrow valley, which extends to its mouth on Quesnel Lake.

As mentioned before, there are several roads radiating out from Horsefly Village. The main road, from the outside, enters the area not far south from the middle of the west boundary. This leaves the main Cariboo Road about 1 mile north of the 153-Mile House at a distance of 33 miles from Horsefly. An old road, built to transport machinery to Hobson's Horsefly Mine and connecting with the main road near Lac la Hache, is still passable for cars beyond the limits of our sheet, but is not used as a through road. Hobson's Horsefly Mine is located 7 miles down-stream from the village, and this road continued to it and was pushed northerly to Antoine Lake, across country to Polley Lake, and on to the Bullion Mine. Most of this, beyond the river, has been abandoned. A branch was also built down to Quesnel Lake. This part has been changed considerably and a new road built closer to the river, reaching Horsefly Bay, 13 miles from the village. The road to Horsefly Lake crosses the river at the village and follows it down-stream for a mile or two, then swings easterly towards the lake. A branch road about half a mile from the lake gives access to it in separate bays at a distance of 7 miles from Horsefly. Two minor roads branch off the lake road. One, about 4 miles from Horsefly, turns off to the north to a bridge over the Little Horsefly River and continues down-stream for 2 miles or more. It is not recommended for cars beyond the bridge. The other turns off to the south about 5 miles from Horsefly and follows the route of the old Black Creek Road for about 3 miles. The rest of this road over to Horsefly River has been abandoned. The Black Creek Road now branches from Horsefly Lake Road less than a mile out of Horsefly and follows the river, more or less closely, for 18 miles to the Black Creek Mine. To complete the list of main roads, or roads possible for motor-cars, the Beaver Valley Road, which leaves the main road to Horsefly about 2½ miles out, should be included. This road follows down the Beaver Valley, beyond the limits of our sheet, to join with the Likely Road between 25 and 30 miles from Horsefly. There are some other roads, more or less passable, used only as winter or haying roads. The Woodjam Road south of the Horsefly River is one of these. Settlers now reach the Woodjam by the river road to Black Creek and cross the river on scow-ferry located there. The only pack-trails noted lead from the end of the Black Creek Road, up the Horsefly River and beyond, and up McKinley Creek to McKinley Lake and on into the mountains.

Settlement is confined to the vicinity of Horsefly River for some miles above and below the village and along the upper part from the Woodjam to Black Creek; also from the village easterly to the lake; also a few settlers are located along Moffat Creek near the south-west corner of the area. Hay is by far the most important crop, and considerable wild hay on many of the outlying meadows is also cut, stacked, and the cattle driven to and fed from these stacks throughout the six months necessary to winter-feed. Vegetables are successfully grown, but not much more than sufficient for local needs. The agricultural possibilities of this area are given in the Pacific Great Eastern Natural Resources Survey, so further comment is unnecessary.

FOREST-COVER.

Except for two patches, the whole country has been burnt over; most of it old burns, with reproduction well on its way. The area between Horsefly and Quesnel Lakes has been more completely burnt, with reproduction generally poplar and some jack-pine. This holds for the burnt area south of Horsefly Lake over to the river. In other sections reproduction of predominately pack-pine is further advanced. The area of small hills around Horsefly Bay, on Quesnel Lake, in part has escaped the fire, and some fair fir, cedar, and hemlock is to be found. A small sawmill is located here, which operates when there is any demand for lumber in the district. The larger unburnt area is located on the slopes from Horsefly Lake up to Black Creek Mountain. Some good cedar, fir, and hemlock is to be found here. Considerable scattered fir was noted, principally on the small hills and ridges and in favoured places.

This year little mining activity was being carried on. Miners were working on a lay at the old Hobson Horsefly Mine and apparently successful. A drag-line was in operation for part of the summer on the Horsefly River a short distance down-stream, but apparently was not very successful. This area is among the oldest placers in the Cariboo and for many years there has been considerable interest in this connection, and considerable prospecting has been

done to trace out the ancient channel of the Horsefly River. Mention has been made of this in several of the annual reports of the Minister of Mines, and particularly in the reports of 1931 and 1932, in which this ancient river-channel is described, and also in the report of the Pacific Great Eastern Natural Resources Survey. The assertion is made that discoveries of considerable importance are very probable.

Moose, deer, and bear are quite plentiful. Grouse are to be found everywhere. Trout are caught in the streams and lakes, with special mention of Horsefly Lake, where rainbow trout and char of large size are numerous. The kickaninnies come up the streams in the fall. Altogether it is a good game country and just on the edge of a mountainous region where hunting-parties go every spring for bear and in the fall for moose, caribou, deer, and mountain-goat. Trapping is carried on during the winter and the whole area is taken up with registered trap-lines.

I have, etc.,

A. J. CAMPBELL, B.C.L.S.

TOPOGRAPHICAL SURVEY, VANCOUVER ISLAND.

BY N. C. STEWART.

December 31st, 1935.

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 under your instructions of July 2nd, 1935:—

The area controlled lies between the easterly boundary of Strathcona Park and the Strait of Georgia and extends southerly from the 50th parallel to latitude 49° 45′, and contains approximately 400 square miles.

The party, consisting of W. J. Moffatt, B.C.L.S., assistant; A. G. Slocomb, instrument-man; and four men, including a cook, was organized at Courtenay on July 3rd and 4th.

The area to be mapped was photographed by the Royal Canadian Air Force in 1931. We were instructed to obtain sufficient ground control to map the area at a 1-mile scale, with contours at 100-foot intervals. We found the area to consist of two main divisions: First, a coastal plain 8 to 20 miles wide along the Strait of Georgia; and, second, a hilly and mountainous area from the coastal plain to and beyond the westerly boundary of the area to be mapped.

For control in the coastal plain we ran traverses, these being controlled at frequent intervals by triangulated points.

In the mountainous section control was obtained by ground photography from triangulated vantage-points. In both sections aneroid readings were used to supplement triangulation and photography for obtaining altitudes.

Our first work consisted of locating and erecting signals at points to control the traverses and to renew the signal on Mount Washington, this triangulation station being visible from most of the area. We established another pivot station on a hill north of the 50th parallel and not far from Forbes Landing. This station, which we called " Forbes," is visible for many miles in every direction. Logging operations cleared off the south end of the hill, making it admirably suited for our purpose. Considerable work will be required, should this station be used for an extension of the triangulation northward.

We also used the Forestry Lookout at Upper Campbell Lake as a triangulation station; from it we saw the cairns on Mount McBride and Elk, established by Leroy S. Cokely, B.C.L.S., and cairns of unknown origin on Mount Elkhorn and Mount Crown.

After completion of the preliminary work near the coast we moved from camp at Shelter Point to Upper Campbell Lake, where control by photo-topographical methods was commenced. From this place two points on the 50th parallel were tied to the triangulation net—one near the 16-mile post and the other near the north-east corner of Strathcona Park. Moving to Buttle Lake, Mr. Moffatt occupied McBride and Elk Stations and established another station south of the mouth of Phillips Creek, while Mr. Slocomb and I established a number of stations on the mountains extending from Upper Quinsam Lake to vicinity of Mount Alexandra, returning

via the headwaters of Iron Creek to Upper Quinsam Lake, where we were joined by Mr. Moffatt. After a few days' work at Upper Quinsam Lake we moved to the Campbell River Road and thence to a camp near the mouth of the Oyster River, from which camp all the work on the flat area was completed, and "fly-camp" trips were made to Mount Washington, Quinsam Lake, and Loon Lake. We also established control on the south end of Quadra Island, a small portion of which comes in the map-sheet.

PHYSICAL FEATURES.

The mapped area contains the drainage system of the Tsolum, Oyster, Quinsam, and part of the Campbell River. As already mentioned, two distinct types of country are found—the coastal plain, very uniform in appearance, but actually broken by minor ridges and depressions, and the hilly and mountainous section to the south and west. The mountains attain an altitude up to 7,000 feet; the higher ones are not entirely free of snow during the summer, and on many there are glaciers. An outstanding feature of this area is the magnificent lakes, including Upper Campbell, Upper and Lower Quinsam, Wolf, and that gem of lakes, Buttle Lake.

FORESTS.

Logging operations have been carried on for many years in a big way, so that now most of the coastal plain is denuded of its forest wealth. The logged area covers approximately 150 square miles. Large stands of excellent merchantable timber, privately owned, still remain south and west of the logged area. Two companies are cutting this; the Elk River Timber Company is working in the vicinity of Gooseneck Lake, Campbell River, and Quinsam Lake, with headquarters at Echo Lake, and the Comox Lake Logging Company is operating in the vicinity of Cariboo Creek and towards Loon Lake, with offices at Headquarters, B.C.

MINERALS.

There was no prospecting in this area during the summer, but evidence of a mining activity of many years ago was seen in various places. Two claims on the north side of Upper Campbell Lake show mineralization, chiefly of copper, and indications of the same mineral were noted on Greenstone Creek, about 3 miles north of Upper Campbell Lake. On the south-east side of Upper Quinsam Lake we saw Iron Hill, estimated to contain 1,700,000 tons of iron ore. Dr. H. C. Gunning, in his report (*see* Summary Report, 1930, Part A, Geological Survey), suggests that the strip of country 3 to 4 miles wide extending from Upper Campbell Lake through Upper Quinsam Lake and south-easterly to vicinity of Mount Albert Edward is worth prospecting. He also mentions an arsenic deposit near Wolf Lake.

CLIMATE.

Very fine weather for our work was experienced during the field season. With the exception of about a week of rainy weather near the end of July, the short rains and storms interfered very little with the progress of our work. Although there were many hot days, no forest fires took place in the area and little smoke drifted in from outside. From experience of the previous field season, and from other sources of information, this part of the Island seems to have a very temperate climate; however, the average precipitation is considerably greater and the mean temperature lower than that found on the south end of Vancouver Island.

GAME.

Game is plentiful, especially deer and blue grouse, the season being exceptionally good for the latter, for berries grew and ripened in profusion. Other varieties encountered were bear, cougar, beaver, ptarmigan, ducks, and geese. Marmots were seen on Mount Washington. A few wolves have been reported in this area. However, this district is chiefly noted for game-fishing; along the coast the salmon-fishing is world-famous and excellent catches of cut-throat trout were made at the mouth of the Oyster River. Large numbers of spawning salmon were seen in rivers, especially the Tsolum and Oyster. Dolly Varden, rainbow, and cut-throat trout are plentiful in Buttle, Upper Campbell, and Upper Quinsam Lakes. We noticed that the Kamloops trout, with which the Forbidden Plateau Lakes were stocked, are finding their way down-stream, some being seen in the tributaries of the Oyster River.

ACCESSIBILITY.

The Island Highway extends through this map-sheet. It follows the shore-line closely from the Oyster River north to Campbell River. During the fall this highway from Merville to Shelter Point was surfaced. From Campbell River there is a good road to Echo Lake, but from Echo Lake to Upper Campbell Lake the road is not good, though passable. Connecting Upper Campbell Lake and Buttle Lake, there is a good horse-trail. A trail connects Upper Quinsam Lake with the Campbell River Road near Gooseneck Lake. We reblazed an old trail from the Buttle Lake Trail to Upper Quinsam Lake. There is a trail from Headquarters to Wolf Lake. The logged portion of the coastal plain is interlaced with logging-railway grades, mostly abandoned, except for the main lines of the operating companies. Some of the old grades are now used as roads. At Shelter Point old grades have been connected, so that one may drive inland about 8 miles.

DEVELOPMENT AND RESOURCES.

The chief development is in the Merville Settlement and in the numerous farms along the coast. There is a general store and post-office at Merville, hotel and post-office at Oyster River, auto camps at Oyster River, Shelter Point, Forbes Landing, and at Upper Campbell Lake.

Although most of the easily accessible timber has been logged off, there still remains a great forest wealth, and this will be the chief resource of the district for many years to come. Agriculture is next to forestry in value, and an extension in this may be expected. During the past two years Mennonites have located in the logged-off lands in the vicinity of Black Creek and the Island Highway. We noticed small areas of good soil in the depressions, and also a considerable area of wet meadow lands, which may possibly be drained and thus afford additional farm lands. The expense of putting these lands in production will be great. The logged-off lands provide good pasture for cattle and sheep; therefore mixed farming is best for this district.

This portion of Vancouver Island has many features which are attractive and entertaining to sportsmen and other tourists, as already mentioned. The scenic attractions are great, but as yet not made sufficiently accessible. Along the coast there is a wonderful view of the straits and islands and the snow-capped Coast Range. Elk Falls on the Campbell River are just outside the area. From the Forestry Lookout at Upper Campbell Lake you get a varied and wonderful view of the coastal plain, the Coast Mountains, including Mount Waddington, and behind you see the mountains of the Island from Mount Washington to Mount Victoria. Buttle Lake and vicinity will make one of the finest natural playgrounds on Vancouver Island when made accessible, for it has fine beaches and camp-sites, clear water ideal for boating and swimming, very good fishing, and scenery unsurpassed. Already there is a fine lodge at Upper Campbell Lake, and another on Buttle Lake, both owned by citizens of the United States.

I wish to convey the thanks of our survey party to the Comox Lake Logging Company, the Elk River Timber Company, and to our own Forestry Service at Campbell River for information, advice, and assistance in transportation, etc.

During these past two seasons' work it was found that an unnamed peak near the headwaters of Wolf Creek, in Strathcona Park, has an altitude greater than any other so far recorded on Vancouver Island.

I have, etc.,

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

TOPOGRAPHICAL AND SUBDIVISION SURVEYS.

BY L. A. AUSTEN-LEIGH.

VICTORIA, B.C., October 28th, 1935.

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

SIR,—I have the honour to submit the following report on the above surveys carried out under your instructions to me of July 11th:—

The topographic area is near the north end of Vancouver Island. It is a rectangle bounded on the south by Quatsino Sound; on the north by the parallel passing through the junction of Dickbooth Creek and the Quatse River, near Hardy Bay; on the east by the meridian through Quatsino Narrows; and on the west by the meridian through Winter Harbour.

Aero-photographs taken by the Royal Canadian Air Force were supplied to me, and also a 14-foot boat with outboard engine.

The party of five left Victoria on July 11th and made camp at Quatsino on the 15th.

Our work was based on the existing main triangulation net. The information on file about the stations was a great help. The old trails leading to them, though much overgrown, were found and cleared out. That to Harris Station starts 50 yards north of the Dickbooth Bridge on the Coal Harbour–Port Hardy Road. A new and shorter trail to Holberg Station was cut. It starts at a grassy point a quarter of a mile east of the outlet of a creek into Winter Harbour, just north of the west end of Wedel Island.

Your instructions were to obtain sufficient information to make a topographic map on the scale of 1 inch to the mile, with contours at 100-foot intervals.

On this work seventy-two days were spent in the field and the area covered is about 290 square miles.

Nineteen dozen photographic plates were used, 5 triangulation stations, 26 additional camera stations, 9 minor triangulation stations, and 7 miles of traverse.

There are also available minor triangulations of the sound and its arms made by the Hydrographic Survey and by the Department, which will be of great use.

A few barometer elevations were obtained. The very dense nature of the bush prevented greater use being made of this method.

The peninsula, which is bounded by Winter Harbour, Quatsino Sound, and Holberg Inlet, is densely timbered and covered by timber limits. It ranges in height up to 2,500 feet, with little variation in the timber, which is hemlock and occasional cedar.

A considerable logging operation is in progress about 4 miles up the Hathaway Creek and another one near its mouth.

A narrow strip on both sides of the Holberg Inlet has already been logged and is reproducing.

The country to the north is similar, but the timber not quite so large. There is a motor-road from Coal Harbour to Port Hardy and a road or trail from Holberg to San Josef, but except for these the area is practically trackless. The convenient waterways and the exceptionally fine summer were compensating features.

In covering the above area it was possible to obtain photographs of all adjoining country.

Except for cougar and bear, there appears to be no game.

The main industry is salmon-fishing. A few fishermen are settled at Holberg, more at Quatsino, and a small but growing number at Winter Harbour. The fish are mostly shipped in fish-packers which call at Winter Harbour, and partly by truck over the Coal Harbour Road to Port Hardy.

The latter part of the season was spent on subdivision-work at Winter Harbour.

As long ago as 1891, Lot 3 on the west side of the harbour was subdivided and put on the market as the townsite of Queenstown. Undoubtedly a good harbour, the place was believed to be a coming naval station, and every lot was sold.

Forty-four years have passed, the naval station did not materialize, and the subdivision might be said to have sunk without a trace. The lots were never occupied, their pegs have disappeared, and all but a very few have reverted.

In the meantime the fishing business at the mouth of the sound has developed. Fishermen found Winter Harbour to be a convenient place to settle, as well as a safe haven.

They started buying reverted lots along the water-front. Not only were they unable to find any pegs to show the limits of their purchases, but the situation was complicated by an Indian reserve having been superimposed on a portion of the townsite without any connection having been made to it. The relative positions of the two were not known.

It was to remedy this situation that you instructed me to re-establish the five water-front blocks and whatever appeared necessary back from there.

Although no trace, beyond a few blazes, of the original subdivision could be found, it was possible to locate the corners of the original Lot 3 and of the Indian reserve.

Both parcels were traversed and a tie made between them. From this work and the subdivision plan four water-front blocks were re-established, as much of the fifth as was outside the Indian reserve, and the two back blocks nearest to the settlement.

There are now at Winter Harbour a store, a post-office, an oil-station, and a fish-packer's float, in addition to several houses built and some under construction.

The work here required twenty-one days in the field, and on the next the party boarded S.S. " Maquinna " to reach Victoria on October 19th.

I have, etc.,

L. A. AUSTEN-LEIGH, B.C.L.S.

TRIANGULATION SURVEY, CASSIAR.

BY FRANK SWANNELL.

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

SIR,—I have the honour to report on the survey made by me during the season of 1935, which was primarily the closing of a gap in the 800-mile circuit of triangulation control embodying the work of some half-dozen surveyors over a decade. As a matter of secondary importance, I was to map, as well as time and transportation facilities permitted, the quite unknown country to be traversed.

The first object was achieved, in that the tie was made, although adverse weather prevented four stations being read, which would have made the triangulation rigid. The closure error of the chain from Prince George north-westerly by the Parsnip, Finlay, and Ingenika Valleys, across to and down the Skeena headwaters to the most northerly stations of Mr. Foster, in the chain carried by him from Hazelton, is as follows:—

Foster (preliminary) value △ " Skeena " to △ " Slowmaldo "
S. 84° 12′ 46″ W. distance 839.80 chs.
Swannell value S. 84° 12′ 15″ W. distance 839.98 chs.
Error (in bearing) 31″ (in distance) .18 chs.

The coincidence is better than was anticipated, as there are several weak links in the hundreds of miles of triangulation involved. The secondary object of the season's operations has resulted in information, now being worked up into a map, being obtained over about 250 miles of heretofore unknown country.

Owing to the remoteness of this region access by pack-train would have meant a late start, an early return, and the loss of some six weeks' valuable time on the trail, leaving far too short a season for actual survey operations. You, accordingly, to save both time and expense, arranged to have the party brought in and out by aeroplane. On July 1st my two assistants, myself, and 1,600 lb. of provisions and outfit were flown from Takla Landing to Kitchener Lake by planes of the United Air Transport. On October 6th we were picked up at the same spot and flown back to civilization. In the intervening three months we had not encountered another human being, either white or Indian. Too much cannot be said in praise of the efficiency of our pilots and their courtesy in dropping mail for us during the summer.

From our base at Kitchener Lake we were busily and very arduously employed for some time in back-packing our supplies across the mountains to Duti River. There was no trail, but we found a pass (christened Kubicek Pass after one of our pilots). The summit, just east of an ice-bound lake, was at altitude 5,300 feet, and 5 miles north-west of Kitchener Lake. From here we dropped rapidly into the valley of Duti River, reaching the river at 11 miles from Kitchener Lake. Camp 3, on a pleasant pine-flat on the river, was at altitude 3,670 feet, being 580 feet lower than Kitchener Lake.

DUTI RIVER VALLEY.

This valley runs south-east from where we entered it for 25 miles to the junction with the Skeena from the west, and continues as the main Skeena Valley into the blue distance. At Camp 3 the valley-bottom was a mile wide, largely swampy meadow. The flood-bed of the river here is 250 yards wide; the main channel at low water 40 yards wide and knee-deep—one of the few places the river can be forded even at extreme low water. The water is heavy with glacial silt, and a few miles above camp the river splits into several branches, each heading in high glacier-bearing mountains. No definite trail could be found down the Duti, the Indians, on their very infrequent visits, using game trails. The only sign of white men having been in the upper valley was an old camp at the ford and traces of a horse-trail cut twenty-five years ago up out of the valley and across through alpine plateau to the Stalk Lake.

Our progress down-river was painfully slow, we having to cut through heavy, windfall-encumbered mountain-balsam and lower down much spruce-swamp. Owing to deep transverse valleys it was quite impracticable to follow along the mountain-slopes above timber-line. We each of us back-packed in three months an average pack of 58 lb. a total distance of 240 miles.

Four miles down from Camp 3 (or " Mile 15 " of our trail) the river runs into wild rapids for half a mile. At Mile 17 the mountain-spurs block the valley and the river is in canyon to Mile 21, where the valley widens and a large stream comes in from the east through burnt country.

We cut trail to Mile 25; for the last couple of miles the river was swift, deep, and smooth-flowing and 40 yards wide. At Mile 25 it cuts through a conglomerate ridge in a deep gorge, dropping 60 feet in 150 yards in a series of cascades. It is just below here that Black Creek comes in.

As the valley ahead was becoming more and more V-shaped, the river apparently much in canyon and the " going " through a terrible mess of spruce, balsam, windfall, and brush, we decided that, in the time at our disposal, we should never succeed in cutting trail through to the Skeena. Later the appearance of this lower valley from the mountains to the west proved our decision to have been wise.

TZAHNY LAKE AND THE GROUNDHOG COUNTRY.

At Mile 24 we had crosscut an old horse-trail used many years ago, leading up the valley of Black Creek. After 2 miles of extremely heavy cutting we reached beautiful grassy flats bordering the creek, and at Mile 30½ reached Tzahny Lake. We rafted this lake and struck across on an old horse-trail to Upper Kluatantan Lake. From here we moved camp on to the mountain summits. A description of this area is needless, as it is within the limits of the Groundhog township surveys, as well as having been reported on by the Geological Survey.

Our return journey to Kitchener Lake was much easier, as we had our cut trail to follow, with a minimum of relaying as we worked from cache to cache.

PHYSICAL CHARACTERISTICS OF THE DUTI VALLEY.

The Duti River is really the main branch of the Upper Skeena and should, strictly speaking, be called the Skeena River. It is the longest, its flow is steadier, being glacier-fed, and at low water we estimated two-thirds the volume of the Skeena came in through the Duti. Even 25 miles up it is hard to find a ford or a place narrow enough to throw a tree across, whereas the Skeena above the entry of the Kluatantan appears to carry very little water.

The lower part of Duti Valley is heavily timbered with spruce running to 2 feet in diameter. Farther up, owing to altitude, balsam is the predominant type. On the old burn at the confluence of the large creek at Mile 21 poplar has largely replaced the original spruce stand. The only pine was for a few miles down from Camp 3 where moraine ridges and gravel-wash cover much of the valley-floor.

Game was plentiful, as many as thirty head of caribou being counted in one herd. Goat were frequently seen, although only once as many as fifteen together. Moose were seldom seen, although they have made many deeply rutted trails. There were a few bear, both black and grizzly. Above timber-line, especially in Kubicek Pass, marmots or " whistlers " were very numerous. Only three wolves were seen. There appeared to be no fish whatever in Duti

River, probably owing to the ice-cold sediment-laden water, and for the same reason trout in Tzahny Lake were both small and few.

CLIMATE.

The summer was very wet and cold and reference to reports of the Groundhog surveys shows that this condition is general for the whole surrounding region. During July rain fell on sixteen days; the mean maximum temperature for the month was 62° F.; the hottest days being the 20th and 21st, when the thermometer touched 77°. Several mornings the temperature was down to 42°; the mean temperature at 6.30 p.m. 55°. For August the mean maximum was 59°, the warmest day being on the 29th, with the thermometer 75° at noon. Mean temperature at 6.30 p.m. 51°. On the 6th we had a violent snow-squall and on the 13th a heavy snow-storm in the mountains, which reached to within a few hundred feet of river-level. It rained on seventeen days.

For most of the first fortnight of September the weather was glorious. On the 14th it broke; the 17th was "first snow" at valley-bottom; on the 22nd and 23rd a violent snow-storm. It rained or snowed on fourteen days during the month. Mean maximum for the month was 54°; warmest day 75° on the 3rd; mean temperature at 8 a.m. 42°. On the 25th was the heaviest frost, 10°—with the thermometer at 29° at 7 that evening.

The winter snowfall in this valley is probably very heavy, 8 feet of packed snow having been reported near by on the Skeena.

ACCESSIBILITY.

Access may be had from Hazelton up the Telegraph Trail to Blackwater 115 miles; thence up the Groundhog Trail and eastward to the Kluatantan Lakes—the latter part of the trail is impassable with windfall. Horses could be brought across from either Kitchener or Stalk Lakes, but our own trail down the Duti Valley being only a back-pack one, would have to be widened and rerouted around swampy places before horses could be taken over it. Tzahny Lake could be used as a possible aeroplane-landing, but in the valley proper there are no lakes.

ALASKAN HIGHWAY.

This valley forms part of a promising route for an Alaskan highway by way of Takla Lake, Driftwood River, Bear Lake and River, and down the Sustut River to its junction with the Skeena; thence up the Skeena and Duti. From what we could see of the headwaters of the Duti, it seems likely a pass to the Upper Stikine can be found at well under 5,000 feet. As an alternative there is a summit of under 4,600 feet between our Camp 3 and Stalk Lake, with a broad shallow valley heading therefrom to the Upper Stikine River.

I have, etc.,

FRANK SWANNELL, B.C.L.S.

HEADWATERS OF FINLAY AND STIKINE RIVERS.

BY PHILIP M. MONCKTON.

ROYAL OAK, B.C., December 11th, 1935.

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

SIR,—In connection with surveys carried out by me under your instructions of June 14th, 1935, I beg to report as follows:—

During the past summer I was employed partly on the survey of placer leases for the Two Brothers Valley Gold Mining Company and partly on a triangulation and topographical survey for your Department, the two programmes being in the same area—namely, in the vicinity of the headwaters of the Finlay and Stikine Rivers, in the Omineca and Stikine Mining Divisions. The object of the trigonometrical work was the closing of the gap between the nets of Fred Nash, B.C.L.S., who had worked from Telegraph Creek in 1930, and that of F. C. Swannell from the Ingenika in 1931. A very satisfactory closure was made here and the triangulation extended eastwards about 30 miles to map the unknown area lying there. From this system

various exploratory surveys were made of the most likely looking country as an aid to future prospectors, and permanent monuments were established to assist in the locating of claims. Rough geological notes were kept along the route of the work, which will be shown on the final plans.

Through the pioneer work being done by the Two Brothers Company quite a lot of attention has been paid the district, and so a description of their property would be of interest. Their holdings are located on three streams—McClair Creek, Moosehorn Creek, and Toodoggone River.

McClair Creek takes its name from a prospector called Charles McClair, who came from Hazelton about 1912 and spent several seasons trapping and searching for placer gold. He first found gold in this creek and located a line of claims there, and is reputed to have taken out $35,000 worth. However, in the spring of 1922 he and his partner Saunders left the valley with the object of going to Fort Grahame and were never heard of again. Indians followed their trail as far as Thutade Lake, and that is the last definite vestige of them. Later several parties did some perfunctory prospecting on the creek, but it was not until 1932 that serious attention was again paid to it. In that year a syndicate from Edmonton located several leases, and in 1933 their mining engineer, R. H. Watson, reported favourably on the ground. After this many more leases were added, including those on the other two creeks mentioned above. In 1934 the Two Brothers Valley Company was formed, a large crew of men shipped in, and a quantity of machinery. To date some $150,000 has been expended in testing the ground, almost entirely on the lower end of McClair Creek and the benches contiguous to it. These benches have been drilled with two small Keystone drills, about sixty holes having been put down an average depth of 40 feet to bed-rock. Also the creek-bed and low benches in the canyon have been thoroughly explored by sluicing. McClair Creek enters Toodoggone River 4 miles above the lake of the same name, which is locally known as Two Brothers Lake. Its average summer flow is around 500 c.f.s., its grade 2 per cent., and its length about 15 miles. Near its lower end for 2 miles it is in a canyon, cut through igneous rock, chiefly syenite, and the canyon-walls are very extensively pyritized. Above the canyon the creek is paralleled by a series of benches, with a valley nearly a mile wide.

Owing to the cost of airplane transportation, mining expenses run very high at Two Brothers. Freight charges run about 25 cents a pound from the Canadian National Railway at Vanderhoof, so that, for instance, gasoline is worth $2.80 a gallon delivered, and other things in proportion. A very fine camp has been erected near the mouth of McClair Creek and is equipped with electric light and a wireless station. A certain amount of supplies are kept on hand for any passers-by, but prices seem high with so much freight charges to be added.

The airplane base is located at Takla Landing, some 165 miles to the south-east, and the flight is made in one hour and forty-five minutes. A minimum rate of $140 is charged for the trip in one of the three Fokker Universals, carrying up to 700 lb. as a load. These planes are owned and operated by the United Air Transport, of Edmonton. Owing to the higher elevation of Toodoggone Lake, 3,700 feet, no more than 550 lb. can be taken out.

All the area covered this year is situated between the western edge of the Cassiar-Omineca batholith and the sedimentaries of the Groundhog coalfields. This contact is more of a broad zone than a sharply defined line, and detached areas of the batholithic rocks are found many miles to the westward of where one would expect to find them. This zone would be, perhaps, 20 miles wide, trending generally north-west and south-east. Toodoggone Lake is on the eastern edge and the district to the north-east of the lake seems to be all granite and diorite, much oxidized, so that, generally speaking, the prevailing colour of the rocks is of a reddish tinge. The area has been heavily glaciated and the topography in the harder rock formations is rugged in the extreme. The greatest relief is not large, not over 5,000 feet, yet owing to the low timber-line the mountains appear higher than they are, and the scenery is very grand. Evidence of metamorphosis is often to be seen, as, for instance, near the head of McClair Creek, where beds of conglomerate have been fused into a hard solid mass, which on being broken still shows the pebbles of which it was originally formed. In places a great deal of fracturing has taken place and on many of the mountains dykes can be seen criss-crossing the faces of the bluffs. At several points mineral-bearing veins were found; one on Mount Gordonia running $35 a ton in gold in a bornite ore; another on Dedeeya Creek nearly $100 in gold and silver. Others in pyrite veins went about $10 in gold content. At the head of

Dedeeya Creek, in the pass, are some enormous blocks of magnetite that have rolled down off one of the peaks.

This same contact-zone extends very many miles. A fair amount of prospecting has been done on it to the south-east by the Consolidated Mining and Smelting Company, and it is known to cross Dease River near McDame Creek. But between the latter point and McClair Creek is virgin territory for the prospector and, being unmapped and far away from any base, it is not easy to enter if short of funds. Moreover, the season is short, not over four and a half months. Nevertheless, it is an easy country once one is in there. Very little of it is covered by timber, and the valley-floors are fairly level and quite practicable for horses. Lakes here and there make good landings for planes. A feasible trip would be from the Two Brothers Camp, following the contact to the Dease River. Taking a few horses along, it could easily be made in a season, and should prove geologically very interesting. Standing on a peak near McKay Creek and looking north-west, one can see large valleys penetrating the mountains and great areas stained a blood-red colour, showing heavy oxidization. For further information on this subject *see* Bulletin No. 1, 1932, "Lode-gold Deposits of British Columbia," pages 24–25, and the Annual Report of the Minister of Mines, 1934, pages C 16–18.

During the past season I was able to map about 600 square miles of this belt, plans of which are now in course of preparation. The following creeks were followed and mapped, of which more detailed descriptions are now given:—

Belle Creek.—This stream enters McClair Creek about 7 miles up from the mouth. It comes in from the north at the point where McClair swings in from the west. It is about 5 miles long and comes from a chain of lakes. Its flow would be about the same as that of McClair at their junction, say 250 c.f.s. Its grade is rather flat, but there is a picturesque waterfall near its mouth with a vertical drop of 55 feet. Its banks are either swampy or low benches, which have all been staked. At its head one crosses the continental divide at an elevation of 4,640 feet to the head of Midas Creek.

Midas Creek.—The trail to Chukachida Lake, which has ascended the left banks of McClair and Belle Creeks, follows Midas Creek down, crossing in more than one place. The creek heads in a lake half a mile long, and from there falls 600 feet in 8 miles to the Chukachida River. Its volume is much the same as that of Belle Creek, and its banks, too, are swampy or consist of gravel benches. These are all staked and in 1935 were under option to some parties from Chicago, who, however, pulled out in August, not very well satisfied.

Chukachida River.—This name is not used locally, where it goes by the name of Blackwater. This is a large river, probably as big as the Stikine at their junction. Heading in glaciers not far from the Finlay, its course is westerly to Chukachida Lake. This beautiful sheet of water, lying 4,105 feet above the level of the sea, is about 3 miles in length and width and has arms to the north-east and south-east. It is hemmed in on the north, east, and south sides by rugged granite mountains, rising to 8,000 feet or more; but the west end is a low gravel flat, and it has some splendid sandy beaches. It is also fed by other large creeks, notably Cushing Creek and Junkers Creek. Near the outlet there are some small islets. A surveyor in British Columbia is apt to become somewhat callous to mountain scenery, but I would not hesitate to nominate Chukachida Lake as queen of them all from a pictorial standpoint. Not only that, but it is stocked with very large fish and is the haunt of plenty of moose and other game. Chukachida leaves the lake at its north-west corner, a wide crystal-clear stream. For the first 10 miles it falls very swiftly and its course is about N. 30° W. It hugs the north side of its valley, and to the south are gravelly flats with hundreds of acres of bunchgrass, with patches of jack-pine interspersed. Beyond 10 miles its current becomes less impetuous, and for the last 10 miles before joining the Stikine it is sluggish and tortuous. In July, when I was there, the willow-swamps at the lower end were full of moose. The distance from the lake to the Stikine is about 35 miles, following the windings of the river. Several large creeks enter, mainly from the north, of which Moon Creek forms a fair pass to the Turnagain.

Moosehorn Creek.—A large creek entering Toodoggone River 7 miles above McClair Creek. Its head forms a pass to the Chukachida River and it is about 20 miles long. It flows 800 c.f.s. The grade is 2 per cent. for the lower 6 miles and above that much less. The altitude at its mouth is 3,875 feet and the lake near its head is 4,934 feet. The lower 2 miles is through a canyon through volcanic rocks, above which the valley opens up to a width of 1 to

2 miles, mostly open and swampy and consisting of old lake-beds. Large trout were caught all along its course and its valley is a favourite for big game, there being many salt-licks. The lake at the head is nearly a mile long and, having low banks at its head and foot, should be practicable for planes, in spite of its elevation. The West Fork, called by the Indians Dedeeya (Groundhog) Creek, has a wide grassy valley, not nearly so wet as the main valley, and is the home of innumerable ground-hogs and ptarmigan, and not a few caribou, grizzlies, and wolves; all of which were observed. At high water part of Dedeeya Creek spills through an old channel into Abesti Creek, and so to the Stikine, forming the only instance I have seen of the same creek sending its waters both to the Arctic and Pacific. West of Dedeeya Creek the granite is left behind and the country is a rolling plateau about 10 miles wide and 5,500 feet altitude. It consists of flows of a red volcanic which has been weathered down into coarse sand, covered with grass, and this forms a fine site for wolves, coyotes, and foxes to dig their dens.

Toodoggone River, also known erroneously as Two Brothers River, is shown on the older maps as Thudegade River. But Toodoggone is the correct Indian pronunciation, with the accent on the first syllable. The meaning of the word is eagle's nest in the Tahltan tongue. The river heads in the sedimentaries just north of Ptarmigan Station. It first runs east for 2 miles, then north-east 5 miles, falling 2,000 feet in this distance. Here it enters the east and west trough in a flat, swampy pass and elects to run to the east on an imperceptible gradient. A few yards distant another creek meanders to the west, and so to Metsantan Lake, the Stikine, and the Pacific. This pass is 4,175 feet high and the easiest and lowest in Northern British Columbia. It is reported to have been the route of a Mr. Black, of the Hudson's Bay Company, more than a hundred years ago. The Indians have a legend of a party of strange white men wintering at the mouth of Chukachida in the dim past and it may bear reference to the same party. Three miles east of this summit and a mile above Moosehorn Creek a large wide valley comes in from the south. This is Lawyer's Creek, and following it a trail leads to Bear Lake and to Hazelton. The summit is 4,450 feet elevation and is named Lawyer's Pass for Stuart Henderson, who came this way with the famous Indian, Simon Gunnanoot, seeking traces of McClair in 1924. Toodoggone River is serpentine and slow all the way to Toodoggone Lake, falling less than 200 feet in 25 miles. Below the lake it is a different story, being one long series of rapids, strewn with boulders, for 25 miles down to the Finlay. It carries about 2,000 c.f.s. and drops nearly 1,000 feet. The lower valley is wide, gravelly, and timbered with jack-pine and Canada spruce. It receives two large affluents, Lee Creek from the north and Jock Creek from the south. An Indian trail follows its left bank for its whole length.

Metsantan Lake and Creek.—The lake is 4,100 feet about sea-level, a mile long, and has low swampy banks. It has long been the site of an Indian encampment. Its name means " full belly," a tribute to its complement of fish and the good hunting around it. Just south of it Edozadelly Mountain is famed among the natives for its herds of caribou, while many a moose can be seen grazing on the roots of lily-pads in the shallow water in summer. And so it is reckoned a delectable place to live. A stock of ancient obsidian arrow and spear heads found in a hole near the lake testifies to the length of time that its shores have been tenanted. The creek, which enters the Stikine at Caribou Hide, is small.

Stikine River flows northwards about 7 miles west of Metsantan Lake, which drains into it at the abandoned village of Caribou Hide. In 1930, after several severe epidemics, the Indians left Caribou Hide, deciding it was unhealthy or had a hoodoo on it. They moved, lock, stock, and barrel, to Metsantan Lake, taking even the name with them, so that now Caribou Hide no longer means the old site at the Stikine, but the new one. The Stikine at the above-mentioned point is about 300 feet wide, clear green water, and slow-flowing. It is lined by stretches of bunch-grass meadows or pine-clad gravel banks. The elevation here is 3,790 feet. The Indian name for it is the Hootlaslui, rising in a large lake of that name, which has been whittled down to its two last syllables on the official maps. Crossing the Stikine to the west, the sandstone and conglomerate formation is immediately entered and this forms the left bank for many miles. The river is alive with trout and other fish, while in the meadows that border it, as on the Chukachida, moose are fond of browsing. The flat-topped mountains on both sides are the home of immense herds of caribou, which graze on the grass and lichens that clothe their summits. Grouse seem to have totally disappeared and not one was seen

all summer. This state of affairs is blamed on the increasing number of wolves and coyotes, which eat the eggs and catch the chicks.

TIMBER.

Below the 4,000-foot contour there is a fair quantity of Canada spruce, some growing as large as 3 feet diameter and 100 feet high, but very knotty. Jack-pine flourishes up to 4,500 feet and grows more than a foot thick. The last tree to weather the blasts of the higher altitudes is the alpine balsam, which grows in clumps to about 5,300 feet, but of no size or value at any height. It is rare below 4,000 feet. There are also a few aspen, cottonwood, and birch. Feed is abundant at all heights and horses can winter in the open at Caribou Hide.

CLIMATE.

Owing to a combination of northerly latitude and excessive elevation the weather is not very good, though there is the odd fine day. In summer there is much cold, wet weather and snow falls at any time. Day after day low hanging clouds obscure the mountains and obstruct the operations of the airplanes. However, the rainfall is not very heavy, nor is the snow very deep in the winter. In all likelihood there is in the neighbourhood of 20 inches of precipitation, all told. This year Toodoggone Lake cleared of ice on June 6th and was frozen again by the latter end of October. The hottest day we experienced was on July 23rd—88°. But two days later it stood at 20° in the early morning. On September 27th it had fallen to zero and all the ponds and sloughs were iced over. Yet on October 4th it was 70° above. October 10th showed 5° below zero.

From the company's records the coldest reading last winter was on January 18th, 59° below zero. But all through April readings of —15° to —30° are noted, which holds back the break-up until very late.

ACCESSIBILITY.

Aside from the plane service above noted, the district can be reached by some other routes. All the trails are mere Indian tracks, not very definite or easy to follow. From Hazelton there are two ways—via the Groundhog Trail, or via the left bank of the Skeena, and the Sustut; thence over South Pass, Tatlatui and Lawyer's Pass. These trails are about 200 miles. Or one can come from Takla Lake via Bear Lake and Lawyer's Pass. This is a little shorter. Another way is via the Finlay River to Whitewater and thence across the Bower Creek Trail, 62 miles. The longest and best trail is from Telegraph Creek, 220 miles.

I have, etc.,

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

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