REPLICA

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING DECEMBER 31st

1905

IN THE

PROVINCE OF

British Columbia

CANYON OF BULKLEY FROM BRIDGE AT AHWILLGATE

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31st DECEMBER,

1905,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, ETC.,

IN THE

PROVINCE OF BRITISH COLUMBIA.

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B. C.
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1906.

REPORT

OF THE

MINISTER OF MINES,

1905.

To His Honour the Honourable Sir Henri Gustave Joly de Lotbinière, K. C. M. G.,
Lieutenant-Governor of the Province of British Columbia:

May it please Your Honour:

The Annual Report of the Provincial Mineralogist upon the Mining Industries of the Province for the year 1905 is herewith respectfully submitted.

RICHARD McBRIDE,
Minister of Mines.

Minister of Mines' Office,
February, 1906.

REPORT OF BUREAU OF MINES.

—BY—

WILLIAM FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

———:o:———

To the Hon. Richard McBride,
Minister of Mines.

Sir,—I have the honour to submit herewith my Annual Report on the Mining Industry of the Province for the year ending December 31st, 1905.

The statistical tables give the total mineral output of the Province to date, and show in considerable detail the actual mineral production of the past year, as based on smelter or mill returns; also, a summary of the production of each of the last four years, thus illustrating by comparison the progress made in productive mining during this period.

To facilitate comparison with information previously given, I have retained, as closely as was possible, the general form already established for such tables and for the Report.

I have the honour to be,
Sir,
Your obedient servant,
William Fleet Robertson,
Provincial Mineralogist.

Bureau of Mines, Victoria, B. C.,
February, 1906.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

METHOD OF COMPUTING PRODUCTION.

In assembling the output for the lode mines in the following tables, the established custom of this Bureau has been adhered to, viz.: The output of a mine for the year is considered that amount of ore for which the smelter or mill returns have been received during the year. This system does not give the exact amount mined during the year, but rather the amounts credited to the mine on the company's books during such year.

For ore shipped in December the smelter returns are not likely to be received until February in the new year, or later, and have, consquently, to be carried over to the credit of such new year. This plan, however, will be found very approximate for each year, and ultimately correct, as ore not credited to one year is included in the next.

In the Lode Mines tables, the amount of the shipments has been obtained from certified returns received from the various mines, as provided for in the "Inspection of Metalliferous Mines Act, 1897." In calculating the values of the products, the average price for the year in the New York Metal Market has been used as a basis. For silver 95 per cent., and for lead 90 per cent., of such market price has been taken. Treatment and other charges have not been deducted.

TABLE I.—Total Production for all Years up to and including 1905.

Gold, placer	$67,772,703
Gold, lode	36,385,058
Silver	23,688,688
Lead	14,958,161
Copper	27,258,013
Coal and Coke	73,786,754
Building stone, bricks, etc	4,560,800
Other metals	252,999
Total	$248,663,176

TABLE II.—Production for each Year from 1890 to 1905 (inclusive).

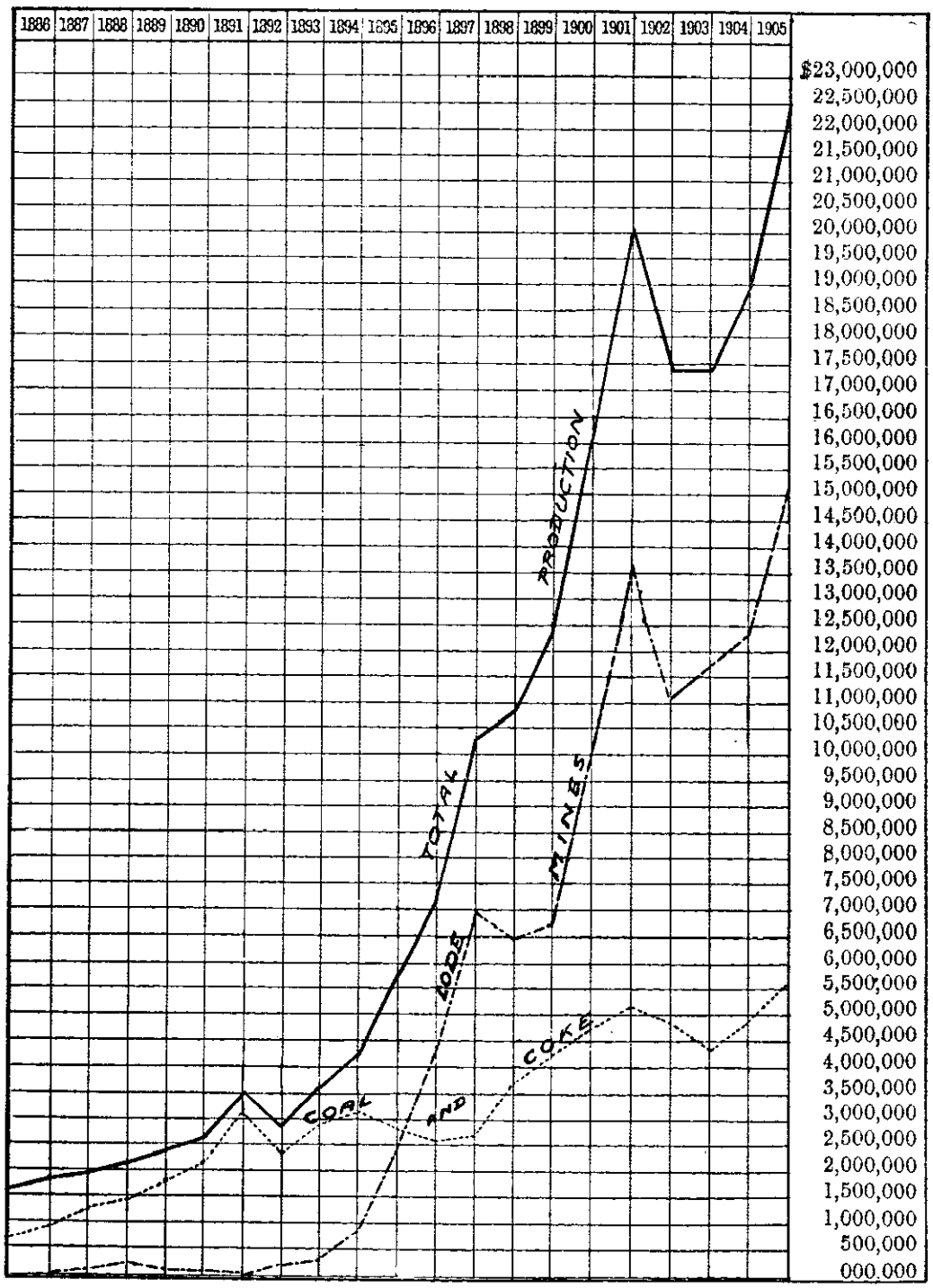
1852 to 1889 (inclusive)	$71,981,634
1890	2,608,803
1891	3,521,102
1892	2,978,530
1893	3,588,413
1894	4,225,717
1895	5,643,042
1896	7,507,956
1897	10,455,268
1898	10,906,861
1899	12,393,131
1900	16,344,751
1901	20,086,780
1902	17,486,550
1903	17,495,954
1904	18,977,359
1905	22,461,325
Total	$248,663,176

TABLE

SHOWING MINERAL PRODUCTION

OF

BRITISH COLUMBIA.



TABLE

SHOWING MINERAL PRODUCTION

OF

BRITISH COLUMBIA

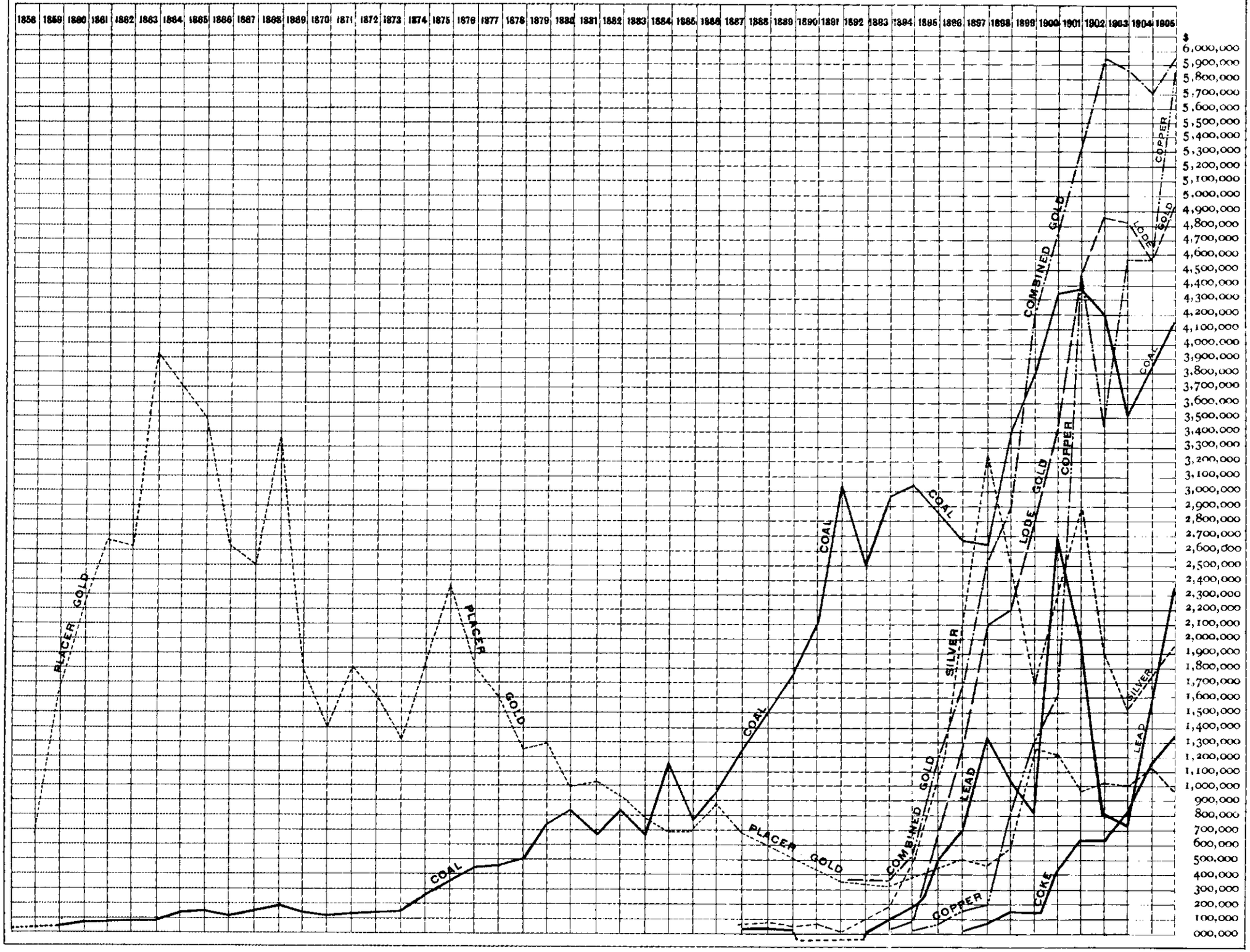


Table IV. gives a statement in detail of the amount and value of the different mineral products for the years 1903, 1904 and 1905. As it has been impossible as yet to collect accurate statistics regarding building stone, lime, bricks, tiles, etc., these are estimated.

TABLE IV.

AMOUNT AND VALUE OF MINERAL PRODUCTS FOR 1903, 1904 AND 1905.

	Customary Measure.	1903.		1904.		1905.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer	Ounces.	53,021	$ 1,060,420	55,765	$ 1,115,300	48,465	$ 969,300
" lode	"	232,831	4,812,616	222,042	4,589,608	238,660	4,933,102
Silver	"	2,996,204	1,521,472	3,222,481	1,719,516	3,439,417	1,971,818
Lead	Pounds	18,089,283	689,744	36,646,244	1,421,874	56,580,703	2,399,022
Copper	"	34,359,921	4,547,535	35,710,128	4,578,037	37,692,251	5,876,222
Coal	Tons, 2,240lbs	1,168,194	3,504,582	1,253,628	3,760,884	1,384,312	4,152,936
Coke	" "	165,543	827,715	238,428	1,192,140	271,785	1,358,925
Other materials			531,870		600,000		800,000
			$17,495,954		$18,977,359		$22,461,325

TABLE V.

PRODUCTION OF MINERAL BY DISTRICTS AND DIVISIONS.

NAME.	DIVISIONS.			DISTRICTS.		
	1903.	1904.	1905.	1903.	1904.	1905.
CARIBOO DISTRICT				$ 475,200	$ 474,600	$ 406,000
Cariboo Mining Division	$ 314,400	$ 313,000	$ 300,000			
Quesnel "	132,000	150,000	96,000			
Omineca "	28,800	11,600	10,000			
CASSIAR DISTRICT				480,368	558,573	504,372
KOOTENAY, EAST, DISTRICT				1,951,128	3,210,573	5,339,154
KOOTENAY, WEST, DISTRICT				6,603,981	5,806,070	5,421,859
Ainsworth Division	219,818	168,023	100,273			
Nelson "	653,457	466,683	532,564			
Slocan "	1,126,986	1,236,858	970,544			
Trail Creek "	4,308,458	3,760,866	3,672,828			
Other parts	295,262	173,640	145,650			
LILLOOET DISTRICT				31,283	34,583	32,584
YALE DISTRICT				3,714,422	4,190,281	6,483,504
Osoyoos, Grand Forks & Greenwood Divisions	3,654,234	4,110,366	6,356,410			
Similkameen Division	2,000	2,500	1,533			
Yale "	58,188	77,415	125,561			
COAST DISTRICTS (Nanaimo, Alberni, W. Coast V. I., Victoria)				4,239,572	4,702,679	4,273,852
				$17,495,954	$18,977,359	$22,461,325

PLACER GOLD.

Table VI. contains the yearly production of placer gold to date, as determined by the returns, sent in by the banks and express companies, of gold transmitted by them to the mints, and from returns sent in by the Gold Commissioners and Mining Recorders. To these yearly amounts one-third was added up to the year 1878, from then to 1895 and from 1898 to 1905, one-fifth, which proportions are considered to represent, approximately, the amount of gold sold of which there is no record. This placer gold contains from 10 to 25 per cent. silver, but the silver value has not been separated from the totals, as it would be insignificant.

TABLE VI.—YIELD OF PLACER GOLD PER YEAR TO DATE.

1858....	$ 705,000	1874....	$ 1,844,618	1890....	$ 490,435
1859....	1,615,070	1875....	2,474,004	1891....	429,811
1860....	2,228,543	1876....	1,786,648	1892....	399,526
1861....	2,666,118	1877....	1,608,182	1893....	356,131
1862....	2,656,903	1878....	1,275,204	1894....	405,516
1863....	3,913,563	1879....	1,290,058	1895....	481,683
1864....	3,735,850	1880....	1,013,827	1896....	544,026
1865....	3,491,205	1881....	1,046,737	1897....	513,520
1866....	2,662,106	1882....	954,085	1898....	643,346
1867....	2,480,868	1883....	794,252	1899....	1,344,900
1868....	3,372,972	1884....	736,165	1900....	1,278,724
1869....	1,774,978	1885....	713,738	1901....	970,100
1870....	1,336,956	1886....	903,651	1902....	1,073,140
1871....	1,799,440	1887....	693,709	1903....	1,060,420
1872....	1,610,972	1888....	616,731	1904....	1,115,300
1873....	1,305,749	1889....	588,923	1905....	969,300
				Total.....	$67,772,703

TABLE VII.—PRODUCTION OF LODE MINES.*

YEAR.	GOLD.		SILVER.		LEAD.		COPPER.		TOTAL VALUES.
	Oz.	Value.	Oz.	Value.	Pounds.	Value.	Pounds.	Value.	
		$		$		$		$	$
1887	.....	.....	17,690	17,331	204,800	9,216	.....	.....	26,547
1888	.....	.....	79,780	75,000	674,500	29,813	.....	.....	104,813
1889	.....	.....	53,192	47,873	165,100	6,498	.....	.....	54,371
1890	.....	.....	70,427	73,948	*Nil.*	*Nil.*	.....	.....	73,948
1891	.....	.....	4,500	4,000	*Nil.*	*Nil.*	.....	.....	4,000
1892	.....	.....	77,160	66,935	808,420	33,064	.....	.....	99,999
1893	1,170	23,404	227,000	195,000	2,135,023	78,996	.....	.....	297,400
1894	6,252	125,014	746,379	470,219	5,662,523	169,875	324,680	16,234	781,342
1895	39,264	785,271	1,496,522	977,229	16,475,464	532,255	952,840	47,642	2,342,397
1896	62,259	1,244,180	3,135,343	2,100,689	24,199,977	721,384	3,818,556	190,926	4,257,179
1897	106,141	2,122,820	5,472,971	3,272,836	38,841,135	1,390,517	5,325,180	266,258	7,052,431
1898	110,061	2,201,217	4,292,401	2,375,841	31,693,559	1,077,581	7,271,678	874,781	6,529,420
1899	138,315	2,857,573	2,939,413	1,663,708	21,862,436	878,870	7,722,591	1,351,453	6,751,604
1900	167,153	3,453,381	3,958,175	2,309,200	63,358,621	2,691,887	9,997,080	1,615,289	10,069,757
1901	210,384	4,348,603	5,151,333	2,884,745	51,582,906	2,002,733	27,603,746	4,446,963	13,683,044
1902	236,491	4,888,269	3,917,917	1,941,328	22,536,381	824,832	29,636,057	3,446,673	11,101,102
1903	232,831	4,812,616	2,996,204	1,521,472	18,089,283	689,744	34,359,921	4,547,535	11,571,367
1904	222,042	4,589,608	3,222,481	1,719,516	36,646,244	1,421,874	35,710,128	4,578,037	12,309,035
1905	238,660	4,933,102	3,439,417	1,971,818	56,580,703	2,399,022	37,692,251	5,876,222	15,180,164
To'l	1,771,023	36,385,058	41,298,305	23,688,688	391,517,075	14,958,161	200,414,780	27,258,013	102,289,920

* Not included in above is 9,413 tons of zinc ore—worth $139,200.

* The information as to production in the earlier years is obtained from the "Mineral Statistics and Mines" for 1896, Geological Survey of Canada.

TABLE VIII.—COAL AND COKE PRODUCTION PER YEAR TO DATE.

COAL.

YEARS.	TONS (2,240 lbs).	VALUE.
1836-64	133,500	$ 535,012
1865	32,819	131,276
1866	25,115	100,460
1867	31,239	124,956
1868	44,005	176,020
1869	35,802	143,208
1870	29,843	119,372
1871-2-3	148,549	493,836
1874	81,547	244,641
1875	110,145	330,435
1876	139,192	417,576
1877	154,052	462,156
1878	170,846	512,538
1879	241,301	723,903
1880	267,595	802,785
1881	228,357	685,071
1882	282,139	846,417
1883	213,299	639,897
1884	394,070	1,182,210
1885	265,596	796,788
1886	326,636	979,908
1887	413,360	1,240,080
1888	489,301	1,467,903
1889	579,830	1,739,490
1890	678,140	2,034,420
1891	1,029,097	3,087,291
1892	826,335	2,479,005
1893	978,294	2,934,882
1894	1,012,953	3,038,859
1895	939,654	2,818,962
1896	896,222	2,688,666
1897	882,854	2,648,562
1898	1,135,865	3,407,595
1899	1,306,324	3,918,972
1900	1,439,595	4,318,785
1901	1,460,331	4,380,993
1902	1,397,394	4,192,182
1903	1,168,194	3,504,582
1904	1,253,628	3,760,884
1905	1,384,312	4,152,936
Total	22,627,330 tons.	$68,263,514

COKE.

1895–6	1,565	$ 7,825
1897	17,831	89,155
1898 (estimated)	35,000	175,000
1899	34,251	171,255
1900	85,149	425,745
1901	127,081	635,405
1902	128,015	640,075
1903	165,543	827,715
1904	238,428	1,192,140
1905	271,785	1,358,925
Total	1,104,648 tons.	$5,523,240

TABLE IX.—PRODUCTION IN DETAIL OF THE

DISTRICT.	YEAR.	TONS.	GOLD—PLACER.		GOLD—LODE.		SILVER.		LEAD.	
			Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.
				$		$		$		$
Cariboo										
Cariboo Division	1902	21	17,000	340,000	19	393	4	2		
	1903		15,720	314,400						
	1904		15,650	313,000						
	1905		15,000	300,000						
Quesnel "	1902		8,000	160,000						
	1903		6,600	132,000						
	1904		7,500	150,000						
	1905		4,800	96,000						
Omineca "	1902		2,000	40,000						
	1903		1,440	28,800						
	1904		580	11,600						
	1905		500	10,000						
Cassiar										
Atlin Lake Division	1902		20,000	400,000						
	1903		22,000	440,000						
	1904		26,500	530,000						
	1905		23,750	475,000						
All other Divisions	1902	100	800	16,000	474	9,797	224	111		
	1903	67	1,750	35,000	244	5,043	53	27		
	1904	303	575	11,500	766	15,333	185	99		
	1905	143	1,250	25,000	187	3,865	477	274	5,600	233
East Kootenay										
Fort Steele Division	1902	3,621	1,650	33,000			114,506	56,738	3,017,756	110,450
	1903	938	1,000	20,000			28,537	14,491	717,479	27,357
	1904	76,895	1,000	20,000			590,186	314,923	21,071,236	817,564
	1905	170,073	708	14,160			1,137,872	652,342	48,248,928	2,045,750
Windermere-Golden	1902	260			16	331	27,918	13,833	204,652	7,490
	1903	808			17	352	59,006	29,963	951,296	36,273
	1904	365	50	1,000			20,964	11,186	401,022	16,559
	1905	226	50	1,000	14	289	16,880	9,677	149,584	6,342
West Kootenay										
Ainsworth Division	1902	4,939			5	103	320,719	158,916	3,083,039	112,839
	1903	24,332			33	682	108,678	55,187	4,299,727	163,949
	1904	14,569			2	41	90,004	48,026	3,091,648	119,956
	1905	3,331			28	579	99,781	57,204	1,002,114	42,490
Nelson "	1902	77,810			25,116	519,148	273,870	135,703	1,680,948	61,523
	1903	76,923	100	2,000	20,114	415,756	190,003	96,483	1,072,542	40,896
	1904	74,442	150	3,000	14,100	291,447	198,795	106,077	976,570	37,891
	1905	50,090	150	3,000	17,667	365,177	116,729	66,921	1,368,388	58,020
Slocan & Slocan City	1902	21,153			353	7,297	2,223,810	1,101,898	13,651,144	499,632
	1903	12,412			257	5,312	1,466,931	744,908	9,880,469	376,742
	1904	70,296			160	3,307	1,540,170	821,835	10,611,227	411,716
	1905	88,279			134	2,770	1,045,948	599,642	5,399,330	228,932
Trail Creek "	1902	329,534			162,146	3,351,558	373,101	184,871		
	1903	360,786			145,353	3,004,446	209,537	106,403		
	1904	312,991			133,095	2,751,074	131,830	97,024		
	1905	330,618			129,843	2,683,855	147,753	84,707		
All other Divisions (Revelstoke, Trout Lake, Lardeau.)	1902	1,692	100	2,000	652	13,477	241,584	119,705	885,734	32,418
	1903	5,430	100	2,000	2,417	49,959	392,354	199,237	1,144,239	43,630
	1904	26,494	50	1,000	3,615	74,722	148,201	79,080	485,520	18,838
	1905	22,302	280	5,600	2,707	55,954	121,551	69,685	339,883	14,411
Lillooet										
	1902	2,882	1,372	27,440	193	3,989				
	1903	3,652	1,291	25,820	264	5,457	12	6		
	1904	40	1,725	34,500	4	83				
	1905	133	1,500	30,000	125	2,584				
Yale—BOUNDARY (Grand Forks, Greenwood and Osoyoos Divisions.)	1902	521,402	250	5,000	42,745	883,539	219,798	108,910	13,108	480
	1903	697,284	150	3,000	50,358	1,040,900	320,749	162,876	23,531	897
	1904	801,925	150	3,000	55,505	1,147,288	245,155	130,815	9,021	350
	1905	965,628	90	1,800	78,689	1,626,501	630,407	351,412	67,076	2,844
Similkameen Div'n. (Vernon.)	1902		135	2,700						
	1903		100	2,000						
	1904		125	2,500						
	1905	38	† 57	1,140	19	393				
Yale Division (Ashcroft, Kaml'ps.)	1902	3,783	2,350	47,000	6	124	542	269		
	1903	22	2,520	50,400	3	62	15	8		
	1904	1,906	1,560	31,200	183	3,783	625	334		
	1905	14,642	230	4,600	610	12,608	3,863	2,215		
Coast & other Districts (Nanaimo, Alberni, W. Coast V. I., Victoria).	1902	31,802			4,766	98 513	121,841	60,372		
	1903	103,524	250	5,000	13,771	284,347	220,329	111,883		
	1904	81,383	150	3,000	14,612	302,030	206,366	110,117		
	1905	61,126	100	2,000	8,637	178,527	118,156	67,739		
Miscellaneous ‡ (other metals, building stone, brick, etc.)	1902									
	1903									
	1904									
	1905									
TOTALS	1902	998,999	53,657	1,073,140	236,491	4,888,269	3,917,917	1,941,328	22,536,331	824,882
	1903	1,286,176	53,021	1,060,420	232,831	4,812,616	2,996,204	1,521,472	18,089,283	689,744
	1904	1,461,609	55,765	1,115,300	222,042	4,589,608	3,222,481	1,719,516	36,646,244	1,421,874
	1905	1,706,679	48,465	$969,300	238,660	$4,933,102	3,439,417	$1,971,818	56,580,703	$2,389,022

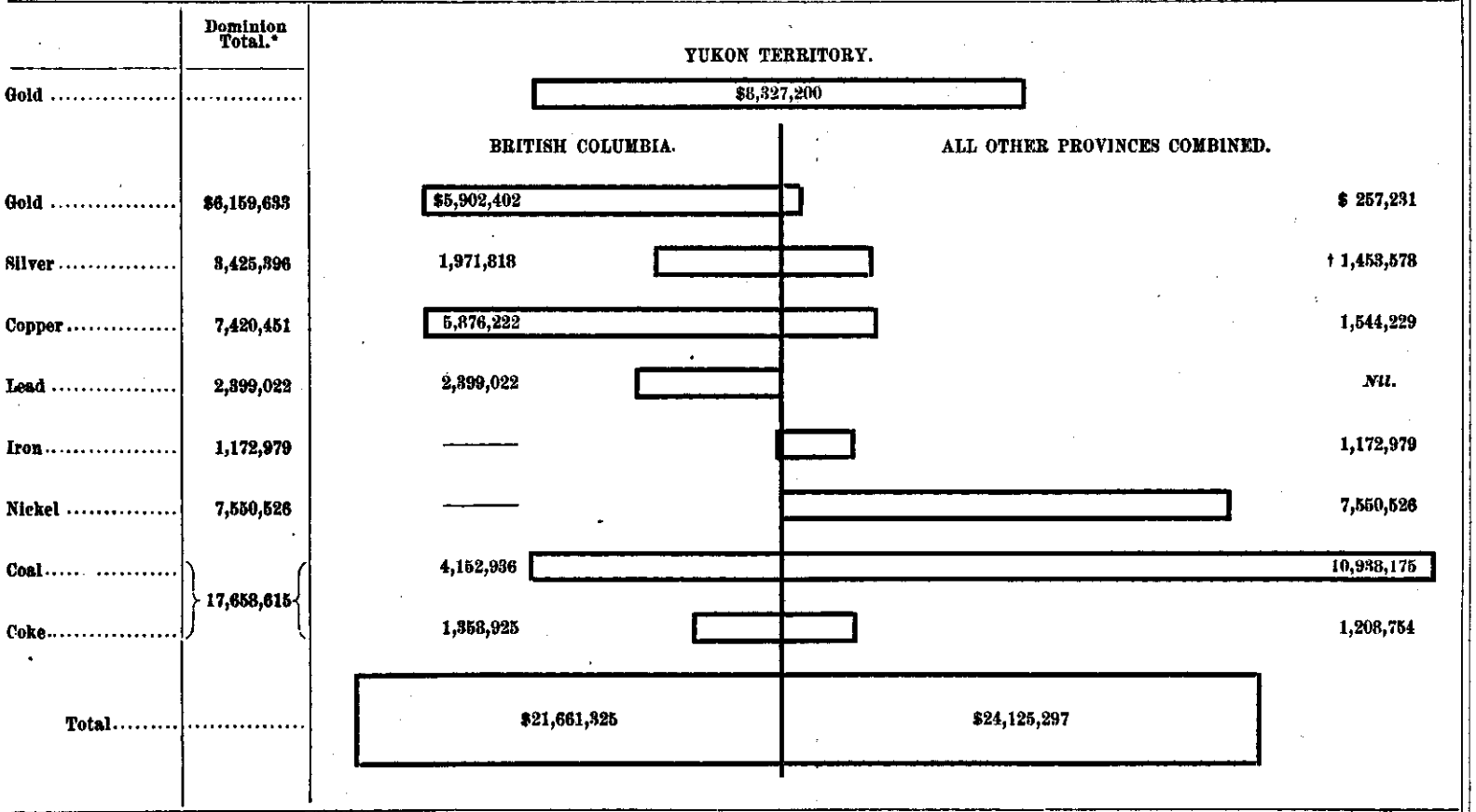
† Includes $500 Platinum. ‡ Including 9,413 tons Zinc ore, valued at $139,200.

METALLIFEROUS MINES FOR 1902, 1903, 1904 AND 1905.

COPPER.		TOTALS FOR DIVISIONS.				TOTALS FOR DISTRICTS.			
Pounds.	Value.	1902.	1903.	1904.	1905.	1902.	1903.	1904.	1905.
	$	$	$	$	$	$	$	$	$
						540,395	475,200	474,600	406,000
		340,395							
			314,400						
				313,000					
					300,000				
		160,000							
			132,000						
				150,000					
					96,000				
		40,000							
			28,800						
				11,600					
					10,000				
						426,636	480,368	558,573	504,372
		400,000							
			440,000						
				530,000					
					475,000				
6,258	728	26,636							
2,249	298		40,368						
8,900	1,141			28,573					
					29,372				
						222,778	128,797	1,180,933	2,731,214
		200,188							
			61,848						
				1,152,487					
					2,712,252				
8,048	936	22,590							
2,730	361		66,949						
5,472	701			28,446					
10,606	1,654				18,962				
						7,716,399	6,498,981	5,806,070	5,257,659
9,537	1,109	272,967							
			219,818						
				163,023					
					100,273				
491,144	57,120	773,494							
346,218	45,822		600,957						
220,500	28,268			466,683					
92,663	14,446				507,564				
		1,608,827							
181	24		1,126,986						
				1,236,858					
					831,344				
11,667,807	1,356,966	4,893,395							
8,652,127	1,145,109		4,255,958						
7,119,876	912,768			3,760,866					
5,800,294	904,266				3,672,828				
1,000	116	167,716							
3,294	436		295,262						
				173,640					
					145,650				
						31,429	31,283	34,583	32,584
		31,429							
			31,283						
				34,583					
					32,584				
						2,787,356	3,707,552	4,190,281	6,433,504
14,955,582	1,739,334	2,737,263							
18,485,542	2,446,561		3,654,234						
22,066,407	2,828,913			4,110,366					
27,670,644	4,313,853				6,308,410				
		2,700							
			2,000						
				2,500					
					1,533				
		47,393							
6,409	848		51,318						
328,380	42,098			77,415					
680,808	106,133				125,561				
						449,249	1,309,606	1,179,295	784,131
2,496,681	290,364	449,249							
6,861,171	908,076		1,309,606						
5,960,593	764,148			1,179,295					
3,437,236	535,865				784,131				
						480,051	531,870	600,000	800,000
		480,051							
			531,870						
				600,000					
					800,000				
29,636,057	3,446,673	$12,654,293				$ 12,654,293			
34,359,991	4,547,535		13,163,657				$13,163,657		
35,710,128	4,578,037			$14,024,335				$14,024,335	
37,692,251	$5,576,222				$16,949,464				$ 16,949,464

TABLE X.

Showing Comparative Mineral Production for 1905 of British Columbia and Other Provinces of the Dominion.



* Figures taken from "Geological Surveys, Summary of Mineral Production of Canada in 1905." † At the British Columbia valuation per ounce.

PROGRESS OF MINING.

The gross value of the mineral production of the Province during the year 1905 was $22,461,325, the largest output ever made by the mines of the Province, and an increase over the preceding year of $3,483,966, or 18.4%, while it is an increase over the year 1903 of over 28%. An analysis of the returns shows, however, that this increase has been confined to certain districts, South-East Kootenay, the Boundary District, Nelson Mining Division and Yale Mining Division, the remaining districts showing a more or less marked decrease. The greater part of the increase is in the two former of these districts. In South-East Kootenay the tonnage of ore mined increased 121% and the value of the product 135% over the preceding year, while in the Boundary the tonnage has increased 20% and the value of the output 53.6%.

The Slocan District shows the most marked decrease this year, its output being little better than half of what it was in the preceding year.

The Rossland camp just about held its own this past year. The tonnage of ore mined increased about 5%, but the values per ton diminished somewhat on the average, owing to the working of low grade ores by concentration methods.

The tonnage of ore mined in the whole Province, exclusive of coal, was this past year 1,706,679 tons, some 245,070 tons, or 16%, greater than in 1904, and 85% greater than was mined in 1901.

The number of mines from which shipments of ore were made in 1905 was 146, and of these only 79 properties shipped over 100 tons during the year, practically no change from the preceding year. Some 38 mines each shipped in excess of 1,000 tons, of which seven were in the Nelson Division, four in the Slocan, seven in Trail (Rossland), and eleven in the Boundary.

The following table shows the number of metalliferous mines which shipped ore during the past year, together with the location of these mines and the number of men employed both above and below ground:—

TABLE SHOWING DISTRIBUTION OF SHIPPING MINES IN 1905.

	Tons of Ore Shipped.	No. of Mines Shipping.	No. of Mines Shipping over 100 tons in 1905.	Men Employed in these Mines.		
				Below.	Above.	Total.
CASSIAR:						
Skeena	143	2	1	8	11	19
EAST KOOTENAY:						
Fort Steele	170,073	3	3	250	67	317
Windermere	226	6	0	31	13	44
WEST KOOTENAY:						
Ainsworth	3,331	13	7	67	39	106
Nelson	50,090	21	15	250	142	392
Slocan	88,279	52	20	352	105	457
Trail	330,618	8	8	582	251	833
Other Divisions	22,302	8	3	89	26	115
LILLOOET	133	1	1	2	2	4
YALE:						
Boundary	965,628	20	16	595	421	1,016
Ashcroft-Kamloops	14,642	3	1	52	25	77
Similkameen-Vernon	88	1	0	7	7	14
COAST	61,126	8	4	109	93	202
Total	1,706,679	146	79	2,394	1,202	3,596

In explanation of the table, it should be said that in its preparation, a mine employing 12 men for four months is credited in the table with four men for 12 months, so that the total given is less than the actual number of individuals who worked in mines during the year.

The "labour employed to the ton of ore mined" forms some criterion of the total cost of mining in a camp, since the cost of labour is in a more or less constant proportion to such total cost. In this respect it is interesting to note in the various districts the number of tons of ore mined to each man employed. An analysis of the above table shows, approximately, that, taking the Province as a whole, there were 474 tons of ore mined for each man employed about the mines. In this respect, however, the districts vary very materially, since in the Slocan District the figures show 193 tons mined to the man in the year, in the Nelson District 127 tons, in the Trail Creek (Rossland) District 396 tons, and in the Boundary 950 tons.

Such generalisation, of course, does not apply exactly to any one mine, but only to the district, and in the first two districts mentioned the mines vary in character so greatly, some having high grade shipping ores, and others low grade concentrating ores, that care must be taken not to carry these average figures too far.

TABLE SHOWING NON-SHIPPING MINES AND NUMBER OF MEN EMPLOYED, 1905.

DISTRICT.	Number of Mines.	Men employed under ground.	Men employed above ground.	TOTAL.
AINSWORTH	1	2	0	2
BOUNDARY (Gd. Forks, Kettle R., Osoyoos)	4	15	7	22
COAST AND CASSIAR	3	12	6	18
LARDEAU AND TROUT LAKE	3	6	3	9
NELSON	1	4	8	12
SLOCAN (Slocan, Slocan City)	9	23	9	32
EAST KOOTENAY (Ft. Steele & Windermere)	2	8	3	11
TRAIL CREEK	1	6	2	8
Total	24	76	38	114

STATISTICAL TABLES.

Referring to the preceding Statistical Tables of the mineral production of the Province, the following is a summary of their contents:—

TABLE I. shows the total gross value of each mineral product that has been mined in the Province up to the end of 1905. From this it will be seen that coal mining has produced more than any separate class of mining—a total of $73,786,754—followed next in importance by placer gold at $67,772,703, and third by lode gold at $36,385,058.

The metal gold, derived from both placer and lode mining, amounts to $104,157,761, the greatest amount derived from any one metal or mineral, the next most important being copper, of a total gross value of $27,258,013, followed by silver at $23,688,688, and lead at $14,958,161.

TABLE II. shows the values of the total production of the mines of the Province for each year from 1890 to 1905, during which period the output has increased nearly ten-fold, and has now reached a production for the past year valued at $22,461,325, or more than double what it was in 1898.

TABLE III. presents in graphical form the facts shown by figures in the tables, and demonstrates to the eye the rapid growth of lode mining in the Province and also the fluctuations to which it has been subject.

It will be seen that although coal has been a constantly increasing industry during this whole period of 20 years, lode mining did not really begin until 1894, since when it has risen with remarkable rapidity, though not without interruption, until now it has reached higher than the $15,000,000 line.

TABLE IV. gives the amounts, in the customary units of measure, and the values, of the various metals or minerals which go to make up the grand total of the mineral production of the Province, and also, for purposes of comparison, similar data for the two preceding years.

The table shows that there has been a decrease in the production of placer gold of some $146,000, but at the same time an increase in the output of lode gold of $343,494, thus leaving for this metal a balance on the right side of nearly $200,000.

The amount of silver produced this past year was 3,439,417 ounces, having a gross value of $1,971,818, an increase over the preceding year of $252,302, due to the greatly increased output of the Boundary and East Kootenay Districts.

The table shows an output of lead amounting to 56,580,703 lbs., valued at $2,399,022, the greatest production of lead ever made by the Province except in the phenomenal year 1900, and is in quantity an increase over the preceding year of 19,934,459 lbs., or 54 %, which is due unquestionably to the effect of the Dominion Government's lead bounty upon two large mines in East Kootenay, which are very low-grade in both lead and silver.

The bounty has, however, apparently had no stimulating effect upon the production of lead in the Slocan District, as the amount of lead produced by this district in 1905 is only about half that produced in 1904 and one-quarter that produced in 1900.

TABLE V. shows the proportions of the total mineral productions made in each of the various districts into which the Province is divided.

It will be noted that this year, for the first time, the Boundary District has wrested from West Kootenay the honour of first place on the list, and leads in the value of its production by over a million dollars, followed in order of output by the West Kootenay, East Kootenay and Coast Districts. The latter two districts owe more than half their output to the coal mines situated within their limits, whereas the production of the two former is entirely from lode miming. The Boundary produces over 42 % of the total output of the Province derived from lode mining.

TABLE VI. gives the statistical record of the placer mines of the Province from 1858 to 1905, and shows a total production of $67,772,703. The output for 1905 was $969,300—a decrease of about 10 % as compared with the previous year, and due to a dry season with a shortage of water for hydraulic mining.

TABLE VII. relates entirely to the lode mines of the Province, and shows the amounts and values of the various metals produced each year since 1887—the beginning of such mining in the Province. The gross value of the product of these mines to date is $102,289,920. The production in 1905 was $15,180,164, an increase over the preceding year of $2,871,129, or about 23 %.

TABLE VIII. contains the statistics of production of the coal mines of the Province. The total amount of coal mined to the end of 1905 is 22,627,330 tons (2,240 lbs), worth $68,263,514. Of this there was produced in 1905 some 1,384,312 tons, valued at $4,152,936, a larger amount than has been produced in any year since 1902.

In these figures of coal production is not included the coal used in making coke, as such coal is accounted for in figures of output of coke. The making of coke began only in 1895-6, and in the ten years since this period the output has increased from 1,565 tons to 271,785 tons

(2,240 lbs.), of a value of $1,358,925 produced in 1905, an increase over the preceding year of 33,357 tons, or 14 %. The total output of coke to the end of 1905 was 1,104,648 tons, valued at $5,523,240.

More detailed statistics of the coal production of the Province and of the separate districts for the year 1905 are given under the chapter on "Coal," near the end of this report.

TABLE IX. gives the details of productions of the mines of the Province (excepting coal mines) for the years 1902, 1903, 1904 and 1905, and the districts in which such productions were made, showing the tonnage of ore mined in each district, with its metallic contents, and market value.

The total tonnage of ore mined in the Province during the past year was 1,706,679 tons, having a gross value of $16,949,464.

The following table shows the percentages of such tonnage and values derived from the various districts of the Province:—

Boundary District,	56.8 %	of tonnage and	37.2 %	of values.
Trail Creek Mining Division,	19.5	"	21.7	"
Fort Steele "	10.0	"	16.0	"
Slocan District,	5.2	"	4.9	"
Coast "	3.6	"	4.6	"
Miscellaneous and other districts,	4.9	"	15.6	"
	100.0		100.0	

TABLE X. compares graphically the output of mineral products in British Columbia with that of similar products in all the other Provinces of the Dominion, and shows that in 1905 British Columbia produced of the metals and coal an amount nearly as great as did all the other Canadian Provinces combined.

COAL.

The collieries actually producing coal in the Province during this past year are the same as in the previous year, and are located either on the eastern side of Vancouver Island or on the western slope of the Rockies, near the Crowsnest pass, in the south-eastern portion of the Province.

The Vancouver Island Colleries are operated by two companies, the Western Fuel Co., at Nanaimo, and the Wellington Colliery Co., at Ladysmith and Comox; while the collieries in South-East Kootenay, at present some three in number, at Michel, Fernie and Carbonado, are all owned and operated by the same company—the Crow's Nest Pass Coal Co.

The gross output of the coal mines of the Province for the year was 1,825,832 tons (2,240 lbs.), which, with 314 tons taken from stock, makes a total production of 1,826,146 tons. Of this total amount, 1,202,971 tons were sold as coal, 441,520 tons were used in making coke, and 181,655 tons were consumed under the companies' boilers and sold locally.

The coke produced amounted to 271,785 tons, of which some 268,091 tons were sold and 3,694 tons were added to stock.

The following table indicates the markets in which the coal and coke output of the Province was sold :—

COAL.	Coast.	Crow's Nest Pass.	Total.
Sold for consumption in Canada.....(Tons—2,240 lbs)	380,332	148,939	529,271
" export to United States..... "	427,698	246,002	673,700
COKE.	808,030	394,941	1,202,971
Sold for consumption in Canada..... "	5,410	145,044	150,454
" export to United States..... "	4,300	113,337	117,637
	9,710	258,381	268,091

The Vancouver Island Collieries mined in 1905 some 993,899 tons of coal, which, with 314 tons taken from stock piles, makes the total of coal disposed of 994,213 tons, distributed as follows :—

Sold as coal in Canada.....	380,332 tons.	
" United States.....	427,698 "	
		808,030
Used under companies' boilers, etc.....		142,491
" in making coke.....		43,692
		994,213

The amount of coke produced was 15,661 tons, of which 5,410 tons were sold in Canada and 4,300 in the United States (including Alaska), while some 5,950 tons were added to stock.

The coal sales of the Coast collieries show this year an increase of about 24,000 tons, or about 3 % over the preceding year. The coal sales to the United States this year amount to 53 % of the total, exactly the same as in 1904, most of which coal was disposed of in the California market, the remainder going to Alaska, where the recent developments in metalliferous mining seem destined to produce a constantly increasing market for the product of our Coast collieries.

The local consumption of coal on the coast of British Columbia also shows an increase this year of 11,568 tons, being 380,332 tons, as against 368,764 tons in 1904.

The coke production this year was some 3,710 tons less than in 1904, and the coke sales also are lower by 3,214 tons, the production being still much greater than the demand, as is evidenced by the fact that in 1904 some 6,647 tons of coke were added to stock, followed in 1905 by a further addition of 5,950 tons, a total of 12,597 tons in two years.

The local coke consumption has dropped from 10,333 tons in 1904 to 5,410 tons in 1905, due to the decreased amount of copper smelting being done on the Coast, while the distance from the Coast to the smelters in the interior of the Province is so great as to prevent that market being available.

The resumption of smelting operations at Crofton about the beginning of 1906 will better materially the local market this coming year.

The coke sold in the United States this past year by the Coast collieries amounted to 4,300 tons, an increase of 1,709 tons, occasioned by the "blowing in" of two smelting plants on Prince of Wales island, in Alaska, which increase promises to continue.

The Nanaimo collieries were closed down for a number of months during the year, on account of labour disputes; but whether this decreased the coal sales, or whether the market was kept fully supplied by the other colliery company it is impossible to say, as the two companies have "pooled" their California sales under one selling agent.

The Crow's Nest Pass collieries at Michel, Coal Creek (Fernie) and Carbonado (Morrissey)—three in number—operated by the Crow's Nest Pass Coal Co., mined, during the year 1905, 831,933 tons of coal, an increase over the preceding year of 169,248 tons, or 25½ %.

The following table shows the disposition made of the combined output of the company's collieries:—

Sold as coal in Canada	148,939 tons.	
" United States	246,002 "	
		394,941
Used in making coke by company		397,828
" under company's boilers, etc		35,843
Sold at retail, locally		3,321
		831,933

The amount of coke produced from the coal noted above was 256,125 tons, and with 2,256 tons taken from stock, makes the total coke sales 258,381 tons, of which 145,044 tons were sold for consumption in Canada (British Columbia), and 113,337 tons were exported to the United States.

The coal sales of the Crow's Nest Pass Co. increased this past year 107,773 tons, or 37½%, due entirely to the increased exportation of coal to the United States, for the consumption of Crow's Nest coal in British Columbia this past year decreased this 20,041 tons, or 12 %, as compared with 1904, while the exportation of coal to the United States increased by 127,814 tons, or about 108 %.

The sales of coke from Crow's Nest collieries were increased this year by 41,687 tons, or 19.2 %, the increase being due to consumption both in British Columbia and in the United States, the former increasing some 26,040 tons, or 13½ %, and the latter 15,647 tons, or 16 %. The increased consumption in British Columbia was due to the constantly increasing demand for coke in the Boundary District to smelt the increased tonnage of ore there mined.

GOLD.

Placer Gold. The production of placer gold this past year is valued at $969,300, a decrease of some $146,000, or 13 %, as compared with that of 1904, and is the smallest output made any year since 1901. This falling off in production is attributable to a very dry summer, preceded by a winter with little snow, with a resulting decreased supply of water for hydraulicing, in which class of mining the output seems to be in direct proportion to the water available for use, since the deposits of gravel appear to be fairly regular in their tenure of gold, and the output is measured by the amount of gravel washed.

In the Atlin District the output this past year was about $475,000, considerably less than in 1904, but still in excess of any year previous to that.

In this district the drought was not so severely felt, as about 40 % of the gold is mined by "individual" methods, in which a large amount of water is not necessary.

In the Dease lake section of Cassiar, mining is carried on largely by hydraulic methods, and between the dryness of the season and the obstacles presented in getting plant in over a long pack trail, the season was not successful.

The Cariboo Mining Division of the Cariboo District about held its own this past season, but the production of the Quesnel Division was some 40 % less, owing to the very short run made by the largest producing property—the Consolidated Cariboo—due to an unprecedentedly low water supply, a trouble which the Company has set about remedying by bringing in water from another water-shed to supplement the present supply, at the expenditure of a large amount of money.

In the Fraser river district the dry season should not have had so much effect, but individual mining on the bars appears to have been replaced by dredging, and the dredges have not met the expectations of the operators, for the reason, it is claimed, that the dredges built have proved to be of too weak construction, and were so constantly under repair as to reduce the actual working time below the margin of profit.

Steam shovels have not as yet been fully proven, and the one formerly operated in South-East Kootenay has been, at least temporarily, abandoned.

The Atlin shovel apparently worked very well, but the appliances for handling the tailings and for washing the gravel proved quite inadequate, so much so that the capacity of the shovel was never fully demonstrated. Enough was learned, however, to indicate that for our conditions in the North the steam shovel is apt to prove much more effective than the dredge.

Gold from Lode Mining.

The value of the output of gold of this Province from lode mining for the year 1905 was $4,933,102, an increase over the preceding year of some $343,494, or about 7½ %, due entirely to the increased tonnage of gold-bearing copper ore smelted in the Boundary district.

The greater part of the lode gold produced is found in combination with copper; in fact, only 11 % of the total gold is produced from stamp-mills, and even in these mills about half the values are obtained in concentrates, which are afterwards smelted.

SILVER.

About 70 % of the silver produced in the Province was found associated with lead, in argentiferous galena, the remainder being chiefly in conjunction with copper ores.

The total silver production was 3,439,417 ounces, valued at $1,971,818, the largest output the Province has made since 1901, despite the fact of a decrease in the Slocan of 494,000 ounces.

The increase is due primarily to the extensive working this year of the galenas, low grade in silver, of the Fort Steele district, which district shows an increased production of nearly 550,000 ounces; and, secondly, to the increased tonnage of the large copper mines in the Boundary and the working of certain smaller but higher grade properties in that district, resulting in an increased silver production in the Boundary of about 385,000 ounces.

LEAD.

There has been produced in the Province in 1905 some 56,580,703 lbs. of lead, valued at $2,399,022, an increase over the preceding year of 19,934,459 lbs., or about 54 %. This year's lead production, with the exception of that made in 1900, is the greatest ever made by the Province.

It is noticeable that almost our entire output of lead is now from the Fort Steele district, while the production of the Slocan is only about half what it was the previous year, and one-third of the amount produced in 1901.

The following table shows the percentage of the total output obtained in the various districts :—

Fort Steele Mining Division		86.1 %
Slocan	"	9.2
Nelson	"	2 5
Ainsworth	"	1.8
Other Divisions		.4
		100.0

The bounty on lead offered by the Dominion Government is certainly responsible for the production of lead in East Kootenay, for, as was pointed out in last year's report, these mines could scarcely be operated without its aid, but the bounty has apparently had no effect in stimulating greater production in the Slocan District.

COPPER.

There is again this year a material increase in the output of copper, the production being 37,692,251 lbs., valued at $5,876,222, an increase over the preceding year of 1,982,123 lbs., or about 5½ %, while the increase in value is $1,298,182. This is the greatest output of copper ever made by the Province. The increase is due entirely to the increased tonnage of the Boundary District, as all the other important districts show a falling off in production.

The following table shows the production of the various districts for the years 1904 and 1905 :—

	1904.	1905.
Boundary District	22,066,407 lbs	27,670,644 lbs.
Rossland "	7,119,876 "	5,800,294 "
Coast "	5,960,593 "	3,437,236 "
Yale-Kamloops "	328,380 "	680,808 "
Nelson "	220,500 "	92,663 "
Various Districts	14,372 "	10,606 "
	35,710,128 "	37,692,251 "

The average assays of the copper ores of the various camps, based upon copper recovered, were as follows :—Boundary, 1.52 % copper; Rossland, .90 %, and Coast District, 2.81 %.

OTHER MINERALS.

Iron Ore. There has been no iron ore mined in the Province this past year, since there is no market as yet available. For the small quantity formerly used as a flux in lead smelting, an impure iron ore, carrying values in the precious metals, has been substituted.

Zinc Ore. This year, for the first time, have any important sales of zinc ore to be recorded. Plants for the "enrichment" of zinc ores have been started at Kaslo, Rosebery and Pilot Bay. These plants are merely concentrators, in which ores, or ordinary zinc concentrates, are more carefully separated, with the elimination of minerals undesirable in the smelting of zinc ore, such as iron pyrite or carbonate, galena and gangue matter.

The resulting "enriched" zinc concentrates, thus rendered saleable, have found a ready market, at prices varying according to the zinc contents and freedom from impurities, from about $25 a ton for 53% zinc in a pure ore, to about $10 a ton for a 40% zinc ore not so free from impurities.

Approximately 9,413 tons of zinc ore or zinc concentrates were sold this past year, having a value at point of shipment of about $139,200.

Almost all of this zinc ore comes from the Slocan district, but has not been all mined this past year, as the sales include zinc concentrates which had accumulated and for which only this year has a market been found.

As yet, most of the zinc ore sold has gone to the United States, but a zinc smelting plant having been this year erected at Frank, in Alberta, just east of the British Columbia boundary, in all probability the larger part of the British Columbia output will in future be treated there.

A Commission appointed by the Dominion Government, and including Mr. W. R. Ingall, of New York, and Mr. Philip Argall, of Colorado, spent the season of 1905 in investigating the possibilities of zinc ore mining in British Columbia and methods of treating the ore. The report of this Commission has not as yet been published.

Practical demonstrations of smelting zinc-lead ores by electricity were upon two occasions attempted at Vancouver, to witness which the Provincial Government was invited to send a representative. Mr. Carmichael, the Provincial Assayer, who was present, reports that the demonstrations did not succeed, for reasons which, he hopes, may yet be overcome.

Of the undeveloped properties carrying strictly zinc ore, those on Pingston creek, in the Arrow Lake Mining Division, present the greatest surface showing.

Platinum. The actual production of platinum is very small, although its occurrence in the placer gravels is so widespread throughout the Province. About $500 worth was obtained from gravels near Granite creek, Similkameen, while the Consolidated Cariboo Hydraulic Mining Co., of Cariboo, and the Berry Creek Mining Co., of Thibert creek, Cassiar, each recovered small quantities in an experimental way, as mentioned in the reports on these districts.

A number of finds of platinum "in place" have been reported. Some of these were assayed by Baker & Sons, platinum refiners, of Newark, N. J., who reported finding considerable amounts of platinum, but upon close examination by this Bureau, confirmed by the Laboratory of the Canadian Geological Survey, of the identical ore assayed by Baker & Sons, no platinum could be found. As this has happened two or three times before, the conclusion is forced that assays made in a platinum refinery are apt to get contaminated by the dust produced by processes of manufacture.

Attention is drawn to the mention in the report of the Provincial Assayer of the finding of appreciable quantities of platinum in a number of samples of Yukon and Cassiar gold, the platinum being actually in the gold, and not as a separate mineral associated therewith.

Building Stone. The quarrying of building stone as an industry is as yet confined to the Coast, such stone as is used in the Interior being obtained from some of the numerous rock exposures to be found in almost all parts of the Province.

On the Coast, the cities of Vancouver and Victoria, particularly the former, have used an increased amount, in building, of granite, andesite and sandstone.

While no exact statistics are available, it is estimated by a leading architect that four times as much brick and stone were used in Vancouver in 1905 as during the preceding year.

Brick. Victoria brick-yards turned out in 1905 some seven and a half million brick, while about the same quantity was made in the vicinity of Vancouver. Grand Forks made two and a half million, while a number of smaller yards scattered over the Province, together contributed some ten million more.

The manufacture of drain pipe at Victoria by the B. C. Pottery Co. amounted in value to between $80,000 and $90,000.

Cement. The product of the Vancouver Portland Cement Co., at Tod inlet, during the past year, is estimated at $150,000, which production will be about doubled next year, by the increased capacity of the plant.

Oil and Oilshales. Indications of oil have been found in various parts of the Province in the form of oil seepages or of shales carrying oil, but to date no oil in commercial quantity has actually been struck. In the Flathead District, on the oil seepages of which a report has already been made by the Provincial Mineralogist, some further prospecting has been done, and it is reported that a boring plant has been brought in from just across the U. S. boundary, where it has been lying for some years, but, from the best information obtainable, no drilling to any depth has yet been done.

As mentioned in last year's report, black carbonaceous shales carrying a small percentage of oil have been known to exist in the Beaver valley, Cariboo, and this past year these shales have been taken up by a company which proposes next season to put down bore holes to test the existence of oil under the shales.

Nothing has as yet been done on the Queen Charlotte islands towards testing for oil in the vicinity of the seepages which exist there.

The bore hole put down at Steveston, near Vancouver, has been, at least temporarily, abandoned, no oil having been struck.

DEVELOPMENTS OF THE YEAR.

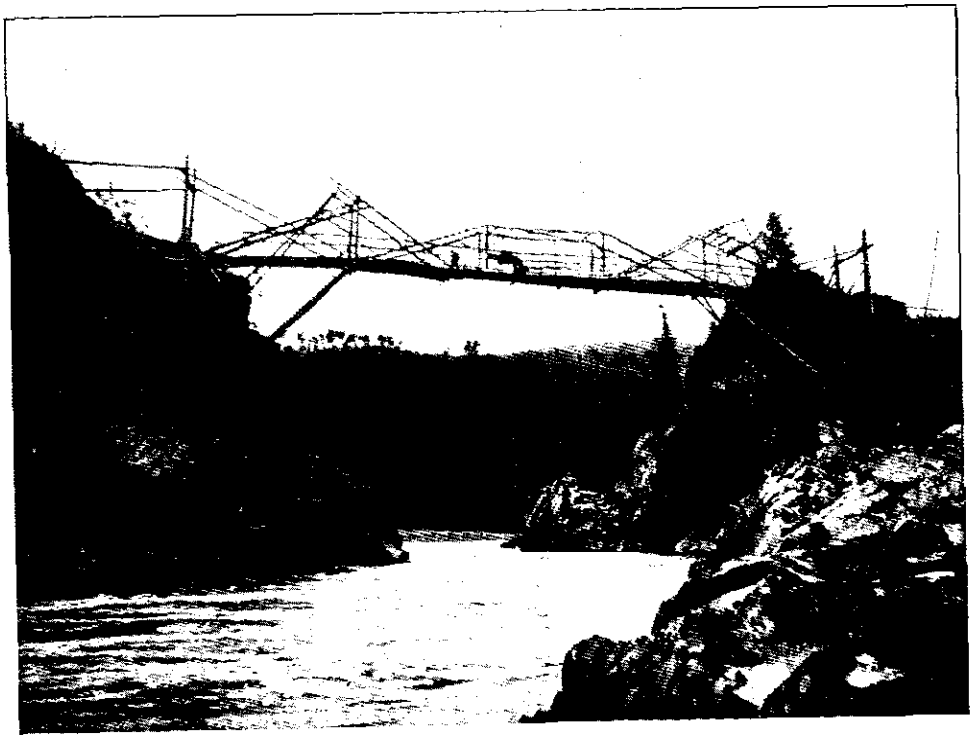
It cannot be said that the year 1905 has witnessed any new departures or developments in mining in the Province.

The increased production in metalliferous mining is due entirely to the increased tonnage of low grade ores treated in the East Kootenay and Boundary Districts, while the other districts—Slocan, Nelson, Rossland and the Coast—each shows this year a decreased production.

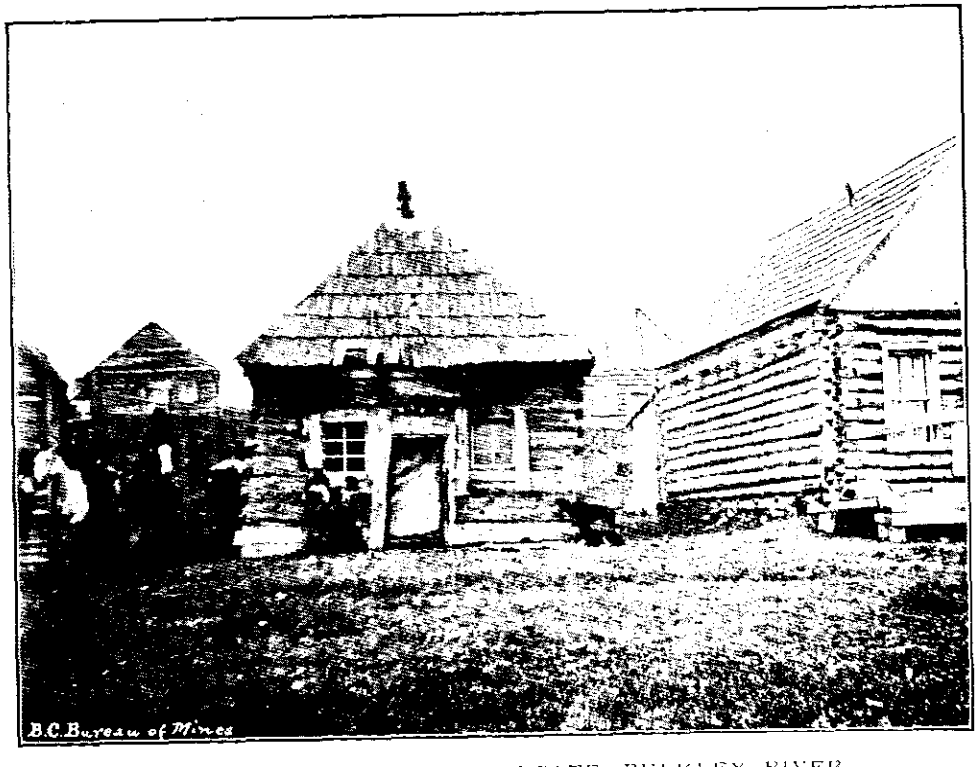
In the Fort Steele Mining Division of East Kootenay the *St. Eugene* mine has this year more than doubled its output of the previous year, despite the fact that several months were lost at its most important opening, through the head works being completely destroyed by fire. The property is a large low grade concentrating proposition, galena, low in silver, in a silicious gangue. This year's output was nearly 150,000 tons of ore, producing about 900,000 ounces of silver and 36,500,000 lbs. of lead, the largest lead production of any property in British Columbia, and about 65% of the total production of the Province. The *North Star*, which has been for many years one of our largest and steadiest producers of silver-lead ore, has been worked out and practically abandoned, as development on an extensive scale failed to disclose further ore bodies, and the small shipments made this year are only the results of the cleaning out of the old workings.

With the passing of the *North Star*, an adjacent property, the *Sullivan*, has taken its place, and is to-day the second largest lead producer in the Province, producing nearly 11,500,000 lbs. of lead, or 20% of the production of the Province.

Fort Steele District this year produced over 86% of the total lead production, 33% of the silver and 50% of the coal and coke sold by the Province, but no copper nor lode gold.



BRIDGE ACROSS BULKLEY RIVER AT AHWILLGATE.
(Constructed by Indians of round poles and telegraph wire.)



INDIAN HOUSES AT AHWILLGATE, BULKLEY RIVER.

In the Nelson Division the tonnage of ore mined has decreased about 33% as compared with the previous year, but the gold produced has decreased only some 12%, indicating that there is a proportionately larger amount of higher grade gold ore being mined.

The copper production of the Division has decreased more than 50%, a result of the inactivity of the *Silver King* mine, but the lead output has increased 50%, owing to the resumption of work at the *Mollie Gibson* (La Plata Mines) and the operating of the *Alice* near Creston.

At the *Ymir* mine, although the tonnage of ore treated is less, the amount of gold produced is greater than in 1904. Some of the smaller mines in the district have done exceedingly well in a small way.

The plant erected at the *May and Jennie* has been found upon trial to require some adjustment and enlargement, and has in consequence not as yet accomplished the results which were expected, and which will, in all probability, be eventually accomplished.

In the Slocan District there was a greater number of mines shipping this past year than in 1904, but the production of lead has decreased 50% and of silver 30%, due to the shutting down of some of the larger mines, such as the *Payne* and *Ivanhoe*, and the decreased production of other large properties, such as the *Rambler*, *Slocan Star*, *Idaho*, *Wakefield* and others.

Many of the mines formerly operated under company management are now worked in a smaller way under lease or "tribute."

The market obtained for zinc ore or concentrates has been of some assistance, some 9,413 tons having brought $139,200.

The "Lead Bounty" does not seem to have had the same stimulating effect upon the lead output of the Slocan that it has had upon that of East Kootenay.

In the Rossland Camp there has been about 5% more ore mined this year than last, and while there has been but a slight depreciation in the gold and silver contents, there has been a very considerable falling off in the copper contents of the ore.

The average assay of the ores of the camp were this past year: Gold, 0.39 oz.; silver, 0.44 oz.; copper, 0.9%.

In the Boundary District the tonnage of ore mined has increased about 20% over the preceding year, and now amounts to 965,628 tons, being over 56% of the total tonnage of the Province.

This increase is due to the constantly increasing operations of the Granby Co., the other large companies about holding their own. The number of smaller high grade properties being operated, while not contributing any appreciable percentage to the tonnage, have helped to keep up the average grade of the ores.

The costs of mining and smelting have been gradually reduced in this section, thanks to as fine equipments as money could buy, in the hands of intelligent and scientific men, until they are now reported to be about the lowest in the world. To quote from a recent editorial in the leading American scientific journal:—

"Ten years ago the idea of smelting for a dollar a ton and mining for $1.10 a ton would have been scouted as impossible. Yet this has been done at the Granby mines, with an exceptionally favorable ore and exceptionally well applied skill. In Tennessee, with low priced labour and fuel, they smelt a copper bearing pyrrhotite for $1.30 per ton."

On Texada island the *Marble Bay* mine has sustained regular shipments, but the *Copper Queen* and *Van Anda* properties have only been prospected for further ore bodies, with little shipping. The iron mines have not been operated.

In the New Westminster District the only property working to any extent is the *Britannia*, at Howe Sound. This company, reported on last year, has finished equipping its tramway and concentrating plant, and in December, 1905, began the shipping of crude ore and concentrates to the company's smelter at Crofton, formerly owned and built by the Northwestern Smelting Co. This plant is being remodelled, under the superintendency of Mr. Thos. Kiddie, to meet the requirements of the mine.

In the Atlin District the placer mines held their own exceedingly well, considering the dryness of the seasan. No lode mines have as yet developed in this district, although on Windy Arm, just north of the boundary and in the Yukon Territory, several most promising prospects have developed, the details of which are contained in a special report herewith. From the location of these discoveries it seems probable that the mineral belt will be found to extend south into British Columbia.

Of the northern districts, the vicinity of the Portland Canal seems to promise the greatest likelihood of becoming a producing camp in the immediate future, as it is near deep water transportation.

There have been a number of discoveries in the vicinity of the Telkwa river of mineral deposits, which, if transportation was provided, might have considerable promise, but which at present, and until such facilities are provided, must remain unworked.

On the Queen Charlotte islands a little prospecting has been done, and an examination made of the coal fields by the Dominion Geological Survey, which, it is reported, is to be followed by active exploration of the properties by a private syndicate, but as yet no definite work has been attempted.

Mining on the West Coast of Vancouver Island has been at a standstill; a little prospecting has been going on, but little more. The only two properties shipping were the *Hetty Green*, about 200 tons of 7 % copper ore, and the *Cascade*, 30 tons of 15 % copper ore.

In the Mount Sicker District of the Victoria Mining Division the *Tyee* mine has maintained average monthly shipments of between 2,500 to 3,000 tons of ore, which has been smelted with some custom ores in the company's smelter at Ladysmith. The development of this property has been carried to a depth of over 1,000 feet, but has as yet not proved up any commercial body of ore below the 300-foot level, although, since the close of the year, an exposure of ore was made on the 1,000-foot level carrying a high percentage of barytes, the gangue of the upper ore bodies, which gave much encouragement, but which there has not as yet been time to develop.

Some development has been carried on, on other properties in the neighbourhood of the *Tyee*, but as yet no ore bodies have been encountered.

The *King Solomon* mine, at Kokasilah, has made a small shipment of 40 tons of 8% copper ore, and some other properties in the vicinity are being prospected.

At Hedley, in the Osoyoos Mining Division, the *Nickel Plate* mine, owned by the Yale Mining Co., has been successfully operated, and there has been treated in the mill of an allied company, The Daly Reduction Co., over 30,000 tons of ore, which yielded between $12 and $14 to the ton, chiefly in gold.

In the Nicola District active prospecting operations have been carried on in the coal areas, with, it is reported, gratifying results.

BUREAU OF MINES.

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Work of the Year.

The work of the Bureau of Mines increases, of necessity, year by year, and this growing activity is due to the following causes:—The extension of the mining area of the Province, with the proportional increase in the number of mines; the increasing desire of the outside public for the free information which the Bureau supplies with regard to the various mining districts and camps; and the appreciation by the prospector of the fact that he may obtain, gratis, a determination of any rock or mineral which he may send to the Bureau.

The routine work of the office, and the preparation and publication of the Report for the year just ended, followed by the examination in the field of as many of the mines and mining districts as the season would permit, together with the work of the Laboratory and instruction of students, fully occupied the staff for the year. The staff of the Bureau consists of the Provincial Mineralogist, the Provincial Assayer, and a junior assistant in the Laboratory, with a clerk as temporary assistant during the publication of the Report. In connection with inquiries for information and the collection of statistics, about 1,700 letters were sent out, with, approximately, the same number received.

Provincial Mineralogist.

The Provincial Mineralogist began his summer field work on June 1st, by a trip up the mainland coast to Princess Royal and Gribbell islands, returning to Victoria on the 13th June to make preparations for the reception of the American Institute of Mining Engineers, it having been previously arranged that the Institute should hold its annual meeting in Victoria, to be followed by an excursion to Alaska and the Yukon.

On June 24th the Provincial Mineralogist, acting under instructions from the Hon. the Minister of Mines, and on his behalf, proceeded to Spokane to meet the members of the Institute, to accompany them to Nelson, Rossland, Trail and the Boundary, and finally to Victoria, to welcome them officially to the Province, and to offer such facilities and information as was possible.

The visiting members of the Institute and guests, numbering about 100, arrived at Nelson on June 27th, visited the power plant at Bonnington Falls and other points of interest, including an excursion on Kootenay lake in the steamer "Kaslo," all provided by the citizens of Nelson.

From Nelson the party proceeded *via* Northport to Rossland, arriving there at 9:45 A. M. on June 28th, and was received by the local committee. The *War Eagle, Centre Star* and *LeRoi* mines and the *LeRoi No. 2* oil concentrating plant were visited in the forenoon, and after lunch at the War Eagle Hotel, a special train conducted the party to the Canadian Smelting Co.'s plant at Trail, where the copper and lead smelting plants and the electrolytic lead-refining plants were inspected, after which, on returning to Rossland, a banquet was given in the evening at the Hotel Allan by the local committee.

During the night the party, travelling in its own special train, moved to Grand Forks, the "international boundary" having been repeatedly crossed, and through the courtesy of the respective governments all custom formalities were dispensed with.

On June 29th the smelting works of the Granby Consol. M. S. & P. Co., at Grand Forks, was visited. This is the largest establishment of its kind in Canada, the plant having smelted some 660,000 tons of ore this past year.

In the afternoon the special train over the Great Northern Railway conveyed the party to the *Granby* mines at Phoenix, where the extensive underground works and "glory holes," together with all the magnificent plant, were duly inspected.

Victoria was reached at 7 A. M. on July 1st, Dominion Day and Canada's national holiday. The first regular session of the Institute was held in the Ministers' room in the Parliament Buildings, provided for the purpose by the Government, at 3 P.M. on Saturday, July 1st, and was presided over by Past President Robert W. Hunt. His Honour the Lieutenant-Governor and the Hon. Richard McBride, Premier and Minister of Mines, were introduced, and in brief and appropriate terms welcomed the visiting members of the Institute and guests to the City and Province. On Saturday evening a public reception was given by the Government to the Institute in the Legislative chamber.

On Monday, July 3rd, a steamer excursion among the islands of the Gulf of Georgia was given by the Victoria Board of Trade.

On Tuesday, July 4th, the Tyee Copper Co., through the courtesy of its General Manager, Mr. Clermont Livingston, provided a special train over the E. & N. Railway to Mt. Sicker and Ladysmith, where the Company's mine and smelter were visited.

On July 5th a business session of the Institute was held in the morning, and in the afternoon a reception was given by His Honour the Lieutenant-Governor at Government House.

The Institute and guests left Victoria the same evening, spending the next day, July 6th, in Vancouver as guests of the Board of Trade and the Provincial Mining Association, leaving that evening for the North by the C. P. R. Co. steamer "Princess May."

The opportunity thus given of showing to the representative men of the most influential body of mining engineers on the continent the material and mining development and possibilities of the Province was taken advantage of as fully as the limited time permitted, and it is felt that the visit of the Institute will result in much good to the Province.

On July 12th the Provincial Mineralogist left Victoria for a trip through the northern interior of the Province, along the proposed route of the Grand Trunk Pacific Railway, proceeding to Ashcroft by Canadian Pacific Railway, thence by stage to the 150-Mile House, on the Cariboo road, and from this point by saddle-horse and pack-train, *via* Quesnel, across country to Hazelton, on the Skeena River, thence by steamer to Victoria, arriving there on October 10th.

The approximate distances travelled were: by railway, 200 miles; by stage, 150; 720 by pack-train and canoe; and 800 by steamer; total, 1,870.

From October 10th to 16th the Provincial Mineralogist was at his office in Victoria, leaving again on the latter date for the north to examine the recent mineral discoveries on Windy Arm, on the boundary between the Atlin District of British Columbia and the Yukon Territory, and returning to Victoria and office November 2nd, 1905, having travelled 2,000 miles on this trip. With the exception of a week between trips, preparing for the next, the Provincial Mineralogist was travelling from June 1st until November 2nd, covering in that time about 6,500 miles.

In December a meeting of the Board of Examiners for Assayers' Certificates of Competency, composed of the Provincial Mineralogist, the Provincial Assayer and Mr. Thos. Kiddie, of Crofton, was held in the Government Laboratory.

The remainder of the year was occupied in the preparation for publication of the notes taken in the field, the collection and preparation of statistics for the year, and the regular routine work of the office.

ASSAY OFFICE.

The following is a summary of the work of the Assay Office of the Bureau for the year 1905, as reported by the Provincial Assayer, Mr. Herbert Carmichael:—

During the year 1905 there were made by the staff in the Government Assay Office 1,176 assays or quantitative determinations, which is an increase over the number made during the previous year. Of these, a number were for the Bureau of Mines, or for the Department, for which no fees were received. The fees collected by the office were as follows:—

Fees from assays and chemical determinations	$ 340 00
" melting and assaying gold dust and bullion	752 00
" assayers' examinations	520 00
Total cash receipts	$1,612 00
Determinations and examinations made for other Government Departments for which no fees were collected	$ 300 00
Value of assaying done	$1,912 00

The amount of gold melted during the year was $99,631, in 142 lots, as against $103,693, in 171 lots in 1904.

Free Determinations.

In addition to the above quantitative work, a large number of qualitative determinations or tests were made in connection with the identification and classification of rocks or minerals sent to the Bureau for a report. Of these no count was kept, nor were fees charged therefor, as it is the established custom of the Bureau to examine and test qualitatively without charge samples of mineral sent in from any part of the Province, and to give a report on the same. This has been done for the purpose of encouraging the search for new or rare minerals and ores, and to assist prospectors and others in the discovering of new mining districts, by enabling them to have determined, free of cost, the nature and probable value of any rock they may find. In making these free determinations, the Bureau asks that the locality from which the sample was obtained be given by the sender, so that the distribution of mineral over the Province may be put on record.

In addition to the ordinary work of the office, a large amount of analytical work was done during the year, including complete analyses of coals and soils from the northern interior of British Columbia, and of samples of clay, marble and magnesia.

A large number of water analyses were made, especially of samples sent from the Boundary District. These were of material aid in locating the source of the typhoid which had been epidemic in that district.

Analyses of spraying materials were made for the Fruit Inspector.

During the past year the Mineral Museum has been renovated and re-arranged and considerable additions of ore and rock samples have been received, notably from Portland Canal, Skeena and Revelstoke Districts.

Exhibits of mineral were sent to the Portland and New Westminster exhibitions, the exhibit at the Dominion Exhibition at New Westminster being a large and representative one.

In addition to his usual duties, the Provincial Assayer visited the Big Bend District, in Revelstoke Mining Division, and also arranged the mineral exhibit at the Dominion Fair.

In the Report of this Bureau for 1903 (p. 23) mention was made of the finding of an appreciable amount of the metals of the platinum group in a sample of gold from near Dawson,

in the Yukon. Since that time a number of samples of gold from different localities in the Yukon and Cassiar have been refined in this laboratory, and in almost every case platinum and allied metals have been separated, to an amount which has a commercial significance.

This platinum appears to be directly combined with the gold and is not visible as a separate mineral in the gold dust, and for this reason, in the ordinary melting down and refining of such gold dust at the mint, is apt to have been overlooked.

Further experiments are being made in this connection, but it is considered advisable to draw the attention of the public to the matter, that other assay offices also may further investigate the subject.

EXAMINATIONS FOR ASSAYERS.

REPORT OF H. CARMICHAEL, SECRETARY OF BOARD OF EXAMINERS.

I have the honour, as Secretary, to submit the Annual Report of the Board of Examiners for Certificates of Competency and Licence to Practise Assaying in British Columbia, as established under the "Bureau of Mines Act Amendment Act, 1899."

The Act requires that at least two examinations shall be held each year, aud such have duly taken place. The first took place at Nelson, in the laboratory of the Hall Mining and Smelting Co., kindly loaned for the purpose, beginning on May 1st, 1905, at which eight candidates presented themselves for examination, of which number five succeeded in passing the required examination, and it was duly recommended to the Minister of Mines that Certificates be issued to them.

The Board met for an examination in Victoria, in the Government Laboratory, on December 4th, 1905, but no candidates presented themselves for examination.

In addition to the five above mentioned, the Board, during the year, recommended the granting of three certificates under section 2, sub-section 2, of the Act, all of which Certificates have been duly issued by the Minister of Mines in accordance with such recommendation.

The following is a list, up to December 31st, 1905, of those to whom Certificates of Competency have been issued :—

LIST OF ASSAYERS HOLDING PROVINCIAL CERTIFICATES OF EFFICIENCY UNDER THE "BUREAU OF MINES ACT AMENDMENT ACT, 1899."

(Only the holders of such certificates may practise assaying in British Columbia.)

Under section 2, sub-section (1).

Austin, John W	Britannia.
Baker, C. S. H	
Barke, A. C	
Bishop, Walter	Grand Forks.
Buchanan, James	Trail.
Campbell, Colin	New Denver.
Carmichael, Norman	Arizona.
Church, George B	
Cobeldick, W. M	Scotland.
Comrie, George H	Atlin.
Collinson, H	Ladysmith.
Crerar, George	Boundary Falls.
Cruickshank, G	Rossland.
Day, Athelstan	Dawson.
Dedolph, Ed	
Dockrill, Walter R	Chemainus.
Farquhar, J. B	Vancouver.
Grosvenor, F. G	Montreal.
Hannay, W. H	Rossland.
Hart, P. E	
Hawkins, Francis	Sandon.
Hurter, C. S	
John, D	
Kitto, Geoffrey B	Ladysmith.
Lang, J. G	Victoria.
Ley, Richard N	Nelson.
Marsh, Richard	Spokane, Wash.
Marshall, William S	Ladysmith.
Mitchell, Charles T	Grand Forks.
McCormick, Alan F	Ruth, Nevada.
McFarlane, James A	Ferguson.
Nicholls, Frank	Nelson.
O'Sullivan, John	Vancouver.
Parker, Robt. H	Rossland.
Parsenow, W. L	
Perkins, Walter G	Basin, Montana.
Robertson, T. R	
Rombauer, A. B	Butte, Montana.

List of Assayers Holding Certificates of Efficiency.—*Concluded.*

Segsworth, Walter.....
Sharpe, Bert N.....
Sim, Charles John .....England.
Snyder, Blanchard M .....Greenwood.
Steven, Wm. Gordon .....
Sundberg, Gustave..... ...Prince of Wales Island.
Tally, Robert E .....Spokane, Wash.
Thomas, Percival W .....Alaska.
Tretheway, John H.....
Turner, H. A .....
Vance, John F C. B.....Kamloops.
Vans Agnew, Frank .....Siberia.
Wales, Roland T .....
Watson, William J .....Ladysmith.
Welch, J. Cuthbert .....Alaska.
Wells, Ben T.. .....Grand Forks.
Whittaker, Delbert E.....Victoria.
Widdowson, E. Walter .....Nelson.
Williams, W. A .....Grand Forks.
Williams, Eliot H .....Trail.
Wimberly, S. H.....Grand Forks.

Under section 2, sub-section (2).

Archer, Allan .....
Browne, D. J .....Rossland.
Bryant, Cecil M .....Vancouver.
Blaylock, Selwyn G.....Trail.
Cartwright, Cosmo T.....Vancouver.
Cavers, Thomas W.....Trail.
Clothier, George A.....Moyie.
Cole, Arthur A.....Rossland.
Coulthard, R. W .....Fernie.
Cowans, Frederick.....
Dixon, Howard A .....Toronto, Ontario.
Galbraith, M. T .....
Gilman, Ellis P.....Vancouver.
Green, J. T. Raoul.....Blairmore.
Guess, George A.....Trail.
Gwillim, J. C ....Kingston, Ontario.
Heal, John H .....
Hilliary, G. M .....Idaho, U. S.
Holdich, Augustus H.....England.
Johnston, William Steele....
Kaye, Alexander .....Rossland.
Lay, Douglas .....Nelson.
Lewis, Francis B .....
Merrit, Charles P ..... .
Musgrave, William N.....
Mussen, Horace W .....Siberia.
McArthur, Reginald E .....
McLellan, John .....Port Simpson.
McMurtry, Gordon O .....
McNab, J. A .....Trail.
McVicar, John .....
Maclennan, F. W. ....Rossland.
Noble, David T.....Trail.
Outhett, Christopher.....Kamloops.
Pemberton, W. P. D.....
Reid, J. A .... Greenwood.
Scott, Oswald Norman .....
Shannon, S ... .
Sharpe, G. P..... .....Midland, Ontario.
Stevens, F. G .....Mexico.
Sullivan, Michael H .....Trail.
Sutherland, T. Fraser.....
Swinney, Leslie A. E .....
Thomson, H. Nellis .....Anaconda, Montana.
Twinning, Leslie A. C. .....Ferguson.
Watson, A. A.....Olalla.
Watson, Henry.....
Workman, Ch. W .....
Wright, Richard .....Rossland.
Wynne, Lewellyn C .....Rossland.

Under section 2, sub-section (3).

Carmichael, Herbert .....Victoria.
(Provincial Assayer.)
Harris, Henry.....Nelson.
(Asst. Supt. Smelter.)
Kiddie, T. (Supt. Smelter)...Ladysmith.
Sutton, W. J.....Victoria.
McKillop, Alexander.....Nelson.
Pellew-Harvey, Wm .....London, England.
Robertson, Wm. F..... Victoria.
(Provincial Mineralogist.)
Marshall, Dr. T. R .....London, England.

Previously issued under the "Bureau of Mines Act, 1897," section 12.

Pinder, W. J.....Dawson, Y. T.
Thompson, James B .....Vancouver.

EXAMINATIONS FOR COAL MINE OFFICIALS.

During the year 1904, under the "Coal Mines Regulation Act Further Amendment Act, 1904," the regulations regarding the qualifications and examinations of officials employed in coal mines have been completely revised and at the same time made much more stringent and thorough.

The "Coal Mines Regulation Act," as now amended, provides that all the officers of a coal mining company having any direct charge of work underground, shall hold Government Certificates of Competency, which are to be obtained only after passing an examination before a duly qualified Board, appointed for the purpose of holding such examinations, and known as the Managers' Board. The certificates granted on the recommendation of such Board, and the requirements for same, are as follows:—

FIRST CLASS CERTIFICATE (or Manager's Certificate).

Such a certificate must be held by every manager or "chief officer having the control and daily supervision of any coal mine" in British Columbia. The statutory requirements for this certificate, in addition to such examination and qualifications as may be imposed by the Board of Examiners are, that the candidate for examination shall be at least 25 years of age, a British subject, and have had at least five years' experience in or about the practical working of a coal mine.

SECOND CLASS CERTIFICATE (or Overman's Certificate).

Such certificate must be held by any person "who has the daily charge of the underground workings of a coal mine under the control and daily supervision of the manager, and next in charge under such manager."

Aside from the requirements of the Board of Examiners, a candidate for such certificate must have had "at least five years' experience in or about the practical working of a coal mine."

THIRD CLASS CERTIFICATE.

This certificate must be held by every shiftboss, fireboss, or shotlighter in a coal mine in British Columbia, and besides the examination by the Board, calls for three years' practical experience.

Experience in a coal mine outside of the Province may be accepted by the Board. Any certificate is considered to include that of any lower class.

In addition to the examinations and certificates already specified as coming under the Managers' Board, the Act further provides that every coal miner shall be the holder of a certificate of competency as such. By "miner" is meant "a person employed underground in any coal mine to cut, sheer, break or loosen coal from the solid, whether by hand or machinery."

Examinations for a miner's certificate are held each month at each colliery by a Board of Examiners, known as the Miners' Board, and consisting of an official appointed by the owners, an examiner elected by the miners of that colliery, and an examiner appointed by the Government.

Examinations were held by the Managers' Board simultaneously at Fernie and Nanaimo, on January 19th to 21st, 1904, under the former regulations, and an examination under the present regulations was held simultaneously at Fernie, Nanaimo and Cumberland on February 14th, 15th and 16th, 1905. Examinations for second and third classes only were held simultaneously at Fernie, Nanaimo and Cumberland, July 19th and 20th, 1905. Examinations for first, second and third classes were held simultaneously at Fernie, Nanaimo and Cumberland November 14th, 15th and 16th, 1905.

BOARD OF EXAMINERS FOR COAL MINE OFFICIALS.

FIRST, SECOND AND THIRD CLASS CERTIFICATES.

Report of Secretary of Board, Francis H. Shepherd.

I beg to report that, under the "Coal Mines Regulation Act Further Amendment Act, 1904," examinations were held under your instructions by the above Board at Fernie, Nanaimo and Cumberland, as follows:—

For first, second and third class certificates—February 14th, 15th and 16th, 1905.

For second and third class certificates only—July 19th and 20th, 1905.

For first, second and third class certificates—November 14th, 15th and 16th, 1905.

PORT ESSINGTON, FROM HILL BEHIND—SHOWING M[illegible]THS OF SKEENA AND ECSTALL RIVERS.

The experience of the Board since the "Coal Mines Regulation Act Further Amendment Act, 1904," came into operation is that two full examinations a year are necessary to meet the growing requirements of the coal mining industry of the Province. It was found necessary to hold an interim examination for candidates for the second and third class certificates on July 19th and 20th, 1905, but the experience of the Board upon that occasion was that it is advisable to hold examinations for the three classes simultaneously.

The Board of Appointment of Examiners, generally referred to as the Manager's Board, in contradistinction to the Miner's Board of Examiners, consists of Mr. Andrew Bryden, Chairman, Ladysmith; Mr. Tully Boyce, Vice-Chairman, Nanaimo; Mr. Thomas Stockett, Jr., Nanaimo; Mr. George Williams, Nanaimo; Mr. Robert G. Drinnan, Fernie; Mr. John John, Fernie; Mr. Archibald Dick, Inspector of Mines, Nanaimo; F. H. Shepherd, Secretary to the Board.

The meetings of the Board are held in the office of the Inspector of Mines at Nanaimo. The scope and aim of the Board is to subject the candidate to an examination in keeping with the requirements, responsibilities and conditions prevailing in the coal fields of the Province, and thus to qualify statutory officials of ability and experience, with a view of reducing the number of accidents and the loss of life attendant upon the coal mining industry of the Province.

The academical feature of the examination, as at present submitted to the candidate, is, in the opinion of the Board, sufficient to elicit the necessary educational qualifications of the candidate, but it is the intention of the Board to require ample evidence from the candidate as to his practical qualifications and experience, and to this end the Board has under consideration the advisability of apportioning a certain percentage of marks for personal qualifications and experience to be awarded arbitrarily by the whole Board in session. Under the present system of awarding earned percentages, a candidate thoroughly experienced and capable may be defeated upon a mere technicality; therefore, future candidates will be advised that original testimonials presented to the Board, and containing indisputable evidence as to experience and ability, will be given due appraisement.

Another feature contemplated by the Board, and a feature which should be early made known to intending candidates, is that a practical sight-test for the detection of low percentages of fire-damp will be submitted to candidates, whose duties are to examine a mine officially for the presence or otherwise of this and other gases met with in coal mines, and the passing of this test will be considered an essential qualification.

By the passage of the "Coal Mines Amendment Act" during the present Session of the Provincial Legislature, the Board is relieved of the ambulance feature of the examination, beyond requiring the necessary medical certificate certifying that the candidate has passed a course in ambulance work.

Questions relative to the installation of electricity for power or lighting in mines will be submitted to the candidate in future, and more particularly appertaining to the wiring and safe transmission of the current.

The Board is often asked for a copy of previous questions or syllabus of the examination, and respectfully request that a copy of the questions of the last examination be embodied in your report, together with copies of the regulations governing candidates sitting for examination.

The appointed examiners, other than members of the Board, must each hold a first-class certificate issued under the provisions of the "Coal Mines Regulation Act" of British Columbia, but the presence of members of the Board as assistant examiners at the examinations (and

provided for in the "C. M. R. Act") is to be commended, especially during the oral examination as provided for in the by-laws of the Board, the object of which is to bring out more particularly the practical qualifications of the candidate.

The examiners who presided at the last examination were:—
Fernie—Messrs. John John, Robt. G. Drinnan and Thomas Morgan, Inspector of Mines.
Nanaimo—Messrs. E. Priest, George Williams and F. H. Shepherd.
Cumberland—Archibald Dick, Inspector of Mines, and Thomas Budge.

COAL MINES REGULATION ACT.

Regulations Governing the Examination of Candidates for First Class Certificates.

(*a.*) The candidate must satisfy the Board of Examiners that he is a British subject, and has had at least five years' experience in or about the practical working of a coal mine, and is at least twenty-five years of age, and must produce evidence as to his sobriety and general good conduct:

(*b.*) The subjects to be submitted to Candidates for examination shall be as follows:—

"Coal Mines Regulation Act" and Special Rules;
Mine Gases;
Ventilation;
General Work;
Mining Machinery;
Surveying.

And the percentage necessary to pass shall be as follows:—

Seventy per cent. on "Coal Mines Regulation Act" and Special Rules, Mine Gases and Ventilation; and 50 per cent. on General Work, Mining Machinery and Surveying; and the general average percentage on the whole, required to pass, shall not be less than seventy per cent.

Regulations Governing the Examination of Candidates for Second Class Certificates.

(*a.*) The candidate must satisfy the Board that he has had at least five years' experience in or about the practical working of a coal mine, and must produce evidence as to his sobriety and general good conduct:

(*b.*) The subjects to be submitted to Candidates for examination shall be as follows:—

"Coal Mines Regulation Act" and Special Rules;
Mine Gases;
Ventilation;
General Work.

And, in addition, shall submit to such oral examination as the Board may from time to time designate, and the percentage necessary to pass shall be as follows:—

Seventy per cent. on "Coal Mines Regulation Act" and Special Rules, Mine Gases and Ventilation, and fifty per cent. on General Work, and the general percentage required on the whole to pass shall be not less than sixty-five per cent.

Regulations Governing the Examination of Candidates for Third Class Certificates.

(*a.*) The candidate must satisfy the Board that he has had at least three years' experience in or about the practical working of a coal mine, and must produce evidence as to his sobriety and general good conduct:

(*b.*) The subjects to be submitted to candidates for examination shall be as follows: "Coal Mines Regulation Act" and Special Rules; Mine Gases and General Work; and, in addition, the candidate shall submit to such oral examination as the Board may from time to time designate, and the general average percentage on the whole, necessary to pass, shall not be less than sixty-five per cent., and not less than fifty per cent. on any paper:

(*c.*) Candidates will be supplied with paper, pens, ink and pencils, and the paper furnished must be used by all candidates in answering questions. Candidates must furnish the necessary draughting tools. Trigonometrical and logarithmic tables will be allowed, but such tables must be approved of by the Examiner. Candidates found having in their possession or using a copy of the "Coal Mines Regulation Act" or Special Rules, or any written or printed formulæ, will be disqualified:

(*d.*) Immediately prior to the first session of the examination, candidates will each draw a number, which number so drawn shall be their identification mark throughout the examination, and such number, with the candidate's name, shall be placed in an envelope, sealed and handed to the Examiner:

(*e.*) Answers must be written on one side of the paper supplied, and the answers must be numbered to correspond with the question. The candidate may answer any question in the order he may prefer. Each sheet must be marked with the candidate's number, and the question papers must be enclosed with the respective answers and handed to the Examiner before the candidate retires:

(*f.*) The candidates are not allowed to take from the examination room a copy of the questions, or any of them:

(*g.*) Candidates shall answer the questions within the time limit designated by the Board:

(*h.*) Candidates are forbidden during any session to hold any communication whatever with each other, or with any person other than the Examiner, nor shall he leave the room without the consent of the Examiner:

(*i.*) No disqualification shall result owing to erasures or corrections on answers submitted:

(*j.*) No person or persons, other than the Honourable the Minister of Mines, the Deputy Minister of Mines, the Provincial Mineralogist, Members of the Board, Inspectors of Mines, and Examiners will be allowed in the examination room during session.

Questions asked at Mine Managers' Examination.

MINING ACT AND RULES.

First Class Candidates. November 14th, 1905. Time, 9 a.m. to 1 p.m. 70% required.

1. What are the duties of the Manager, as provided in the Act? 10.

2. What does the Act stipulate as to the employment of women, young persons and children? 10.

3. What does the Act stipulate in regard to the payment of wages, also payment by weight? 10.

4. What are the exceptions provided for in the Act in regard to the use of single shafts? 10.

5. What does the Act say in reference to the division of the mine into parts? 10.

6. Fill out the accident form given. Suppose that a serious accident has occurred at the face. Give rough sketch as requested in the form? 10.

7. What are the provisions of the Act in regard to Arbitration? 10.

8. What does the Act stipulate in reference to ventilation being supplied at too high a velocity? 10.

9. What does the Act specify in regard to machinery and boilers? 10.

10. Fill out Schedule, form 4. 10.

MINE GASES.

First Class Candidates. November 14th, 1905. Time, 2 p.m. to 5:30 p.m. 70% required.

1. Give the names, symbols, properties, atomic weights, specific gravities and general characteristics of the explosive gases found in coal mines, where they are found, how generated and how they can be removed and rendered harmless? 15.

2. How would you overcome the dangers which arise from the presence of coal dust in a coal mine that is giving off inflammable gases. What percentage of gas in the general mine atmosphere would you consider dangerous in this case? 10.

3. Sketch in section a Wolf, or any other permitted safety lamp, showing that you really understand the construction? 10.

4. Give the natural laws which regulate the behaviour of all gases. 10.

5. Select one gas, elementary or compound, and tell all you know about it, mentioning experiments in making, testing, etc., of the gas selected. 10.

6. What proportion of moisture can the atmosphere contain under ordinary circumstances. What effect has this moisture upon the ventilation. Describe any instruments used in measuring the proportion of moisture present. 15.

7. A sample of fire-damp taken from the mine is found to have a specific gravity of .9. What are the proportions of the mixture? Please show method of working. 10.

8. What principles are involved in the construction of a safety lamp which would render one lamp more sensitive in the detection of gas than another? 10.

9. A pair of headings rising one in four, with the usual cross-cuts, are full of fire-damp. The ventilating pressure is low. Give the various methods which may be used to restore the ventilation. 10.

10. After an explosion the quantity of inflammable gas given off is usually greater for some time. Give the various reasons for this increase. 15.

VENTILATION.

First Class Candidates. November 15th, 1905. Time, 9 a.m. to 2:30 p.m. 70% required.

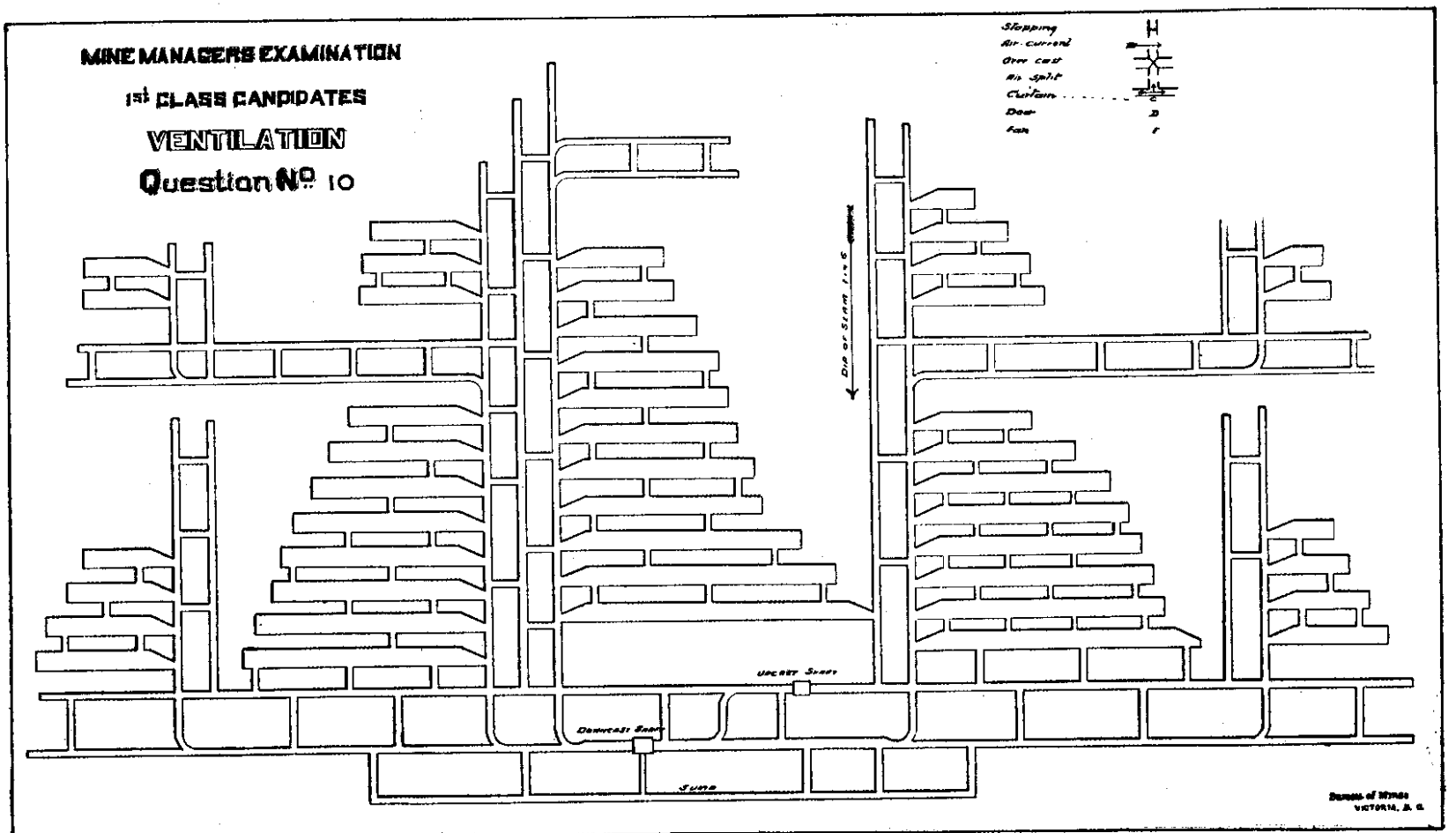
1. What principles should be observed in the construction of a mine fan so as to obtain a maximum of efficiency in working? 10.

2. The weight of air in a down-cast shaft of 325 feet in depth is 1,950 pounds, the temperature is 60 degrees F. Barometer 30 inches, and the difference of the weight of air in the two shafts is 294 pounds. What is the length of the motive column, and what is the area of the down-cast shaft in square feet? 15.

3. If with 95,000 cubic feet of air per minute the water gauge reads 1.5 inches, how much air would be required to increase the water gauge to 2 inches, and what would be the horse power required to produce the increased quantity? 10.

4. Suppose that with a given power 75,000 cubic feet of air per minute circulates through an airway and it is decided to split the current into three splits as follows:—

First split—6 feet x 6 feet in section, 5,000 feet long.
Second split—6 feet x 7 feet in section, 4,000 feet long.


MINE MANAGERS EXAMINATION
1st CLASS CANDIDATES
VENTILATION
Question No. 10
Stopping
Air current
Over cast
Air split
Curtain
Door
Fan
Dip of Seam 1 in 6
UPCAST SHAFT
DOWNCAST SHAFT
SUMP
Bureau of Mines
VICTORIA, B. C.

Third split—6 feet x 5 feet in section, 4,500 feet long.

What quantity will pass through each split, the power remaining the same? 20.

5. Describe carefully how you would measure the air current in a mine. 10.

6. Describe with sketches how you would construct a self-acting door or doors on a main level. 10.

7. What is the relation between the quantity of air required in a fiery mine and—

(*a.*) The number of men employed?

(*b.*) The output of coal?

(*c.*) The quantity of gas given off?

Would you consider it necessary to increase the quantity of air in a mine if it was worked double shift and putting out double the quantity of coal than if working one shift only? 15.

8. A certain district in a mine is being extended into a new part of a coal field. The air is divided into two (2) splits and it is proposed to make a third split. State the various changes you would expect. 10.

9. In a remote district where the air is split to its fullest extent and you cannot increase the power, state how you would increase the ventilation. 10.

10. Ventilate the plan given without doors on the haulage roads. Use the conventional sign shown and give quantity of air required for an output of 800 tons per shift. 20.

GENERAL WORK.

First Class Candidates. Nov. 15th, 1905. Time, 2 p. m. to 5:30 p. m. 50% required.

1. In the following section of a coal seam where the coal is firm and the roof tender, sketch and explain how you would work and timber the seam so as to ensure safety and obtain the greatest percentage of the pillars. 15.

Shale roof (tender):—

Coal 6.0
Mining 4
Coal 5.6
Mining 3
Coal .....9.0—Total, 21.1
Sandstone floor.

2. Give a complete list of the apparatus and material which should be on hand at a large colliery in case of general accidents, fire and explosions. 15.

3. Explain with sketches a method of timbering a shaft bottom where the output may reach 1,000 tons per shift, the coal pitching one in six, and workings on both sides of the shaft. 15.

4. Give a short description of the geology of any coal field with which you are acquainted, mentioning some of its peculiar features. 10.

5. Give a short description of any branch of mining or any special feature connected with mining of which you have made a special study and which you think is of special or important interest to the industry. The subject may be either practical or theoretical, but the work must show special study. 10.

6. A coal seam 6 feet 6 inches in thickness, including 1 foot 6 inches of dirt bands, has been worked into pillars with rooms 14 feet wide and 15% of coal taken out in the first working; 300 feet above is a seam of coal lying drowned out, and intervening between these two seams are some beds of soft shale and fireclay. Show how you would extract the pillars without bringing the water down from the top seam. 15.

7. A gravity plane has an inclination of 7 degrees and is 1,800 feet long, and the rope weighs 3,800 pounds. A loaded car weighs 2,800 pounds and an empty car weighs 1,500 pounds. What number of cars must be in the trip to start it? 15.

8. Sketch what you consider a good long wall plan, making your own section of seam, roof and floor. Give cross-section of road showing packs and brushing. Show dip of seam and main return air course. 20.

9. How would you fix trolley wire along a main haulage road in a mine. Show cross-section of road at curve with wire in position. 10.

10. Explain the different systems of mine haulage and state under what conditions each of these systems might be advantageously applied. 15.

Mining Machinery.

First Class Candidates. Nov. 16th, 1905. Time, 9 a. m. to 12.30 p. m. 50 % required.

(1.) Describe the mountings of colliery boilers. 10.

(2.) Explain the principle of the injector. Explain how it is that water at atmospheric pressure and steam at 80 pounds pressure may be forced into a boiler carrying the same pressure without interposing mechanical movement. 15.

(3.) Give a longitudinal section of any self-contained mine pump you may choose. (Water end only). 15.

(4.) A beam of uniform size is 18 feet long between supports and weighs 250 pounds. There is a lode of 2,800 pounds at 7 feet from one end. Find the pressure on each support. 10.

(5.) Find the size of pump required to pump 200 imperial gallons per minute from a depth of 600 feet. Steam pressure available 55 pounds. 15.

(6.) The power supplied to an electric motor is 30 K. W., the pressure is 220 volts. Find the current in amperes, also the H. P. 10.

(7.) What system of bringing the output to the surface would you adopt in a slope 6,000 feet long and dipping one in six, and with a view of extending the slope? Output, 1,500 tons per shift. 15.

Surveying.

First Class Candidates. Nov. 16th, 1905. Time, 2 p. m. to 5.30 p. m. 50 % required.

(1.) What are the various inaccuracies to be found in an ordinary compass or miner's dial, and how would you test for them? 10.

(2.) The following bearings are magnetic:—

North 72° 20′ East.
South 82° 15′ East.

Reduce these to true or astronomical bearings. Variation 25° 10′ East. 10.

(3.) Give field-notes of an imaginary survey of an underground level of three courses and show stalls and cross-cuts. 15.

(4.) In the following survey—

A to B, N. 22° 12′ W. 217 feet.
B to C, N. 17° 48′ E. 389 „
C to D, N. 12° 23′ W. 192 „
D to E, N. 16° 37′ W. 284 „

What is the bearing from A to E, and what is the distance? This question must be answered by computation only, accompanied by the traverse sheet. 20.

(5.) Plot the following survey at a scale of one chain to one inch. Find the closing course and distance and take out the acreage in acres and decimals:—

S. 45° W. 180 links.
S. 38° E. 252 "
N. 61° E. 206 "
S. 17° W. 112 "
N. 76° E. 295 "
N. 28° W. 130 "

(6.) From the following level readings, plot a profile to a horizontal scale of fifty feet to one inch and a vertical scale of five feet to one inch:—

Station.	Distance.	Back-sight.	Fore-sight.
1	0 feet	2.94	3.40
2	100 "	4.60	8.20
3	200 "	7.21	8.40
4	300 "	9.21	8.30
5	400 "	2.20	0.40
6	500 "	3.10	0.56

Total distance 500 feet.

Assume your own datum and give elevations. 20.

(7.) Of what value are contours on a mine plan and what general method would you adopt to obtain them? 15.

(8.) Explain carefully one method of a survey carrying line down a shaft other than by a magnetic bearing. 10.

MINING ACTS AND RULES.

Second Class Candidates. Nov. 14th, 1905. Time, 9:30 a. m. to 1 p. m. 70% required.

(1.) What are the duties of the Overman as specified in the Act? 10.

(2.) What supplies are necessary to be on hand at the mine for the safe and economical operation of the same, and what does the Act require in this respect? 10.

(3.) What does the Act require relative to the mine officials examining the working places of the mine, and what should be the nature of such examination? 10.

(4.) What do the general rules require as to ventilation? 10.

(5.) What does the Act specify as to the hours of employment underground? 10.

(6.) What are the duties of the pit-head man? 10.

(7.) What do the special rules require as to Runners and Drivers? 10.

(8.) What are the requirements of the Act in regard to blasting where inflammable gas issues so freely as to show a blue cap on the flame on a safety lamp? 10.

(9.) When and where is it necessary to install a barometer and thermometer? 10.

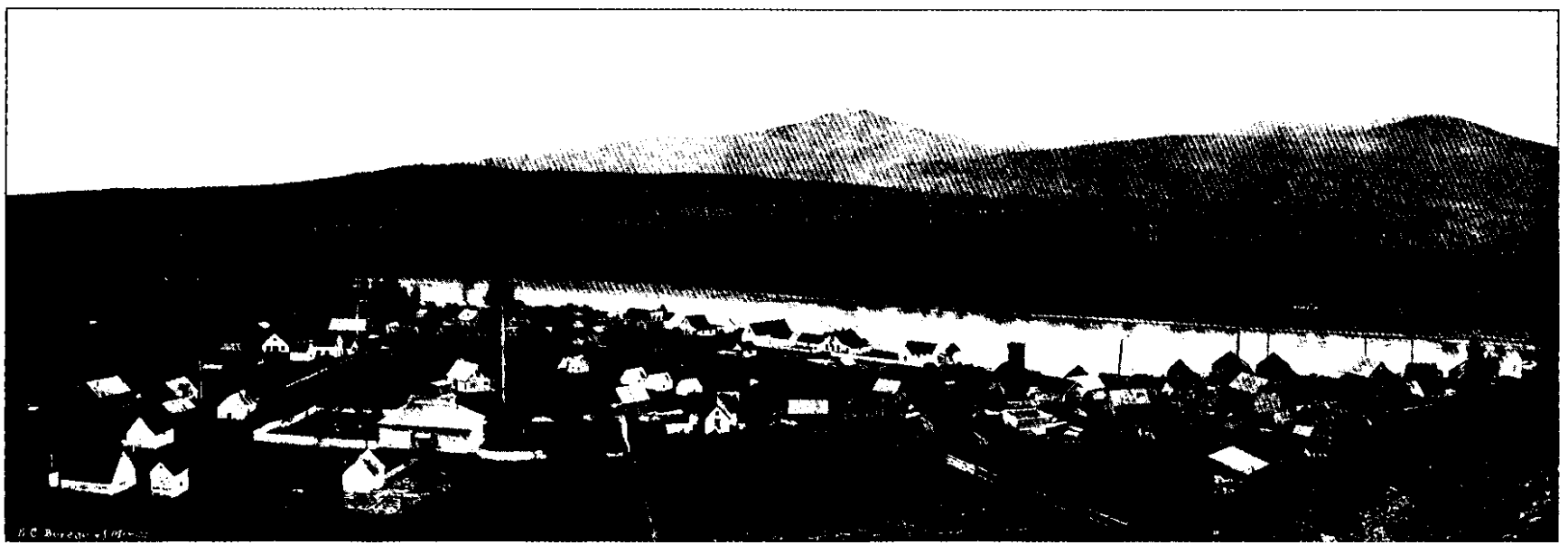
(10.) What are the Overman's special duties respecting the inspection and examination of machinery? 10.

MINE GASES.

Second Class Candidates. Nov. 14th, 1905. Time, 3 p. m. to 5 30 p. m. 70% required.

(1.) Name the various dangerous gases met with in coal mines. Describe their various properties and give specific gravities and symbols. 20.

(2.) What is meant by the diffusion of gases? 10.



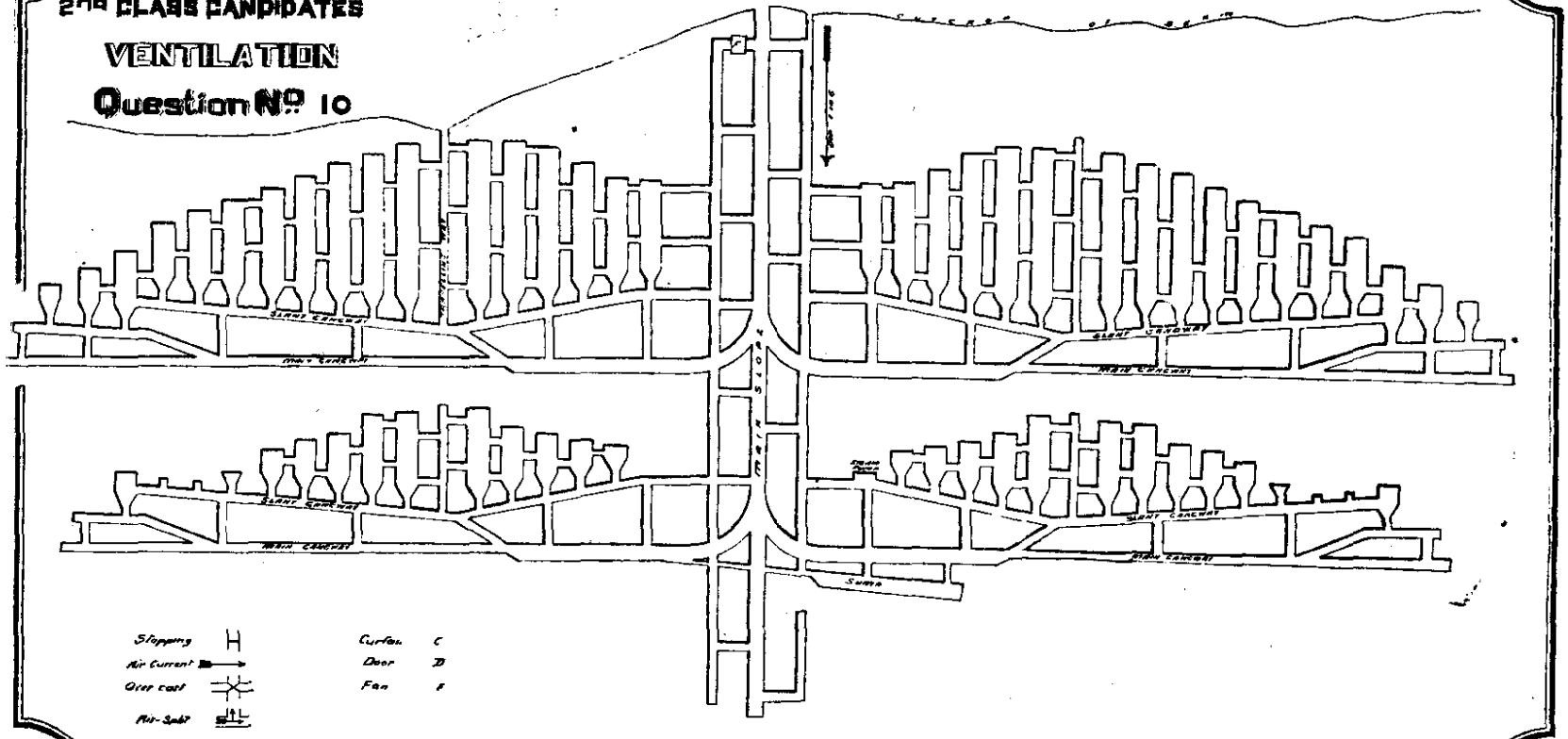
TOWN OF HAZELTON—HEAD OF NAVIGATION ON SKEENA RIVER.

MINE MANAGERS EXAMINATION

2nd CLASS CANDIDATES

VENTILATION

Question No 10



(3.) There is passing through a heading a mixture of air and marsh gas amounting to 5,000 cubic feet per minute. The mixture is at its most explosive point. What additional quantity of air must be added to this quantity to render it harmless? Show computation in full. 15.

(4.) What is the specific gravity of firedamp at its most explosive point? Show computation in full. 10.

(5.) What principles are involved in the construction of a safety lamp which renders one safety lamp more sensitive to the detection of gas than another? 10.

(6.) Is it possible that an explosion of firedamp in a saftey lamp could be of sufficient force to pass the flame through the gause? Explain fully. 10.

(7.) How would you render first aid to (*a*) a person severely burned by gas, (*b*) a person overcome by breathing any of the deleterious gases found in mines? 15.

(8.) In driving entries where large volumes of gas are generated, what precautions would you take to ensure safety to the men? At what distance would you make cross-cut connections? How would you prevent an accumulation of gas at the face? 15.

(9.) Give the chemical composition of after-damp, showing its relation to the mixture before explosion. 10.

(10.) State what experience you have had with any or all of the dangerous gases met with in coal mines, giving an instance of the method employed in removing the same, if in your experience, and, if not, state what methods you would employ in removing a large body of gas? 15.

VENTILATION.

Second Class Candidates. Nov. 15th, 1905, Time, 9 a.m. to 12:30 p.m. 70% required.

(1.) State fully what practical experience you have had in the ventilation of coal mines. 10.

(2.) State the principles upon which ventilation depends and the cause of the air's motion in mines, and what are the factors of resistance operating against ventilation? 15.

(3.) In which of two openings, one 6 x 6 and the other 9 x 4, would the friction be the greatest? Accompany your reasons by computation. 10.

(4.) Which is the most difficult to ventilate, a highly inclined seam of regular thickness or a flat seam of variable thickness? 10.

(5.) What is the motive column? Give the formula to find this. 10.

(6.) If 125,000 cubic feet of air is produced by 50 h. p., what is the water gauge? 10.

(7.) Clearly distinguish the meaning of the terms pressure and power as applied to mine ventilation. 10.

(8.) Which do you prefer, an overhead or under-level air crossing? State the advantages and disadvantages in each. 15.

(9.) In the event of a mine fire, what dangers are likely to be encountered, and what precautions would you take to protect the workmen engaged in extinguishing the fire from loss of life by suffocation or explosion and the possible destruction of the mine? 15.

(10.) Ventilate the plan given and show by conventional signs, stoppings, overcasts, etc. 20.

GENERAL WORK.

Second Class Candidates. Nov. 15th, 1905. Time, 2 p.m. to 5:30 p.m. 50% required.

(1.) Describe how you would deal with a "creep" which has been induced by pillars being too small and a hard roof? 10.

(2.) Show how you would work thick coal with a tender roof, and describe or sketch the system of timbering that you would employ? 15.

(3.) What system of watering do you consider best in a dry and dusty mine? 10.

(4.) In opening a mine by main slope and counter where water is large in quantity, how would you proceed? State experience, if any. 15.

(5.) Describe the different systems of haulage used in mines, and state under what conditions each of these systems could be advantageously applied. 20

(6.) A single cylinder steam engine, cylinder 16 inches in diameter, stroke 3 feet 3 inches, running 85 revolutions per minute, mean effective pressure 65 pounds, find the horse power. 15.

(7.) Describe, with sketches, the various joints used in framing timbers for mine and shaft work. 15.

(8.) Plot the following on a scale of 100 feet to 1 inch :—

A to B, N. 15° W. 275 feet.
B to C, S. 65° E. 325 "
C to D, S. 20° W. 430 "
D to E, N. 85° W. 360 "

Find the closing course and distance. 20.

(9.) In a pipe full of water in a shaft 400 feet deep, what is the total pressure of water at the foot? 10.

(10.) What point of a hoisting plant would you examine first when inspecting in the interests of safety? 10.

Mining Acts and Rules.

Third Class Candidates. Nov. 14th, 1905. Time, 9;30 a. m. to 1 p. m. 65 % required, and not less than 50 % on any one paper.

(1.) What are the duties of the Fireman, exclusive of the duties of the Shot-lighter? 10.

(2.) In your examination you find it necessary to work a working place with safety lamps, what other precautions are required by the Act in this case? 10.

(3.) You have made your examination and report and the miners are about to proceed to enter the mine. You are notified that during or since your examination that the fan has been stopped for half an hour, what are your duties under the circumstances? 10.

(4.) How would you proceed to make an examination of your district? Make a report of the same, giving some defect found, omitting your signature. 10.

(5.) What are your duties in regard to the supervising, the charging and firing of (*a*) one hole in a working place, (*b*) two or more holes in a working place? 10.

(6.) What are the provisions of the Act with regard to a shot which has missed fire? 10.

(7.) What do the General Rules require as to ventilation, and which it is the duty of the Fireman to attend to? 10.

(8.) What are the regulations as to the use of locked safety lamps in the mine? 10.

(9.) What does the Act stipulate with regard to manholes? 10.

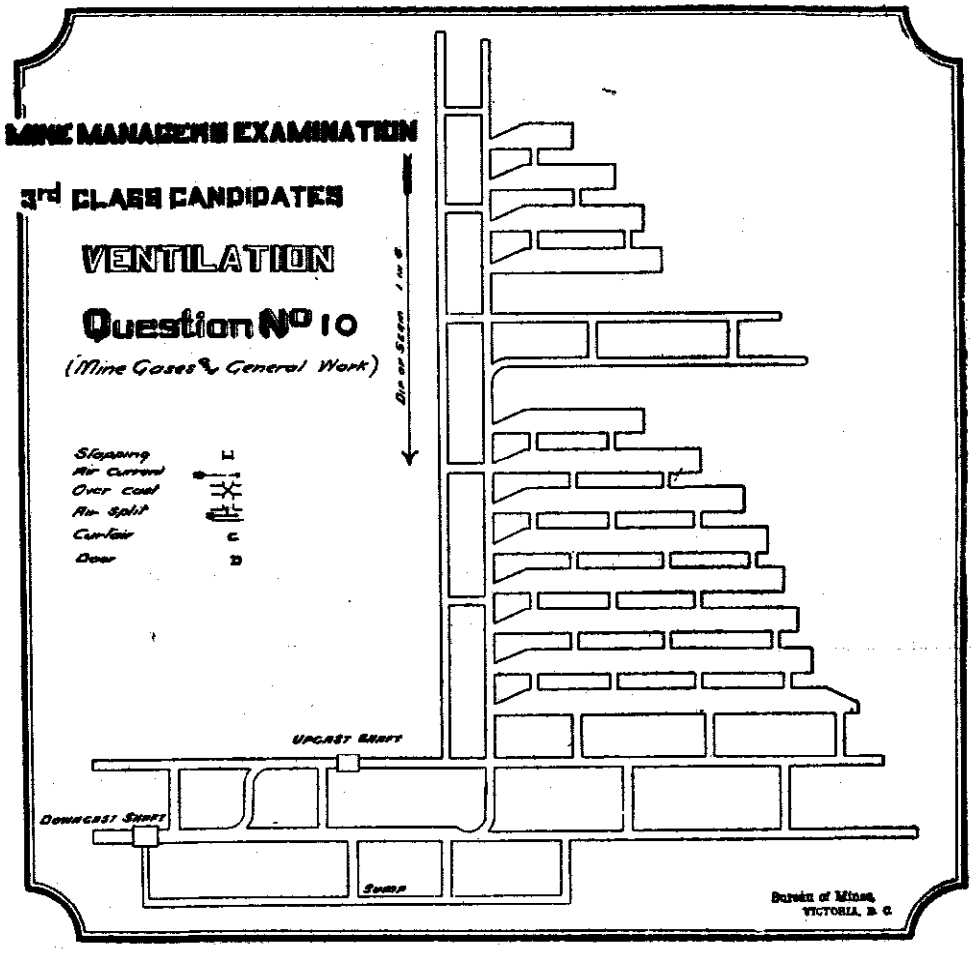
(10.) What are the Fireman's duties in regard to timbering? 10.

Mine Gases and General Work.

Third Class Candidates. Nov. 14th, 1905. Time, 2 p. m. to 5:30 p. m. A total of 65 % required, and not less than 50 % on any one paper.

(1.) Name the various dangerous gases met with in coal mines. Where would you expect to find them? 15.

(2.) Is there more liability of having dangerous accumulations of gas (explosive) in high or thick seams than in low and thin seams? Give reasons. 10.



(3.) How should a safety lamp be treated when found to be full of flame while in an explosive mixture? 10.

(4.) At what velocity of air current containing an explosive mixture do lamps of the "Davy," "Stephenson" and ordinary "Clanny" type, without shields, become dangerous, and why? 15.

(5.) Give a list of the apparatus and material contained in a proper ambulance box necessary to render first aid to injuries usually received in a coal mine. 10.

(6.) With the barometer unusually low and the water gauge unusually high, how would you proceed to make an examination of the mine? 10.

(7.) Describe, with sketches if necessary, some method of working coal with which you are acquainted. 15.

(8.) Describe, with sketches, the general method of timbering levels and stalls with which you are acquainted. 15.

(9.) Describe the precautions necessary in general shot firing and name some of the conditions under which you would refuse to fire a shot or shots. 10.

(10.) In the plan given there are 100 men employed in the mine. Show by arrows and signs indicated how you would ventilate the workings? 20.

The following is the registered list of those to whom Certificates of Competency have been issued by the Managers' Board, the Secretary of which Board is Francis H. Shepherd, Nanaimo:—

First Class Certificates.—Service Certificates Issued Under Section 39, "Coal Mines Regulation Act, 1877."

John Bryden, Victoria,
*James Gillispie.
Edward G. Prior.
Thomas A. Buckley.
*John Dick.
Archibald Dick, Government Inspector of Mines.
James Dunsmuir, Victoria.
James Cairns, Comox, Farmer.

First Class Certificates of Competency Issued Under "Coal Mines Regulation Act, 1897."

Name.	Date.
Shepherd, Francis H	March 5th, 1881
Gibson, Richard	" 5th, "
*McGregor, William	" 5th, "
Honobin, William	May 1st, 1882
*Muir, Archibald	" 1st, "
Little, Francis D	" 1st, "
Martell, Joshua	" 1st, "
*Scott, Robert	" 1st, "
Chandler, William	December 21st, 1883
Priest, Elijah	" 21st, "
McGregor, James	January 18th, 1888
Randle, Joseph	" 18th, "
*Dickinson, Urick Evan	" 8th, 1889
Matthews, John	" 8th, "
*Jones, John Bunyan Louis	" 8th, "
Norton, Richard Henry	August 26th, "
Bryden, Andrew	December 30th, "
Russell, Thomas	April 20th, 1891
Sharp, Alexander	October 27th, "
*Lindsay, William Alfred	March 4th, 1892
Kesley, John	" 4th, "
Wall, William H	May 30th, 1896
Morgan, Thomas	" 30th, "
Wilson, David	" 30th, "
Smith, Frank B	" 30th, "
*Jamieson, Robert	" 30th, "
Bradshaw, George B	June 12th, 1899
Simpson, William G	" 12th, "
*Fisher, Robert	November 5th, "
Hargreaves, James	February 5th, 1901
Drinnan, Robert G	" 5th, "
Browitt, Benjamin	August 3rd, "
Stockett, Thomas, Jr	" 3rd, "
Pearson, Robert	" 3rd, "
Cunliffe, John	" 3rd, "
*Lamb, Robert B	" 3rd, "
Evans, Daniel	" 3rd, "
McEvoy, James	October 17th, 1902
Wilson, A. R	" 17th, "
Simister, Charles	" 17th, "
Colville, Andrew	" 17th, "
Budge, Thomas	" 17th, "
Mills, Thomas	" 17th, "
Faulds, Alexander	" 17th, "
Richards, James A	" 17th, "
McLean, Donald	January 21st, 1905
Wilkinson, Geo	" 21st, "
Wright, H. B	" 21st, "
Coulthard, R. W	" 21st, "
Roaf, J. Richardson	" 21st, "
John, John	" 21st, "
Manley, H. L	" 21st, "

*Dead.

ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904."

NAME.	Date.
Fraser, Norman	March 4th, 1905
Graham, Charles	November 14th, "
Heathcote, Elijah	March 4th, "
Strachan, Robert	" 4th, "
Shaw, Alex	November 14th, "

SECOND CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904."

NAME.	Date.	Cer. No.
Barclay, Andrew	July 29th, 1905	B 25
Dunsmuir, John	November 14th, "	B 26
Evans, Evan	March 11th, "	B 2
Finlayson, James	July 29th, "	B 21
France, Thos	November 14th, "	B 27
Graham, Chas	March 4th, "	B 1
Gillespie, Hugh	July 29th, "	B 24
Jackson, Thos. R	March 4th, "	B 5
Jones, Wm	July 29th, "	B 20
Nellist, David	March 4th, "	B 6
Reid, Thomas	July 29th, "	B 23
Rigby, John	" 29th, "	B 29
Somerville, Alex	March 4th, "	B 4
Shaw, Alex	July 29th, "	B 19
Webber, John Frank	March 4th, "	B 3
Wyllie, John B	July 29th, "	B 22
Watson, Adam G	November 14th, "	B 28

SECOND CLASS CERTIFICATES OF SERVICE.

NAME.	Date.	Cer. No.
Corkhill, Thomas	March 4th, 1905	B 7
Morton, T. R	" 4th, "	B 8
Loe, John S	" 4th, "	B 9
Miller, J K	" 4th, "	B 10
McCliment, John	" 4th, "	B 11
Martin, David	" 4th, "	B 12
Hunt, John	" 4th, "	B 13
Walker, David	" 4th, "	B 14
Short, Richard	" 4th, "	B 15
Powell, William Baden	" 4th, "	B 16
Sharp, James	" 18th, "	B 17
Bryden, Alexander	" 4th, "	B 18

Third Class Certificates Issued Under "Coal Mines Regulation Act Further Amendment Act, 1904."

Name.	Date.	Cer. No.
Biggs, John	March 4th, 1905	C 210
Bridge, Edward	July 29th, "	C 223
Crawford, David	March 4th, "	C 208
Cooke, Joseph	" 4th, "	C 209
Catchpall, Charles	July 29th, "	C 227
Cunningham, G. F	November 11th, "	C 229
Doney, John	March 4th, "	C 211
Freeman, H. G	November 14th, "	C 230
Hodson, R. H	March 4th, "	C 216
Hutchison, Ben	November 14th, "	C 232
Jenson, J. W	March 4th, "	C 205
Jones, W. T	" 4th, "	C 221
Liddle, John	July 29th, "	C 228
Morgan, John	" 29th, "	C 224
Monks, James	November 14th, "	C 234
McAlpine, John	March 4th, "	C 217
McLellan, William	" 4th, "	C 219
McGuckie, Thomas	July 29th, "	C 226
Perry, James	March 4th, "	C 215
Plank, Samuel	November 14th, "	C 233
Rigby, John	July 29th, "	C 225
Spruston, Thos. A	March 4th, "	C 206
Smith, Joseph	" 4th, "	C 207
Taylor, Chas. M	" 4th, "	C 213
Thomson, Duncan	" 4th, "	C 218
Thomas, Joseph	" 4th, "	C 220
Thomas, John B	November 14th, "	C 231
Watson, Adam G	March 4th, "	C 212
Weeks, John	" 4th, "	C 214
Wintle, Thos. A	July 29th, "	C 222

CARIBOO DISTRICT.

—:o:—

CARIBOO AND QUESNEL MINING DIVISIONS.

REPORT BY JOHN BOWRON, GOLD COMMISSIONER.

SIR,—In submitting my thirty-first annual report upon the mining industry in Cariboo District, I have the honour to say that, in consequence of an enforced absence from my district on sick leave for the past three months (during which months of the year the information and data for the report are for the most part collected), I am indebted to Acting Gold Commissioner McKen for the information herein contained. It will be seen that, in so far as the product of the mines is concerned, our last year's expectations have scarcely been realised, a result entirely due to the fewer men employed and the unusually short run had by most of the hydraulic mines, the Consolidated Cariboo Co., usually by far the most prolific contributor to the general output, having but fourteen days' piping, while during the time water lasted the demand for labour much exceeded the supply.

QUESNEL MINING DIVISION.*

Mining Recorder Stephenson makes a more extensive report upon this division of the district, but I may say, briefly, that here the shortage in the water supply has been felt more seriously than elsewhere in Cariboo, and the failure of the Consolidated Cariboo Hydrulic Co. to produce the usual contribution has reduced the output of the division to less than that of any previous year. I regret my inability to speak more definitely of the purposes or future intentions of this company, owing to the absence of Manager Hobson in the East. It is, however, reported that a sale of this property is being made to New York capitalists, who contemplate the expenditure of a very large sum the coming year to improve the water supply.

NOTE BY PROVINCIAL MINERALOGIST.—Through the courtesy of Mr. J. B. Hobson, the Provincial Mineralogist has been permitted to make the following extracts from Mr. Hobson's report to his directors as to the operations during the season of 1905.

N. B.—In British Columbia a *miner's inch* of water is by statute not a *quantity* of water, but "a *flow* of water equal to 1.68 cubic feet per minute" (practically 100 cubic feet per hour). In his report, Mr. Hobson uses the term "miner's inch" to represent a *quantity* of water, and he means thereby *the quantity of water produced by the flow of a miner's inch during 24 hours*, or presumably 2,400 cubic feet of water, at which rate Mr. Hobson's total quantity of water for the season of 1905 was 108,171,600 cubic feet, or a body of water 1 mile square by about 4 feet deep. Mr. Hobson's canal has a maximum carrying capacity of a flow of 5,000 miner's inches.

THE CONSOLIDATED CARIBOO HYDRAULIC MINING CO.

Manager's Report.

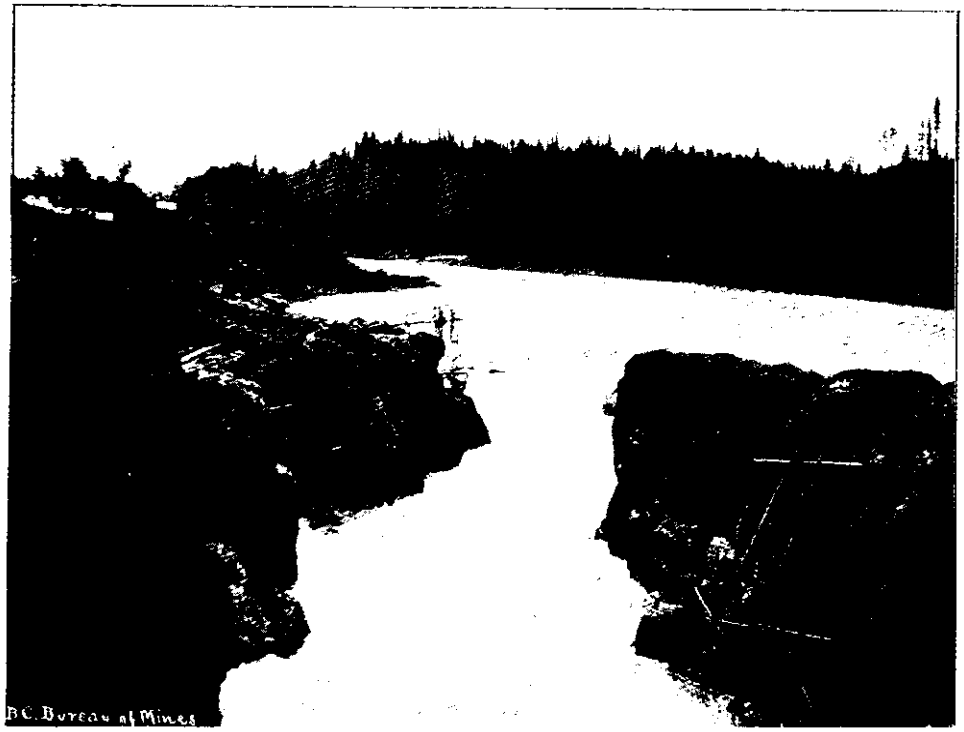
BULLION, B. C., July 31st, 1905.

To the President and Directors of the
Consolidated Cariboo Hydraulic Mining Co., Ltd., Toronto, Canada.

GENTLEMEN,—I hand you herewith my report for the season, including the time from September 4th, 1904, to June 22nd, 1905.

Owing to the lack of ample precipitation, the past season turned out the most disappointing one experienced since the equipment and opening of the property. The total quantity of

*See also Report of Mining Recorder, page 58.



LOOKING UP CANYON OF BULKLEY FROM BRIDGE AT MORICETOWN.

BRIDGE ACROSS CANYON OF BULKLEY AT MORICETOWN.
(Constructed by Indians of round poles and telegraph wire.)

water afforded amounted to only $45{,}071\frac{5}{100}$ miner's inches, which was not sufficient to warrant the opening of the mine for regular mining operations. The small quantity of water available was, however, used to face up the bank so as to afford Mr. Charles Hoffman, the expert for Mr. John Hays Hammond, an opportunity to test the gold value of the deposits of the upper bench from the floor of the excavation to the surface.

When the canals were opened and sufficient water accumulated in the pooling reservoirs, the water was used at intervals of a few hours each to clear the cuts and sluices of the ice that accumulated therein during the winter months. This work commenced on the 20th day of April, and was completed on the 11th day of May. During the progress of the work, including 74 hours' washing, 8,275 miner's inches of water were used.

Washing to remove the talus and to face up the bank commenced on the 12th day of May and continued for a period of 354 hours, equal to 14 days and 18 hours washing. During the progress of the work $36{,}796\frac{85}{100}$ miner's inches of water were used to wash out 183,984 cubic yards of top gravel and volcanic-mud capping, from which was recovered $1{,}268\frac{7}{10}$ ounces of gold valued at $21,733.47—an average yield of $11\frac{81}{100}$ cents per cubic yard. The duty attained for the water used was about five cubic yards per miner's inch per 24 hours.

Summary of Season's Prospecting Work.

Total time occupied in washing top gravel, 354 hours or 14 days 18 hours.
Total quantity of water used washing gravel, $36{,}796\frac{85}{100}$ miner's inches.
Total quantity of top deposits washed, 183,984 cubic yards.
Average duty of water per miner's inch, washing gravel, 5 cubic yards.
Average yield per cubic yard washed, $11\frac{81}{100}$ cents.
Average yield per 2,500 miner's inches of water used 24 hours, $1,473.45.
Gold product for season, $1{,}268\frac{7}{10}$ ounces.
Value of gold, $21,733,47.
Value of gold recovered since 1894, $1,212,203.04.
Total value of gold recovered from June 1st, 1894, to June 22nd, 1905, $1,233,936.51.

Development Work.

At the close of the previous season—September 4th, 1904—it was decided to continue work in the sluice tunnel, advance the sluice cuts and sluices, re-lay and repair the hydraulic pipe lines, prepare ground and set guy bolts at intervals along the rims required for setting up derricks and hydraulic elevator, reconstruct the jetties at Polleys Lake Reservoir, repair and replace rotten timbers in dams, flumes and trestles and other wooden structures on line of canals, clear out canals of gravel and shingle that accumulated therein since construction, and do all other work required to place the water supply system in good condition for continuous water delivery and economical maintenance, the expenditures for which (including that for leasehold rents, fire insurance and winter caretaking) is annexed hereto.

Water Supply.

The precipitation for the season commencing at close of mining operations on September 4th, 1904, and ending June 22nd, 1905, turned out the lowest recorded for the district since the phenomenally dry seasons of 1864 and 1887.

Precipitation for season 1904, $24\frac{39}{100}$ inches.

Precipitation for season 1905 (rainfall, $7\frac{4}{100}$ inches; total for snowfall, $6\frac{75}{100}$ inches)—total for season, $13\frac{79}{100}$ inches.

Season 1905 precipitation less than that of 1904 by $10\frac{60}{100}$ inches.

Quantity of water available and used during season 1904, 225,198 miner's inches.

Quantity of water available and used during season 1905, 45,052 miner's inches.

Season 1905 water supply less than that of season 1904 by 180,146 miner's inches.

The rain precipitation occurred in such light showers that only on three occasions, viz.: October 20th, 1904, $\frac{60}{100}$ inches, May 11th, 1905, $\frac{68}{100}$ inches, and May 20th, 1905, $\frac{75}{100}$ inches, did it prove sufficient to contribute any water to the reservoir lakes.

The snowfall, which averaged $67\frac{5}{100}$ inches on the watershed tributary to the reservoir lakes, went off too slowly under the influence of moderately warm days, accompanied by northerly winds and temperatures falling under freezing point at night—bad weather conditions for a water supply, and accounting for the unusually small percentage of the snow precipitation that was contributed to the reservoir lakes.

Product of Mine since Completion of Water Supply System in 1898, compared with Precipitation.

Year.	Precipitation in Inches.	Water used in Miner's Inches.	Time Run.	Cubic yards Gravel Washed.	Product.
1899	28-65/100	353,056	144 days, 8 hours	1,952,535	$ 92,678 93
1900	30-67/100	460,878	171 " 13 "	1,843,928	350,085 77
1901	20-30/100	258,250	104 " 13 "	2,420,288	142,273 41
1902	23-40/100	179,520	65 " 15 "	690,442	61,395 19
1903	17-48/100	127,083	53 " 7 "	373,000	44,943 70
1904	24-39/100	225,198	88 " 16 "	1,461,341	85,936 30
1905	13-79/100	45,052	14 " 18 "	183,984	21,733 47

Careful gaugings of the water supply flowing from Spanish lake, from November 15th, 1904, to date, indicate that the watershed tributary to that lake is capable, even with the light precipitation recorded for the past season, of affording ample water to keep the mine in continuous operation throughout the open season; and the company's water system should be extended with all possible haste to that source of abundant and permanent water supply.

Sluice Tunnel.

The 10 foot x 10 foot sluice tunnel was advanced 679 feet, at a cost of $16.34 per foot, making the total length to face 930 feet, and leaving 300 feet of tunnel and 60 feet of uprise to complete the new opening into the hydraulic excavation, the floor of which is now about 75 feet above the bed-rock of the channel. During the months of May and June several dykes of extremely hard rock were encountered, which interfered with the progress of the work and added materially to the cost thereof. This tunnel and uprise should be completed without delay, so as to facilitate the working of the high-grade deposits included in the lower bench and on the bed-rock, and the cutting out of about 4,000 feet of sluice which is very expensive to maintain.

Condition of the Mine.

The large amount of necessary repairs and development work done during the progress of the past two seasons' work leaves the water supply system and the mine in as good condition as possible for the continuous use of an abundant water supply; but the mine will not be in first-class condition until the sluice tunnel is opened and the bank can be worked in one bench from service to bed-rock. The upper gravels washed during the season showed a marked increase in grade, indicating that the low-grade zone encountered in the current-crossing has been passed.

A bank blast of about 6,000 kegs of black powder, to cost about $27,000, is strongly recommended. Such a blast would disintegrate and break up ready for economical washing the heavy capping of indurated volcanic-mud, at a cost not exceeding one cent per cubic yard, as against a cost of about 12 cents per cubic yard to break it up with dynamite and hand labour. The proper disintegration of indurated alluvial deposits tends to increase the washing duty of the water, thereby increasing the gold output, besides working a material reduction in the cost of mining.

Respectfully submitted,
(Signed) JOHN B. HOBSON, *Manager.*

The Ward Hydraulic Gold Mining Company.

Ward's Horsefly Hydraulic Co. did remarkably well for the length of time it was enabled to work. Replying to a request for information, Mr. R. Ward, the manager, writes me as follows:—

"Operations were seriously hampered by the lack of water, actual piping being limited to a period of some thirty odd days, and the mine being practically closed down for the season by the beginning of August. The amount of gold taken out was 343.53 ounces, valued at $10,849.37; expenditure, $8,000. The number of men employed at no time amounted to more than a dozen.

"As regards future operations, we are now bringing in a drill, to learn approximately the nature of the substrata of the leases and the values contained therein. This is to be done mainly with the idea of determining whether dredging on the property is practicable or not, the present system of hydraulicing and elevating the gravel being found unsuitable, mainly on account of the greater part of the workings being below the level of the river. This drilling we hope to accomplish to a great extent this winter, but a good deal will of course depend on the mildness or otherwise of the weather."

Keithley Creek.

Referring to the *Onward* claim, on Keithley creek, owned by Messrs. Veith and Borland, Mr. G. A. Veith says:—

"The Onward Company, of Keithley creek, has been working steadily with two shifts for the past year and expects to work during the present winter, employing from 15 to 18 men. The ground being worked is an old channel in the hill, 1,100 feet from the channel of the present creek. It is not over rich but pays a dividend of about $500 per month. Since June 1st to 30th September, it paid dividends of $6,000. Every economy has to be used and the best of men employed underground to make it pay."

Snowshoe Creek.

The light fall of snow last winter was a big drawback to the work on the *Hayward* hydraulic claim, on Snowshoe creek, owned by the same firm, giving water to pipe only forty days. On account of putting in a new steel pipe 600 feet long and moving the tank and flume, there was not enough money taken out to cover all the extra expenses. The mine is now in good working order for ten years to come, and if it continues to pay as well as in past years, the shareholders will be satisfied.

The *Luce* or *Live Yank* hydraulic mine, just above the *Hayward* mine, on Snowshoe creek (of which the late W. F. Anderson was foreman and principal owner), and from which but meagre returns had been received the past three years, had this year got on to the gold run and was paying handsomely, when Mr. Anderson was taken suddenly ill and died, after which mining operations ceased. This claim will give a good account of itself in future years.

THE CARIBOO MINING DIVISION.

In the Cariboo, or what is locally known as the Barkerville Mining Division of Cariboo District, the result of the season's operations have been fairly good, as even with the remarkably short run of water and a decreased number of men employed, the product of the mines closely approximates that of the preceding year.

Williams Creek and Tributaries.

On Williams creek and its tributaries the old well-known placers which yielded so largely in the past may now be regarded as practically worked out; consequently, the gold yield from these has been but small. There are a few still operating in a limited way and producing small returns.

The Gold Fields Company failed to operate its hydraulic lift the present season, and it is understood that a reorganisation of the company has taken place and that work will be resumed with renewed vigour the coming season.

The old Forest Rose Hydraulic Company, on whose claim little has been done for some years past, having repaired the ditches and installed an improved hydraulic plant, had a short run.

The *Mucho Oro* claim, on Stouts gulch, has again yielded satisfactory returns and, having passed into new hands, will be worked on a larger scale in the future, a new monitor with increased capacity having been placed on the ground.

The Wyoming Company, adjoining the *Mucho Oro*, on Stouts gulch, and the *First of May*, on Williams creek, paid about as usual, according to the time of their working.

LIGHTNING CREEK AND TRIBUTARIES.

From the accompanying statistics it will be seen that the mines operating on Lightning creek have not come up to their average production. The *Point* and *Montgomery* properties, which have been yielding so largely of late years, did but little during the season and that little on non-productive work.

The Cariboo Consolidated Company, operating at La Fontaine, after overcoming many difficulties, is now drifting on pay gravel, but owing to the great width of the channel, the auriferous deposit has not so far met expectations, but so soon as the channel narrows the gravel will doubtless improve in richness. Regarding the present state of the mine, Mr. Bailey, the Manager, writes me as follows:—

"With the exception of a period of six weeks' time lost by reason of the breaking of the main crank of the pumping engine, work has proceeded steadily during the entire year, with a force of men numbering, on an average, 36 a day.

"The total length of the various tunnels, drives, cross-cuts, etc., that have been run to date in developing the deep channel is 2,976 feet. The face of the main tunnel running up stream is now 1,130 feet from the shaft and will be continued to a point opposite the old *Eleven of England* upper shaft at the mouth of Anderson creek, a further distance of 436 feet. This will allow the working at an early date of the rich gravels known to exist at that point.

"Early in May the old *Eleven of England* lower workings were tapped and drained by our drives and, by the 1st of June, the deep channel gravels, from the No. 1 east cross-cut up-stream to the upper end of the old *Eleven of England* lower workings, a distance of about 600 feet, were sufficiently drained to enable us to commence the work of taking out the gravel on a large scale.

"The channel gravels from No. 1 east cross-cut down-stream to the No. 1 west cross-cut, a distance of about 500 feet, are draining very slowly, and as yet are too wet to work economically.

"The channel, where it has been possible to mine the gravels, has been found excessively wide, averaging 250 feet in width from the extremes of the pay lead, and this would account for the comparatively low values per cubic yard thus far recovered in our work. Cross-cuts that have been run from the old *Eleven of England* lower workings show that the channel narrows rapidly as we proceed up-stream, and much better results may be looked for as soon as we are able to commence mining the gravels further up the channel.

"During the period from June 1st to October 13th a total of 4,043 cubic yards of gravel was mined and washed and yielded 498 ounces of gold, the gravel having, therefore, a value of about $2.22 per cubic yard.

"While it is unfortunate that we should have opened the channel at this wide point in its course with low gravel values, at the same time our development work, both up and down stream, shows most encouraging results, and the work now under way should in a few months time fully demonstrate the great value of this property.

"The company did not operate its *Lowhee* hydraulic mine during the past season, as it wished to concentrate its efforts on the Lightning creek property.

"The *Ah Quay* hydraulic mine, near Stanley, owned by this company, was leased to and operated by other parties, who were most successful in their season's operations."

The Lightning Creek Gold Gravel and Draining Co., operating on lower Lightning creek, near the "Wing-Dam," has been doing excellent work during the season to further develop its property, and is now believed to have located the deep channel at this point with boring appliances, by which method, it is reported, flattering prospects have been obtained. In reference to these works the assistant superintendent, Frank Hibl, has to say:—

"On the advice of Mr. Samuel Keast, a very complete drilling equipment, with ample extra supply of material, was shipped in, to test the depth and location of the old channel. Drilling began in the spring of 1905, the Keystone Drill Co., the manufacturer of the drills, having furnished a skillful driller to operate the machine.

"It was the opinion of Supt. Keast that, in addition to locating the old channel and obtaining precise data from which to work it, these drill holes, when properly placed and cased, could be used for pumping stations, and such has been the result, the property being now equipped with two fast-speed 6-inch pumps, in addition to the regular Cornish equipment, and additional 6-inch pumps will be installed if found necessary to handle the water.

"This makes the installation economical, and just as effective as if an expensive shaft had been sunk in which to place the pumps. The results of the drill tests here at the 'Wing-Dam,' on Lightning creek, have demonstrated the old channel for a certainty at a depth of 167 feet, while the values recovered are entirely satisfactory and indicate that the ground will continue its previous producing record.

"A large flume has been constructed to utilise the whole of the water of Lightning creek for power purposes and a most complete equipment is being installed, including a steam-power hoist and other appliances to operate the property in the most thorough-going manner. A careful survey is on the eve of being made, with a view to completing the bed-rock drain in due time. At present it is intended to use the present drain by connection with the shaft and to run off the water by syphon effect, as soon as the mining is carried up-stream a certain distance.

"This, however, while being equivalent to a bed-rock drain tunnel, in fact, is only intended for temporary use. The drain tunnel will be started at such point down toward the mouth of the stream as shows by careful survey the best location. It is the intention of the company to equip, in the spring, several additional shafts for taking out gravel. A daily average of 14 men has been employed at the mine."

Manager James Mathers and his company, whose concessions are situated on Peters creek, near Beaver pass, have done but little actual development work, having been engaged in constructing a water-wheel for pumping and hoisting purposes, of which he speaks as follows:—

"In compliance with your request, I have to state that during the past season there has been established on my leased ground on Peters creek a power plant, to be run by water. The plant is of a capacity sufficient for any work that may be required of it, the wheel being 18 feet in diameter and 3 feet in width, with hoisting and pumping rigs attached. The water is supplied to it through a short ditch and an elevated flume of sufficient size to run the wheel to its full capacity. These also have been constructed during the past season. A 6½-inch Cornish plunger pump, with a 6-foot stroke, has been placed on the works, which unwatered the shaft and drifts on a half stroke with a low speed of the wheel in about three days, and the water is held with about an eighth of the capacity of the plant. A building 58 feet by

24 feet, double-roofed, and in every other way fixed to keep out the cold, has been built over the wheel and work-shafts, dump-boxes, and string of sluice-boxes. Drifting up the channel is in progress on what apparently was a cascade in the time the deep channel was eroded, and there are indications that the present drive is nearly at its summit."

A report just received from Cariboo states this company is now on good pay, getting out about 4 oz. to the "set" of timbers. This news is important, as this is the first good gravel found on Peters creek and it promises to be of considerable extent.

SLOUGH CREEK.

The Slough Creek Gravel Gold, Limited, notwithstanding the enormous expense incurred and the almost insurmountable difficulties hitherto encountered, is continuing in the hope of overcoming the difficulty of breaking through bed-rock into the channel, where exceedingly rich gravel has been proven to be. The manager, Mr. Arch. Stark, speaking of the season's work, says:—

"During the year a total of 510 feet of drifting was done in schist bed-rock, chiefly on the down-stream side of the main tunnel, and the gravel was tapped in five fresh places. Several boreholes were also put up from the drifts to the gravel.

"In the beginning of the year the flow of water from the workings was at the rate of 572,000 gallons (Imperial) per day, and was gradually increased by fresh openings to over one million gallons a day by the beginning of June. During the last four months the average daily flow has been at the rate of 1,115,000 gallons, and this has kept the two duplex steam-pumps going constantly at a moderate speed.

"There is still a free flow of water from the ends under a high pressure, which has prevented any attempt at the extraction of the gravel, beyond small sample lots, and the drainage of the gravel will take a considerable time.

"The samples taken showed a good gold prospect at all points and confirmed those previously taken.

"An average of 25 men was employed throughout the year, and 13 men in the bush, cutting and hauling fuel and mine timber.

"Beyond the extension of mine buildings there have been no additions to plant and machinery, all of which kept running in good order.

"I enclose a reduced plan and section of mine."

WILLOW RIVER AND TRIBUTARIES.

The *Williams* and *Alabama* hydraulic mining claims, on Mosquito creek, owned and operated by the Flynn Bros., although having but a short run owing to the light snowfall, upon which they have to depend entirely for their water supply, continue to maintain their reputation of being among the most productive in the district.

Willow River Mining Company.

At this mine the pumps were started about the 1st of July and continued pumping for about two months before work was commenced in the face. The drift was then pushed out into the channel a distance of 120 feet. Losing the bed-rock, a blind shaft was sunk from the tunnel level 11 feet, when bed-rock was again found, but still pitching slightly into deeper ground. Work in the drift was then stopped, the company deciding to sink the main shaft some 25 feet deeper and to run a new tunnel to strike the channel in the deepest place. It is reported that an excellent prospect was obtained.

Eight-Mile Lake and Vicinity.

Regarding the operations on the Thistle Company's mine, 8-Mile lake, the assistant manager, Mr. T. O. Burgess, writes:—

"This company commenced hydraulicing on their 8-Mile lake property on April 25th. The total time occupied in washing was 138 ten-hour shifts, as compared with 175 shifts in 1904 and 275 shifts in 1903. Considering the actual working time, this property is holding its own as compared with former seasons. In order to obtain dump for the coming season, about 1,000 feet of new sluice flume will be required. This work is well under way.

"To prepare ground for hydraulicing in 1906, a small bank blast was put off this fall. Details of blast: Height of bank, 50 feet; character of bank, bottom of fine 'chicken-feed' gravel, with heavy overburden of very hard, compact clay; length of main drive, 40 feet, 4 feet high by 2½ feet wide; length of cross drives, 20 feet, or total length of 'T,' 40 feet. A charge of 1,000 pounds of black blasting powder and 150 pounds of giant powder was placed at the end of each cross drive. The total charge was 2,300 pounds, or 28¾ pounds of powder per 1,000 cubic feet of ground covered by the drives. Three exploders were placed in the giant powder at each end of the 'T.' About 25 feet of the main drive was tamped, the material being firmly rammed with wooden mauls. The blast was fired by igniting simultaneously six lines of time fuse. The background was raised 4 or 5 feet and the face of the bank thrown forward into the pit, followed by an avalanche of thoroughly shattered ground. The ground was cracked and shaken about 80 feet back from the face and on each side about 30 feet beyond the ends of the 'T,' thus preparing for hydraulicing over double the quantity of ground covered by the drive."

The Canadian Creek Company, under the management of H. McMasters, was unable to reach bed-rock with the shaft before winter set in. A steam hoisting and pumping plant was installed during the summer. I understand work on the shaft will be resumed early in the spring.

Grouse Creek.

Regarding the *Waverly* mine, Grouse creek, the foreman, Mr. Pomeroy, says:—

"There has not been much change in the *Waverly* since my last report. We worked seven men about four months and took out 450 ounces of gold. The chances are equally good ahead. Have put in no new machinery."

The property of the United Mining Co., Grouse creek (J. Wendle, foreman), consists of the old *Hard Up* real estate ground, worked in conjunction with a lease taken out by Messrs. Lasell and Wendle. Upon tunnelling into the hill (including side drives) some 600 feet, the company eventually succeeded in accomplishing the object of its search, namely, locating the old *Heron* lead and finding ground which pays some 10 to 12 ounces to the set of timbers, but in running up toward the old Heron Company's diggings it was found impossible to work to advantage until the same was tapped, in doing which the rush of water brought with it such a quantity of slum that the works were almost entirely filled. This necessitated the running of a new tunnel, lower down the creek, by which the channel has been reached, but it was found to be so much deeper than the tunnel level that a blind shaft had to be sunk, and this the company is now engaged in doing, but is experiencing much difficulty in overcoming the influx of water.

China Creek.

The China Creek Hydraulic Mining Co., which has given a good account of itself during the last two seasons, is undoubtedly one of the most promising hydraulic mines in the district and gives evidence of permanency. In reference to this company, Mr. Lasell speaks as follows:—

"Owing to the uncommonly early spring, hydraulicing was commenced in the early part of April, ten days earlier than the average season, and, although the winter snowfall was extremely light, the water supply for this mine was an average one. The exact number of days for which a full head was available was forty-three, during which time 88,000 cubic yards of material were removed.

"At the close of the piping season work was immediately commenced on the construction of a large dam, at the foot of a long ravine through which the ditch system passes, and where an ideal storage reservoir has, by the aid of the dam, been created. This will enable the mine in future to run a day shift during nearly the entire working season, and will fully double the mine's output.

"Just before the close of the season a second pipe-line was laid, which will be used for sweeping the gravel lying along the sides of the pit into the main ground-sluices leading to the sluice flumes. This will greatly increase the efficiency of the main giant located in the centre of the pit. The past season's work exposed the right hand rim, which now gives the mine a well-defined channel 247 feet in width, proving conclusively that there is here the bed of a large pre-glacial river, which has undoubtedly been the source of much of the gold found in the beds of present creeks which have cut the channel."

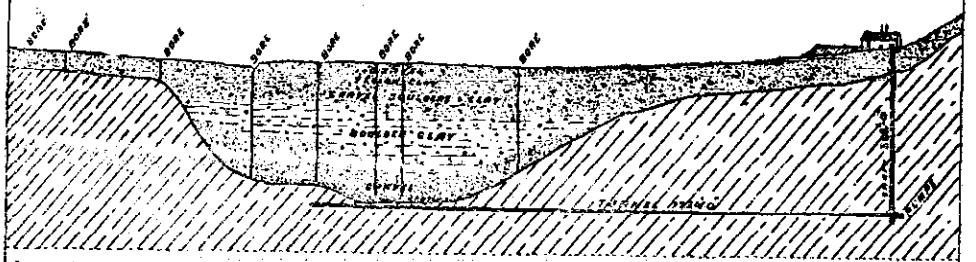
CUNNINGHAM CREEK.

On Cunningham creek, "The Bear Hydraulic Company," an enterprise started last year by Messrs. Wendle and Lasell, proved such an exceptionally promising venture that the company decided to increase largely the capacity of the plant, and it has now been made second only to the celebrated Consolidated Cariboo mine at Bullion. Mr. Wendle, the manager, has the following to say regarding the season's operations:—

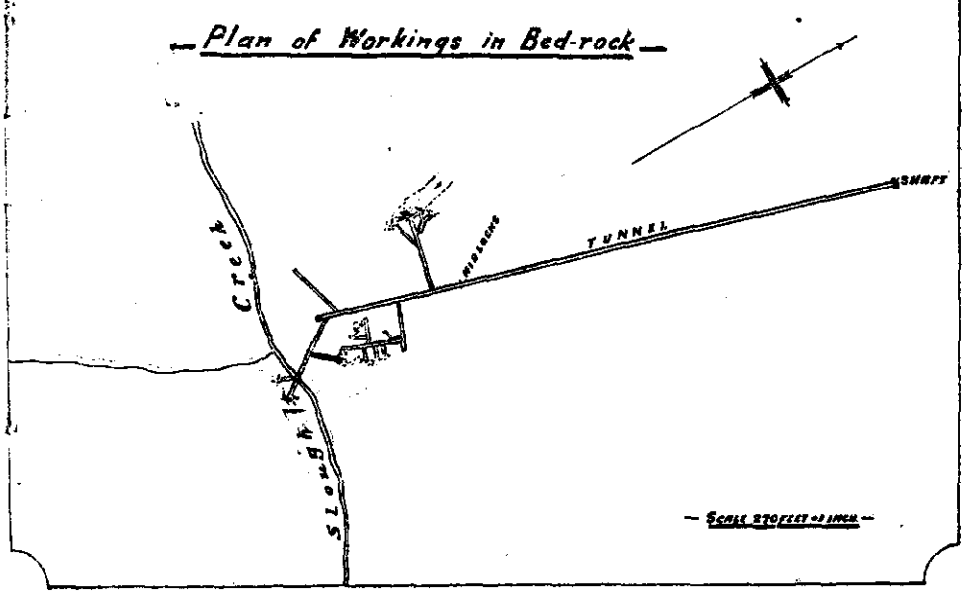
"My report to you last year gave a short description of this property and the plant then installed, the work at that time being principally of a prospecting nature, with very encouraging and satisfactory results. At the beginning of this season's work a great deal of further prospecting was done, to determine fully the extent of this ancient deposit, and proved to be most satisfactory, in view of the extremely low cost of placing the water supply which is available on the property. These conditions caused the management to recommend the enlargement of the plant then at the mine, as it was inadequate to work this extensive gravel deposit expeditiously and economically. Work was therefore not begun until after the spring freshet. The main ditch to Antler creek was enlarged to a carrying capacity of 3,000 miner's inches. On the completion of this the water was turned on to the giants and a cut was made through the rim into the channel. To take this water the new flume was begun, but could not be completed before the cold weather set in.

"The returns for this work were considerably above expectations and showed a good profit. Although the channel was not reached and a great deal of rim and slide rock was washed, still, taken altogether, it was most satisfactory. A ditch of 3,000 miner's inches capacity was also dug from Cunningham creek. This delivers the water on top of the bank and will be used as a ground-sluice head. It sometimes happens that in extremely dry seasons the water drops low in these streams, and to overcome this possibility, a foundation has been started in Cunningham pass, on which a dam will be built so that hydraulicing can continue uninterruptedly at such times. In considering the construction of this dam, it was decided to install a small hydraulic plant, to be used in tearing down the bank and depositing the material through a flume into the dam embankment, and for this purpose a ditch was dug, which carries the water from the headwaters of Beaver river through a pass and drops it in Nine-Mile creek. From here a ditch takes it to the dam site. On the completion of the dam this water will be stored

Section of Slough Creek Deep Placer



Plan of Workings in Bed-rock



with Antler and Cunningham creek waters in the reservoir. There will be used at the mine two No. 6 giants, with pipe-lines, flumes, etc., to match, one overhead cable-way, operated by water power, for handling boulders, and a steam saw-mill outfit complete. During the progress of this season's work an average of over thirty men was employed."

Messrs. Thompson, McGregor and Ross, working higher up Cunningham creek, speak of the season's operations as follows:—

"Work was commenced on the *Cunningham* claims on March 10th, and consisted of the building of 200 feet of 7-foot flume and 150 feet of 4-foot flume, and the 'blocking' of same. On May 10th water was turned on and the pipe started, continuing till June 10th. It was then discovered that the bed-rock up-stream was going off deep, and a shaft was sunk 17 feet in the bottom of the pit, which was 10 feet deeper than we anticipated, so we concluded to stop the pipe and clean out the shaft, with the object of ascertaining the depth of the channel and of prospecting the ground. Considerable water was encountered in the carrying out of this work, and it became necessary to erect a water-wheel and to install a pump. This was done and work was then resumed in drifting. Three drives were run, one east, one west, and one up-stream. The gravel taken from the drives was accurately measured and washed and its average value was found to be $2.18 to the cubic yard. The bed-rock is spotted, the value of the bed-rock about equalising the value of the gravel. The shafts and drives demonstrated that the ground had gone off from a depth of 20 feet to a depth of 32 feet, and as this was too great a depth to admit of bottoming, work was suspended for the season.

"Our intentions are, if satisfactory arrangements can be made, to install a Miller 14-inch hydraulic gravel elevator to elevate to a height of 40 feet. We hope to be able to have it in place for the coming season."

On Jack of Clubs creek, Messrs. McDougal, McMillan & Co., having acquired a lease of half a mile of the bed of the stream, commenced sinking a shaft, but encountering more water than could be handled by windlass, the company built a 16-foot overshot water-wheel to operate an 8-inch Cornish pump. Sinking has again been resumed, and it is expected bed-rock will shortly be reached.

J. D. Peebles & Company have recently started the exploitation of the deep gravel on Fountain creek, a tributary of Swift river to the south-west of Van Winkle, the shallow ground of which was worked in the early sixties. Sinking on the deeper ground has never been heretofore attempted, and it is for this purpose the present company is putting up a water-wheel and pump. It was upon this creek in 1862, before taking up his law practice in Cariboo, that Mr. Justice Walkem had his practical experience in mining, which stood him in such good stead in his subsequent legal, legislative and judicial experience.

River Dredging.

Nothing has been undertaken during the present year to prove further the value of this method as applied to the recovery of gold from the bars of the many auriferous streams of the district. Should, however, the report of the successful working of dredges elsewhere prove well founded, it will mean much for Cariboo, as many of our streams are particularly well suited for working in this manner.

Quartz Mining.

If I except the undertaking by Messrs. Lasell and Hanour, two local men, to develop further the property of the British Columbia Milling and Mining Co., nothing worthy of mention has been done the past year. The persons mentioned, however, having secured an option on this company's property, caused the deep shaft to be baled out, when some two tons

of rock were extracted and sent out for treatment. I am informed that the parties have since then been successful in financing the enterprise, and that arrangements are now under way to open and work the mine in a systematic manner as soon as the spring opens up.

This report would be incomplete without some reference to the strong impression at this time prevailing that the Yellow Head pass of the Rocky Mountains, and presumably the Goat river pass in the Cariboo range, will be adopted by at least one of the lines of railway at present building from the east towards the coast. Nothing perhaps could be done that would so effectually bring to light the dormant resources of the Cariboo District.

OFFICE STATISTICS—CARIBOO DISTRICT.

Free miners' certificates issued, company	12
" " individual	370
" " special	5
Records and transfers of recorded placer claims	139
Leaves of absence	35
Water records issued	21
Placer mining leases issued	43
" " cancelled	27

Revenue Receipts.

Free miners' certificates	$ 2,868 75
Mining receipts general	29,512 04
Water grants and rentals	1,836 75
Leaves of absence	120 00
Land sales	8,768 36
Other land revenue	501 00
Mineral tax	3,949 21
Revenue tax	2,436 00
Real property tax	2,888 78
Personal property tax	3,861 21
Wild land tax	161 26
Income tax	261 86
Licence, spirits	1,400 00
Licence, trade	525 00
J. P. Court fines	432 50
Miscellaneous receipts	347 24
Total	$59,869 96

QUESNEL MINING DIVISION.*

REPORT BY W. STEPHENSON, MINING RECORDER.

In submitting this, the annual report, with the estimated yield of gold from Quesnel Mining Division of Cariboo District for the mining season of 1905, I find the amount of gold obtained is somewhat less than for 1904. This is however owing, not to the depreciation of the mines, but altogether to the lack of water for the working of hydraulic properties and for other surface mining. This is the third dry season in succession in this section, and owing to the very light snowfall last winter, many of the small creeks and gulches ceased to flow after the snow was gone. The small surface mines located on, and others depending on, those streams did nothing for the season, while the hydraulic mines had a very limited supply of water, for the reason that there was not enough melting snow to make any considerable amount of water

* *See* also report of Gold Commissioner, page 48.

in the lakes and reservoirs, which had been drained to the utmost the preceding season, and, consequently, the water supply was of very short duration and the output of gold light in consequence. Hydraulic and other surface mining is our chief dependence in this section, and the shortage of snow for the last three winters has been a great drawback. The rainfall during the summer months was very light; in fact, it might be said that we had no rain from the first of May to the last of August.

On Keithley creek, Messrs. Veith and Borland have a drifting claim which has paid well for the past year, with good prospects of continuing to do so for some years. This is the only drifting claim in this Mining Division that is working upon a paying basis. Two or three others are working, but with very indifferent results.

On Snowshoe creek the mining season was very short, on account of the shortage of waters; but the claims are looking well, and with a good supply of water would make a good showing.

On Goose creek Mr. Thos. Helgesen & Co. are working on their lease, with good results I have heard. There is always plenty of water in Goose creek for mining purposes.

On the north fork of Quesnel river there are a few white men working, and they report making about fair wages. Some Chinese also scattered along the river were working in a desultory manner.

On the south fork of Quesnel river the work for the season has been limited. The Consolidated Cariboo Hydraulic Mining Co. had to close down after a very short run, the water supply becoming entirely exhausted before the middle of June. It is reported that the property of the Consolidated Cariboo has been sold to American capitalists, and that the mine will be worked upon a more extensive scale than heretofore, a further water supply having been obtained. A number of new mining leases having been acquired, it may be inferred that Mr. J. B. Hobson still has faith in this section of Cariboo District for hydraulic mining.

There is very little mining being carried on along the main Quesnel river. A few Chinese are working on the bars of the river, as the water is very low, but there are no regular organised companies mining.

On the Horsefly river, at Harper's camp, Mr. R. T. Ward resumed operations last spring, and he did quite well as long as he had sufficient water to work, which was about half of the mining season. Mr. Ward is now installing a boring plant with which to prospect the ground during the winter, so as to give him a better idea of working the ground the coming season.

On the upper Horsefly river, about fifty miles up from Harper's camp, where some good prospects were obtained and some gold taken out in the latter part of the summer of 1904, there have been about twenty men working this last season. Most of them were prospecting and doing preliminary work; and, consequently, there was not much gold obtained, but some of the prospectors whom I saw and talked with maintain they have good claims there, and expect to get them in working shape next summer.

There is nothing to report upon in the way of quartz mining or prospecting for minerals of any kind for this last year, no work of that kind having been done in this Mining Division.

CASSIAR DISTRICT.

ATLIN MINING DIVISION.

Windy Arm Mineral Locations.*

NOTES BY W. F. ROBERTSON, PROVINCIAL MINERALOGIST.

The attention of the Provincial Government was drawn during the past summer to the reports of very successful prospecting on Windy Arm, a branch of Tagish lake, the claims being situated very near the boundary line between British Columbia and Yukon Territory, the 60th parallel of north latitude. In consequence, the Provincial Mineralogist, on his return from the Bulkley valley on October 10th, was requested to proceed to investigate these reports and to determine as to the location of the claims. He, therefore, left Victoria by the next boat, sailing on October 16th, arriving at Skagway on the 22nd and at Conrad City on the 24th.

Routes of Access. The district in question is reached from southern British Columbia by steamer to Skagway, Alaska, thence over the White Pass and Yukon Railway to Carcross—formerly called Caribou Crossing or Narrows. Steamers from Victoria and Vancouver to Skagway run every week, with additional steamers from Puget Sound ports, on which the first-class fare is $30. From Skagway to Carcross the White Pass Railway runs a passenger train every day, except Sunday, the year round. The railway fare is $12.25. From Carcross to Conrad City, the terminus on Windy Arm of the aerial tramway from the Conrad Consolidated Mines, is a distance of about 14 miles by navigable water. During the summer season transportation is provided here by the steamer "Gleaner," which makes two trips a week, or by row-boat, while after the ice forms travel is by sleigh over the ice.

Anticipating the necessity for direct railway connection into this new camp, the White Pass Railway has caused two surveys to be made for a branch from its main line. One line starts from Carcross and follows the shore line of Windy Arm to Conrad City, while a second survey leaves the main line at Log Cabin, following down the watershed to Tutshi lake; thence over a very low divide, only a few hundred feet high, to the south end of Windy Arm, the west shore of which it follows up to Conrad City. This latter route, although much longer, is said to be favoured by the railway, as it approaches the summit of the Pass by an easier grade and is reported to admit of cheap construction, while from the southern end of Windy Arm a spur could be run along the east side of the Arm to Conrad mountain, should the mineral claims there located, upon development, fulfil the promise of the present surface showings.

The Lewes river, the most important tributary of the Yukon river, has its source immediately to the north of the Chilkoot and White Passes, which mark the dividing line between Alaska on the south and the British possessions on the north. Through these passes and by this waterway has been the course of travel to the Yukon gold-fields. The river may

*Published as a Bulletin in November, 1905.

be said to begin in Tagish lake, which receives the waters of Bennett, Atlin and a number of smaller lakes of the district. These lakes are all cut by the 60th parallel of north latitude—the boundary line between British Columbia and the Yukon Territory—and are, consequently, partly in each territory. In longitude they lie between the 134th and 135th west of Greenwich. Windy Arm is an arm of Tagish lake extending in a southerly direction for nearly ten miles from a point about five miles east of the Caribou narrows where Bennett lake flows in. About one and a half miles of the southern portion of the Arm is in British Columbia.

The general course of the Arm is parallel with that of Bennett lake—the two bodies of water being separated by a mountain ridge which attains an elevation of some 4,500 feet above the lakes, which are themselves 2,200 feet above sea level. The separating ridge is about six to seven miles across in a direct east and west line.

The first of the mineral discoveries, already referred to, were made on the Windy Arm slope of this mountain ridge about two to three miles north of the 60th parallel, and in this vicinity only has there been any extensive development of the surface prospects. Such development, however, as time has permitted to be made at this point, proved so eminently satisfactory as to stimulate prospecting over the entire district, with the result that, during the past summer and autumn, a large number of claims have been recorded along the range and on a parallel range lying to the east of Windy Arm. As most of these newer prospects were discovered only late in the season, no very definite information as to them is obtainable, further than that the samples from surface croppings brought in by the prospectors give very encouraging assays and seem to indicate that from the vicinity of the more developed claims there is a mineral belt perhaps three miles broad and extending southward into British Columbia for some distance.

Mineral Development.

As has already been noted, the older, and, in fact, the majority of the mineral locations, together with all the material development at present accomplished, is in the Yukon Territory, and, consequently, outside the jurisdiction of the Province of British Columbia. It was, therefore, by the courtesy of the owners—particularly of Mr. J. H. Conrad—that the Provincial Mineralogist was permitted to inspect the workings and see the results so far obtained.

From the shores of Windy Arm the hills rise rapidly, their lower levels being so covered with wash and slide as to have confined all prospecting to the upper levels—that is, from 1,500 to 4,000 feet above lake level. Timber line in this part of the country is found to be at an altitude of from 4,500 to 5,000 feet above sea level, or about 2,500 feet above the lake.

When the Provincial Mineralogist visited the camp in the last week of October, snow completely covered the hills down to 1,500 feet above the lake, so that none of the surface workings were visible, and as work in winter could only be carried on underground, only those properties sufficiently far advanced to permit of this were found in operation.

The property upon which the most important development has been done is that held by the Conrad Consolidated Mines, an organisation of which Mr. J. H. Conrad is president. This company holds a group of 8 or 10 claims, situated at an elevation of from 3,000 to 4,000 feet above the lake, in a comparatively level basin among the higher peaks some four miles in a direct line back from the Arm. The surface here is covered with heavy wash or slide, in which rich float was found in such a well-defined line as to induce pits and cross-trenches to be dug until the vein was eventually struck in the solid formation upon the *Montana*, one of the central claims of the group. On this lead a drift had been driven for from 200 to 300 feet, attaining a depth estimated at about 100 feet. From this level stoping had been carried up in places for about 30 feet.

As seen in these workings, the vein was found to be a clearly-defined quartz fissure vein between two distinct walls. The hanging wall is the general country rock of the vicinity—a fine-grained, basic, volcanic rock, too much altered to admit of closer determination—while the foot-wall is a very much decomposed, rusty, coarsely crystalline, igneous rock, probably a diabase. The vein, as exposed, had a thickness of from 2 to 5 feet, averaging about 3 feet. The strike of the vein was found to be N.W. and S.E., with a dip to the S.W., into the hill, averaging about 25°. On the foot-wall was found a layer from 3 to 12 inches thick of galena embedded in "carbonates," or iron oxides, from which some astonishingly high assays have been reported, not infrequently running as high as 800 ounces in silver, with $20 in gold, to the ton.

Above this is the quartz proper, from 12 to 30 inches thick, mineralised sometimes more and sometimes less, with iron pyrites and silver and antimony sulphides, from which the management report assays higher in gold but lower in silver, the whole, however, averaging well. The manager estimated the entire vein to run over $25 to the ton, which estimate seemed reasonable. Shipments of sorted ore were being made down the hill by the pack-train which brought up supplies, and these shipments were reported as running over $100 to the ton in gold and silver.

The Provincial Mineralogist took samples from the upper and lower portions of the vein, representing the two classes of ore rather than the average. These he brought to Victoria, where they were assayed by the Government Assayer. The results obtained were as follows:—

No. 1.—Galena from the lower portions of the vein—Gold $13.60; silver, 442 ounces to the ton.

No. 2.—The vein quartz well mineralised—Gold, $7.60; silver, 113 ounces to the ton.

No. 3.—The "fines" broken in sorting the ore from both portions of vein—Gold, $17.60; silver, 163 ounces to the ton.

On the strike of the vein as indicated by the *Montana* workings, a tunnel was driven in on the *Mountain Hero*, the adjoining claim, through wash for 80 feet, when the solid formation was struck, in which a 50-foot raise was made, when the vein was found containing similar quartz ore, seemingly proving the vein and ore body for 1,800 feet along its strike. The management reports the vein as distinctly traced through at least seven claims by float and occasional croppings, upon which some work has been done.

The Company has a Riblet aerial tramway, 3¾ miles long, almost completed from the *Montana Group* to the shore of Windy Arm at Conrad City, and has constructed at the mine a stone bunk and cook-house for the workmen, and will, consequently, be able to continue development work all winter with a small force of men.

An allied syndicate, the J. H. Conrad Bonanza, has done considerable development in the way of open cuts on the *Venus* vein, which lies about half a mile south of the *Montana*. The country here is cut by the deep canyon of Pooley creek, apparently a fault line, which has enabled the vein to be prospected at a depth of over 1,000 feet. The strike of this vein appears to be about south-west, with a dip to the west. In the same vicinity this syndicate is also developing a parallel vein on the *Uranus* claims, on which it is reported some 600 feet of work has been done, developing good ore.

From both of these properties tram lines have been surveyed and the right of way cleared down to Windy Arm, at a point some 2½ miles to the south of Conrad City.

There are probably 100 more claims located on this slope, on which, as yet, only slight surface development has been done, but in many instances most encouraging results are reported.

From the plans seen of the various properties, it would appear that there are at least two main series of veins, an east and west series and a north and south series, which latter series, to the north of Pooley Canyon, bears to the north-west, and south of the canyon to the south-west. It could not be learned that as yet any development had been done on any claims on the west side of Windy Arm south of the 60th parallel. On the east side of the Arm, on Conrad mountain, which is cut by the 60th parallel, a large number of claims were staked late this past summer, but these have not yet received much development, being difficult of access and at an elevation high above the lake.

These locations, however, indicate that the mineralised belt will be found to pass into British Columbia, and that on such extension there is a promising field for the prospector.

The shore of the Arm was followed down to its southern end and the ridge to the west was found to continue unbroken, save where cut into by a couple of creeks.

The geological conditions existing in the vicinity of the *Montana* claim, appeared to continue to the southward into British Columbia territory and past the southern end of the Arm. The only exception to this was that within half a mile of the south end of the Arm, a bed of hard, dark slate cropped out on the west shore, its contact with the overlying igneous rocks being masked by the surface soil.

A prospector reported that this same slate is cut at an elevation of several hundred feet above the lake by Boundary creek, a creek that flows into the Arm from the west almost exactly on the 60th parallel. This contact, when traced out, should prove a profitable field for prospecting and is worthy of serious investigation.

On the east side of the Arm the mountains are even more precipitous than on the west, and seem to consist for the most part of the same class of igneous rocks seen on the west side of the Arm.

In the vicinity of the British Columbia boundary, about a mile to the east of Windy Arm, a mass of limestone was noted on the mountain side, and from float seen near by, it is probable that a band of slate will also be found on this side of the Arm, although its location has not been fixed. The contact of these sedimentaries with the igneous rocks, so prominent in the district, must be looked upon as likely to contain mineral, and is a section well worthy the attention of the prospector.

On the west side of Windy Arm, just south of the British Columbia-Yukon boundary, a townsite has been laid out on a gravelly point formed in the Arm by Boundary creek. Should the railway branch be built in from Log Cabin, it would pass through or near the townsite.

Accompanying this report is a map of the Atlin district, upon which is shown in red, as accurately as possible, the location of the claims and points herein referred to.

Recent Mineral Discoveries on Windy Arm of Tagish Lake.

By R. G. McConnell, B. A.—Geological Survey of Canada.

Situation and Communications.

The principal ore deposits so far discovered occur on the west side of Windy Arm, a southerly branch of Lake Tagish. Tagish lake forms part of a chain of long narrow lakes including, in order from north to south, Lakes Lindeman, Bennett, Nares, Tagish and Marsh, which commence well within the Coast Range of mountains and extend northward and eastward for a distance of nearly seventy miles. The general direction of these lakes is north and south, with the exception of Lake Nares and the upper part of Tagish lake, which have an east and west alignment. Windy Arm joins Tagish lake near its head and extends south for a distance of twelve miles. Its course is nearly parallel to that of Bennett lake and the two sheets of water inclose an area of high mountainous country about eight miles in width, the scene of the principal recent discoveries.

The White Pass and Yukon Railway affords easy communication to the new mining district. This line, after crossing the Coast Range, follows the east shore of Bennett lake to Caribou Crossing, at the foot of the lake, from which point steamers run to Conrad City, on Windy Arm, the shipping point of the mines. The total distance from tide water at Skagway, to Conrad City, is 79 miles, of which 67.5 miles is made at present by rail, and 11.5 miles by water. A railway can easily be built from Caribou Crossing along the shores of Lake Nares, Tagish lake and Windy Arm to Conrad City, and surveys for one have already been made by the engineers of the White Pass and Yukon Railway. A second route from Log Cabin station, on the main line of the White Pass and Yukon Railway, above Bennett lake, by way of Tutshi lake to Windy Arm, has also been proposed. The distance to tide water would be reduced considerably by this route, but the mileage of new line necessary would be greater.

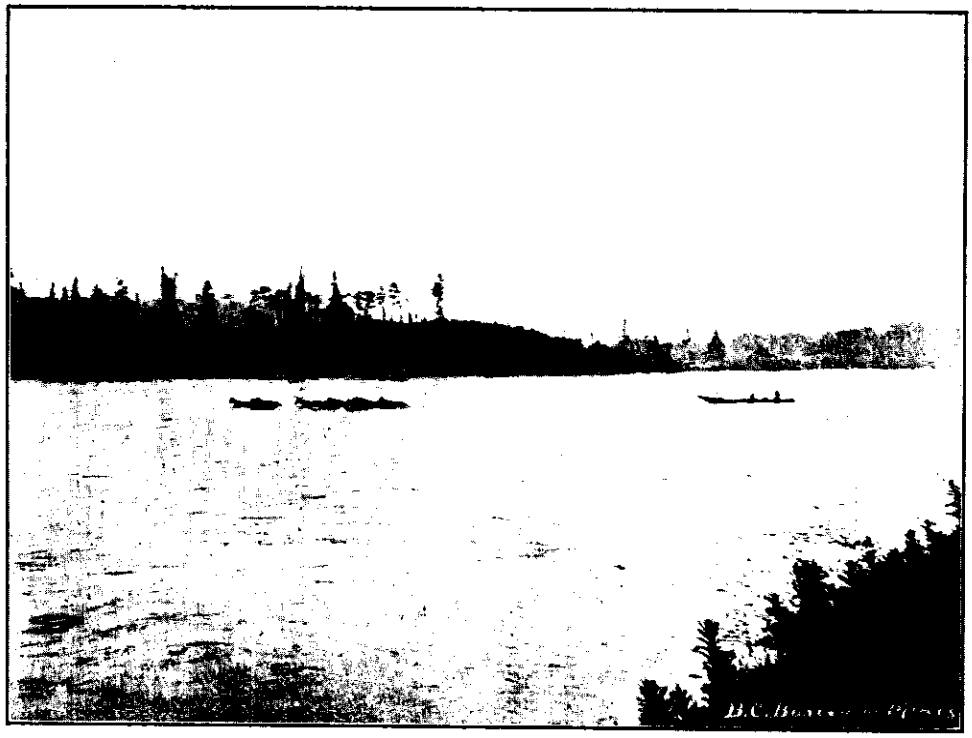
Character of Country.

The country bordering the north-eastern slope of the Coast Range, including the Windy Arm mining district, may be characterised generally as consisting of a system of wide valleys, often interlocking in a peculiar manner, separated by mountain groups and ridges rising from 4,000 to 5,000 feet above the valley flats. Most of the valleys are bottomed at intervals with long, narrow, deep lakes, due to the blocking of the channel at various points with glacial drift. The uplands are usually fairly regular in outline, but in places are exceedingly rugged and are often deeply incised by the numerous small streams which flow down their sides.

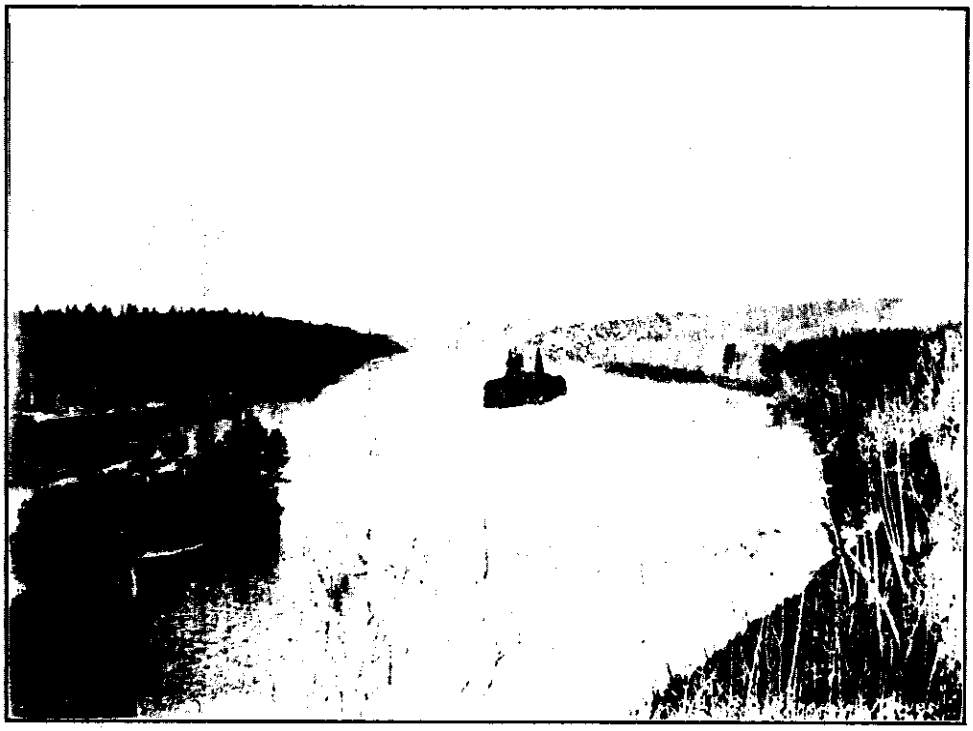
The forest growth is sparse and is confined to the valley flats and lower slopes of the mountains. At an elevation of 2,000 feet above the valley bottoms the forest practically ceases. The principal trees in the district are the white and black spruces, the aspen, the balsam poplar, the balsam fir and the black pine. The supply of rough lumber within easy distance of the camp suitable for ordinary mining purposes is ample for some years at least.

Geology.

The mineralised area on Windy Arm is situated a few miles north of the great granite area of the Coast Range. The rocks outcropping along the lower part of Windy Arm consist of a wide band of crystalline limestone, followed, going south, by hard slates and shales, passing in places into feldspathic quartzites and associated with dark and gray cherts and red



SWIMMING HORSES ACROSS NECHACO RIVER, AT STONY CREEK.



LOOKING UP NECHACO RIVER FROM MOUTH OF STONY CREEK.

jaspers. This clastic series is cut off and replaced about five miles above the mouth of the arm by an eruptive rock of a porphyritic character, exposures of which outcrop along the shores of the arm for a distance of about five miles. The porphyrite is followed, going southward, by strongly cleaved dark argillites and fine-grained tufaceous sandstones alternating with bands of conglomerates and limestone. These rocks are less altered than the slates and associated rocks north of the porphyrite area, but no data sufficient to determine the age were obtained. They are cut off a few miles south of Windy Arm by the great granite mass of the Coast Range.

The porphyritic rock separating the two series of clastic rocks constitutes the principal metalliferous formation of the district. It crosses from Windy Arm to Bennett lake in a band about four miles in width and also extends some distance east of Windy Arm. It has not been studied in detail, but is evidently somewhat complex in character. A fine-grained, somewhat altered specimen collected near the Montana vein has the character of a porphyrite, while one from Red Deer mountain proved to be a gabbro. The two types may represent portions of the same magma cooled at different depths. The principal structural feature of the porphyrite-gabbro area is the system or systems of strong jointage planes that intersect it everywhere. The joints, like the veins, show little parallelism in either dip or strike in different parts of the area. The porphyrite in many places is heavily charged with iron and weathers to a rusty colour.

A granite area about three miles in width occurs on Lake Bennett north of the porphyrites and associated rocks. The granite is separated from the latter on the lake shore by a narrow band of slates and limestones, but, further inland, comes in contact with them. It is a medium grained, gray rock similar to the Coast Range granites and probably belonging to the same period of igneous activity.

General Character of Veins.

The largest and most persistent veins so far discovered occur in the porphyrite area. They are not, however, confined to this formation, a few occurring in the granite and some, also, in the slates. The veins occupy typical clean-cut fissures with regular walls often slickensided and grooved. They are comparatively narrow, but as a rule exhibit remarkable persistency in strike. The *Uranus* vein, with a width of from one to four feet, has been traced by small openings and surface showings for a distance of about 1,500 feet and may extend much farther, while the *Montana* vein, with a maximum width of five feet in the portion explored, has apparently been cut at a distance of 1,600 feet from the main workings and may also of course be very much longer. The *Venus No. 2* lead (the largest seen by the writer) has a width of nine feet at two openings about 400 feet apart, and must extend for long distances in both directions. Numerous other veins such as the *M. and M.*, the *Joe Petty* and *Venus No. 1* are traceable by surface outcrops for several hundred feet. Portions of all these veins are concealed by slide rocks and their full length was not ascertained.

The dip and strike of the veins are exceedingly irregular. The Montana vein strikes N. 43 W., while the direction of *Venus No. 2* is about N. 42 E. The *M. and M.* strikes nearly north and south. The dips are nearly all to the south and west and vary in steepness from 12° in the *Montana* to 50° in *Venus No. 1.*

The gangue in all the veins is mainly quartz. Single and multiple lines of interlocking quartz crystals is a constant feature. In a few instances, portions of the vein-filling consist of alternating layers of quartz and country rock. The latter, in such cases, is always heavily mineralised, usually with iron, and weathers to a rusty colour.

The list of metallic minerals contained in the veins as identified in the field, and in the laboratory of the Survey from specimens brought back by the writer includes the, following:—.

Native Silver.—Occurs in small spangles and in wire form in the Montana and Uranus veins.

Argentite.—Is found in some of the veins but is not abundant.

Stephanite.—Occurs in several of the veins and is an important source of silver.

Freibergite.—A dark, highly argentiferous mineral occurring in some abundance in the *Joe Petty, Montana,* and some of the other claims, has been referred tentatively to this species. A partial analysis by Mr. Connor showed it to contain copper, silver, zinc, arsenic, iron, sulphur and antimony, the constituents of freibergite. The copper percentage in the specimen examined amounted to 9 per cent. and the silver to 37 per cent.

Pyrargyrite (Ruby Silver).—This rich silver mineral occurs in most of the veins, sometimes in considerable quantity.

Galena.—This mineral occurs in all the veins and is usually highly argentiferous.

Tetrahedrite.—Argentiferous tetrahedrite occurs in small quantities in the *Montana, M. and M.*, and probably in other claims.

Chalcopyrite.—Occurs in the *Silver Cliff* and other claims east of Windy Arm.

Native Copper.—Occurs in the *Millet, Fedora* and other claims east of Windy Arm.

Malachite and Azurite.—Green and blue incrustations and stains referable to the copper carbonates and due to the leaching out of the copper in the tetrahedrite and freibergite occur in most of the veins.

Specimens of a green mineral, stated to be a silver chloride, proved on examination to be a copper carbonate. It is possible that such a chloride is present in some of the veins but it could not be detected in the specimens examined.

Iron Pyrite.—Common in all the veins.

Arsenopyrite.—Occurs in a number of the veins but is usually subordinate in quantity to the iron pyrite.

Pyrrhotite.—Occurs in the *Big Thing Group.*

Sphalerite.—Zinc-blende occurs sparingly in most of the veins examined.

MINING DEVELOPMENT.

Montana.—This important vein is situated on a bleak hillside, about 3,700 feet above Windy Arm and 5,860 feet above the sea. An aerial tramway, four miles in length, connecting it with Conrad City, on the lake shore, was nearly completed at the time of my visit. At present, all supplies and materials for the mine, including firewood, are packed on horses.

The principal workings consist of a drift 180 feet in length. The drift pierces 50 feet of slide rock, then meets and follows the vein. A small fault, with a displacement of seven feet, was encountered at one point. The strike of the vein is N. 43 W., and the dip 10 to 12 to the S. W. The width of the vein increases from about two feet near the mouth of the drift to nearly five feet at the face. Some stoping has been done and a considerable quantity of ore has been shipped.

The ore minerals include native silver, pyrargyrite, argentite, freibergite (?), tetrahedrite, galena, and iron and arsenical pyrites. The distribution of the minerals through the quartz gangue is somewhat irregular. In places, especially near the walls, the vein matter is so thoroughly impregnated with silver-bearing minerals that it is rich enough to ship without much sorting—that is, it contains values of $80 per ton and over. The leaner portion of the vein will require concentration.

The principal values in the vein are in silver. The ferruginous portion of the vein is stated to also carry some values in gold.

At the time of my visit a second drift, intended to cut the *Montana* vein at a distance of 1,600 feet in a north-westerly direction from the main workings, was being driven, mostly through slide rock. The two workings are connected by a line of float ore and in places where the surface is bare by outcroppings; the management were confident that the vein extended at least that far. Since leaving the camp the vein (or a vein stated to resemble the *Montana* vein in general character) is reported to have been struck.

Uranus.—The Uranus vein is situated just above the forks of Pooley creek, a small stream tributary to Windy Arm. It is distant from the *Montana* vein about a mile, in a southerly direction, and from the lake about a mile and a half. The elevation above the lake is approximately 2,000 feet. The Uranus vein is traceable by numerous surface outcrops in a direction a few degrees east of south from the north to the south branch of Pooley creek, a distance of about 1,500 feet. The vein crosses a high ridge separating the two creeks, and is thus exposed naturally in depth for some hundreds of feet. A tunnel starting at the south fork has been driven 180 feet along the vein, which dips to the west at an angle of about 40° and varies in width from a few inches to three or four feet. It carries considerable quantities of highly argentiferous galena and also some native silver, ruby silver and iron and arsenic sulphides. A few tons of sorted ore have been shipped.

Other important veins in the vicinity of Pooley creek and its branches are the *Joe Petty* and the *M and M.* The *Joe Petty* is a very strong vein. A shaft following the lead has been sunk at one point to a depth of about fifty feet, showing a vein fully six feet in width. The vein material consists of alternating bands of quartz and silicified and mineralised country rock carrying layers and scattered grains and crystals of the rich silver and silver-bearing minerals of the district. The *M and M* is a much narrower vein, seldom exceeding twelve to fifteen inches in thickness, but is very persistent in strike. It is traceable on the surface for several hundred feet at least. This vein is especially rich in places in high-grade silver minerals, such as pyrargyrite, stephanite and the sulph-antimonite referred to as freibergite.

Another important group of claims is situated south of Pooley creek and about half a mile west of Windy Arm. This group includes, among others, *Venus No. 1*, *Venus No. 2* and *Ruby Silver.* No work was being done on them at the time of my visit. *Venus No. 2* is an exceedingly strong vein. The only work done on it consists of two shallow openings about 400 feet apart. These show a vein fully nine feet in width. The vein-filling consists of three and nine inches of quartz along the footwall, followed by alternating bands of quartz and decomposed and mineralised country rock. The ore is principally argentiferous galena. Good assays in gold are stated to have been obtained from this vein. *Venus No. 1* is a smaller vein. A shaft following the vein has been sunk on it to a depth of fifty-two feet. This shows a quartz vein, increasing in width from ten inches at the surface to about thirty inches at the foot of the shaft, bordered by several feet of decomposed and mineralised country rock, fissured parallel to the vein. Fifteen tons of ore obtained in sinking the shaft and shipped to outside smelters are stated to have averaged $65 per ton in silver. *Ruby Silver* is a narrow siliceous vein, spotted in places with the mineral from which it takes its name. Very little development work has been done on it.

South of the *Venus Group*, and apparently in the same zone of fracturing, are the *Red Deer* and *Humper* claims. The *Humper* vein, as shown in a couple of small openings, has a width of about two feet. The quartz is bordered above and below by about a foot of decomposed iron-stained country rock, which might be considered part of the lead. A shaft, twelve

feet in depth, has been sunk on the *Humper Extension*, an adjoining claim on the east. The vein followed has a width of about fifteen inches. The ore on the dumps showed galena, ruby-silver, stephanite and green copper carbonate, probably derived from tetrahedrite.

About a mile north of the *Montana* is the *Big Thing Group*. The conditions here are different, as the country rock is granite. A considerable body of loose ore, principally argentiferous galena, evidently derived from a strong vein, occurs on one of the claims. The vein had not been determined at the time of my visit. A number of other veins are reported to cross the various claims, but were not examined.

The claims, briefly described above, comprise only a small proportion of those staked in the district, but on most of the remainder little or no development work has so far been done, and the time at my disposal did not permit me to make a systematic examination of them.

The general outlook for the camp is considered exceedingly promising, and its opening up marks an important event in the mining history of the country.

The mining conditions are not unfavourable. Most of the veins are situated at distances of from half a mile to four miles from the lake and at elevations of from twelve hundred feet to three thousand six hundred feet above it. Aerial tramways can therefore easily be constructed for the carriage of the ores to the lake shore for concentration, and can also be used to take supplies to the mines. Miners' wages during the past season amounted to $3.50 per day for eight hours' work, and ordinary labourers obtained the same amount for ten hours' work. The cost of supplies, considering the short distance to the seaboard and the almost continuous rail connection, ought to be moderate. The climate, while severe during a portion of the year, will have little effect on mining operations.

ATLIN MINING DIVISION.*

REPORT OF J. A. FRASER, GOLD COMMISSIONER.

I have the honour to submit herewith my annual report on mining operations in the Atlin Mining Division, Cassiar District, which now includes what were formerly the Bennett and Chilkat Mining Divisions, for the year ending 31st December, 1905.

I might repeat the language of last year's report with reference to unfulfilled promises and unrealised development, disappointed hopes and expectations, and also state that, notwithstanding all these, the results on the whole should be considered satisfactory and successful, for, with a smaller force engaged in mining than in any previous season (the most regrettable feature), the actual output has been almost equal to that of last year.

The comparatively light snowfall last winter and the warm dry summer, particularly in the early part, rendered the water supply the scantiest since the opening of the camp; in consequence of which and other local causes, a smaller force than last year (or ever before) was actually engaged in mining, there being at no time more than 450 men engaged in placer mining, as against 550 to 600 in 1904 and 800 to 900 in 1903; but the results per capita were, I think, quite as good as in any previous year and better than in most.

The drifting operations of last winter were, on the whole, satisfactory, but I regret to say that there are not as many drifting this winter as last, there being only about 190, as against 250 last winter.

* NOTE.—By an Order in Council, approved on 26th January, 1906, the boundaries of the Atlin Mining Division will, from the first day of May, 1906, be extended to include all the territory now included within the boundaries of the Teslin Mining Division. Mr. James Porter, Gold Commissioner at Telegraph Creek, will act as Deputy Mining Recorder of the Atlin Mining Division, for that portion of such division as was formerly included in the Teslin Mining Division.

Drifting operations are being carried on this winter on Spruce, Pine, Gold Run, Boulder, McKee, Birch, Otter, Ruby and O'Donnell, and many are sluicing, to which operation the very mild weather which has so far predominated this winter is peculiarly favourable.

McKee Creek.

Nearly all the ground on this creek is owned by companies and only from 10 to 15 individual miners operated on it during the summer, but those were rewarded by good returns.

The scarcity of water and the uncomfortably close quarters into which Ginaca & Co., and the McKee Consolidated Hydraulic, Limited, had worked themselves in 1904 induced the latter company to suspend operations for this season, so as to enable the said Ginaca & Co. to work past the point of conflict and interference, which they did with satisfactory results. They operated on the *Old England* and *Winnemucca* leases, and with five men and the use of the hydraulic plant and water of the above-mentioned McKee Creek Consolidated Hydraulic, Limited, uncovered about 5,500 square yards of bed-rock and moved about 27,500 cubic yards of gravel, with satisfactory results.

The Amalgamated McKee Creek Mining Company, under the management of Mr. S. H. Plumbe, operated further down stream on the *Beta* and *Gamma* leases, with a force of from 8 to 12 men and an expenditure of about $15,000, and uncovered about 4,700 square yards of bed-rock, and as the banks were very high (about 130 feet), moved a considerable quantity of material, which averaged about $4.70 per square yard of bed-rock exposed, and gave a handsome net profit for the season's operations, notwithstanding the shortage of water, which, unfortunately, permitted of the use of two monitors for a few weeks only, and towards the end of the season of one monitor only for a few hours a day.

Pine Creek.

A smaller force of individual miners operated on Pine creek and Gold Run this season than ever before, the number varying from 30 to 50 for both creeks. Results were, as usual, apparently satisfactory to the operators, except for the delay and difficulty in procuring water, as already indicated.

Of the companies, the Pine Creek Power Company, Ltd., and the North Columbia Gold Mining Company, under the management of Mr. J. M. Ruffner, President and General Manager of both, had a very successful season and moved a large quantity of gravel with very satisfactory financial results.

These companies ranked first this season in the amount of output, aggregating over $50,000, but as the manager, who left the district sooner than he expected to, neglected to furnish me with the usual report of his season's operations, I am unable to supply details. I may say, however, that their expectations as to the continuity and richness of the gold-bearing "yellow deposit," mentioned in former reports, have not been disappointed, and the methods of operation reported or suggested in last year's report, of the running in of powder drifts discharged by battery, and the introduction of a new style of elevator for the disposition of tailings, led the management to believe that they had obtained the best possible results from the means and water available.

On the *Stephendyke* group of leases, which is also under Mr. Ruffner's management, nothing worth mentioning, as far as I know, was done this season.

The Atlin and Willow Creek Gold Mining Company, Ltd., under the management of Messrs. F. H. Brackett and W. H. Hale, continued where it left off last year on the "D" lease and recovered about $14,000 by its sluicing operations, at a satisfactory profit. There were from 7 to 10 men employed. I have had no report from these managers either.

The British American Dredging Company, Ltd., under the management of Mr. O. T. Switzer, continued to operate its dredge on Gold Run, but with indifferent success, for, notwithstanding the use of the "Keystone drill" and dynamite, which certainly assisted very materially, the cemented material with which the dredge had to cope proved too hard for that style and weight of boat and machinery, and did not meet the expectations of the management in the amount of material moved, although very fair returns were realised from this material. An average of about 10 men was employed. The manager of this company also failed to make the customary report as to his season's operations, which renders me unable to supply details.

From 120 to 135 men were engaged on Pine creek and Gold Run during the season.

I have reason to believe that a steam shovel will be installed on *Tar Flats* next season, and that a much larger quantity of water will be made available for use, as the necessary steps are being taken for the diversion of the same from Surprise lake.

SPRUCE CREEK.

On this creek about 200 men were employed during a portion of the season, including those employed by the companies, and again does the output from the individual operation on this creek exceed that on any other, being over $95,000 as reported, and well over $110,000 if proper returns were made. Scarcity of water and of dump-room were again keenly felt and seriously embarrassed the operators, although not to the same extent as last year. Between 90 and 100 men are drifting on this creek this winter.

Of the companies, the Spruce Creek Power Company, Limited, under the management of Mr. W. C. Hall, with a force of from 10 to 15 men, did some ground-sluicing and prospecting upon the *Duchess* lease and *Woodbine* group of placer claims, besides changing a portion of its pipe-line, enlarging and repairing its ditch-line, etc. While piping, it used a No. 6 and two No. 4 monitors, but the scarcity of water precluded their use beyond a few weeks. The expenditure for the season's operations was about $13,000 and the amount of gold recovered did not exceed one-third of that amount. The company reports that prospect work is being done this winter on the *Plumas* lease by means of tunnels. It may be expected to make a much better showing next season.

Some prospecting was done on the *Gorgon* lease, preparatory to piping next season.

On the *Tobacco Box* lease the work is all done by "drifting," and over $10,000 has been expended thereon during the last two years, with results very gratifying to the operators.

The owners of the *Gladstone* lease expended about $4,500 in mining and $1,000 upon the ditch, under water record No. 37, which is appurtenant thereto. Owing to scarcity of water and of room for dumping purposes, they have confined themselves to ordinary "individual" methods of operation, *i. e.*, drifting, sluicing, etc., with very gratifying results, as the ground is rich.

There are other leases held in that vicinity, but all work done on them has been by ordinary individual methods so far.

The Columbia Hydraulic Company, under the management of Mr. W. F. Gore, with two "giants" and a force of 10 men, moved about 40,000 cubic yards of gravel and prospected a considerable area in search of the "pay streak," which, unfortunately, they did not find, and they were at the close of the season still ignorant of its exact whereabouts.

This company has been unusually unfortunate in having installed an expensive plant before it had properly ascertained where the "pay" was. It has, consequently, spent four

seasons, at least, prospecting, with a considerable force of men and at heavy expense, without finding adequate pay. Good pay exists above and below this property, and is doubtless to be found somewhere in that vicinity, but so far this company has not found it.

The British Columbia Dredging Company, Limited, which was reported last year as having a large dredge in course of construction near Blue Canyon, completed the same this season and had it operating for about a month before the close of navigation. The dredge appeared to work very smoothly and efficiently and seemed either to avoid or to overcome more easily the difficulties experienced by the dredge on *Gold Run*, so that sanguine expectations are entertained for good results from its operation. In fact, I was given to understand that the results for the short time it was in operation were very satisfactory. Again I have to report failure on the part of the manager to furnish me with the usual and necessary report as to their operations, and I am, consequently, unable to supply details. The mildness of the season was such that apparently the dredge might have been operated for some weeks later than it was.

The initial venture with a steam shovel in this district was undertaken this last season by the Northern Mines, Limited, which company, having some good ground on Spruce creek (individual claims), installed thereon a "Little Giant" traction shovel, which, notwithstanding the embarrassments and losses that almost invariably attend initial and experimental ventures, worked very satisfactorily, and convinced the management that, with some additional equipment and changes in methods of operation, this style of plant can be made to pay handsome profits and dividends on the investment. The management of this undertaking was in the hands of Messrs. A. H. Bromley and R. D. Fetherstonhaugh. The shovel was operated nearly two months, and in that time moved considerably over 10,000 cubic yards of gravel, at a net profit of over $3,500, demonstrating that the shovel could handle the gravel faster than it could be sluiced and the tailings disposed of by the water available. The ground upon which the shovel started work was very rich, there having been over $24,000 taken from a strip 100 feet by 300 feet, but the shovel operators did not get the full benefit of this, as the ground had been partially worked beforehand by their predecessors in title, but they realised about $1.50 per cubic yard. A force of from eight to twelve men was employed, but this force can be materially reduced when everything has been placed in proper position and working order.

In last year's report I mentioned a group of leases situated on Little Spruce creek, upon which prospecting operations were in progress, in the course of which a shaft had been sunk 27 feet without reaching bed-rock. This season this shaft was continued to a depth of 70 feet, and still without reaching bed-rock. The ground was found to be very hard, requiring the constant use of explosives, but the owners are still sanguine of success, believing that they have good ground, and, with commendable pluck, intend continuing the work next season.

Birch Creek.

On this creek not more than ten individual miners operated during this season, and with but indifferent success. The difficulty is not with the ground, which appears to be rich enough to pay more than wages, but with the water supply. Taking the experience of Messrs. Chancellor, Pearse & Co., who were the largest individual operators, we find that during the latter part of May the spring freshet came on suddenly, when the water rose very high in the creek and caused much loss and damage by filling up their pits and carrying away their flumes, etc., in consequence of which they were unable to take full advantage of the high water for ground-sluicing purposes, and then they were compelled to close down about the 1st of September for want of water. They, however, intend to try it again next season.

The Atlin Lake Company, Limited, under the management of Mr. A. Bryan Williams, had everything in good shape for an early start and anticipated a good season's output, but the early freshet upset the company's calculations, and subsequently the water supply diminished so rapidly that about the first of July the mine was closed down for want of water, about $3,000 having been recovered. It is apparent that reservoirs must be established on this creek before satisfactory results can be confidently anticipated.

BOULDER CREEK.

The creek claims on this creek having been pretty well worked out up to *20 above Discovery*, or for about 2½ miles from its mouth, and the benches not being capable of profitable operation except by ground-sluicing, because of the height of the banks and the distribution of the gold through the gravel to a greater height above bed-rock than on some of the other creeks, and the injunction against ground-sluicing (or practically that) obtained by the Société Minière de la Colombie Britannique two years ago not having yet expired, only between 35 to 40 individual miners were operating on this creek during this season. The results of their operations, however, were quite as good as in former years, but would be better if they could ground-sluice away the heavy over-burden. About 20 men are drifting on Boulder creek this winter.

The Société Minière de la Colombie Britannique, under the management of Mr. Pelletier, assisted by Mr. Henry Maluin, worked up-stream for another 150 feet, but met with poor results for most of the distance. The last 25 feet, however, proved better and gives promise of rich ground for next season's operations. This company reported for royalty for the year 1905 over $103,000, but nearly all of this was secured for it by its "laymen," Messrs. Black and Grant, whose drifting operations were reported at length last year and who continued until May, when they closed down. Subsequently, Mr. Black entered upon another "lay" upon the same ground, and is now working it with a force of 10 or 12 men.

On the *Non-union* lease, a force of 6 men, under the management of Mr. H. O. Morse, with a small hydraulic plant moved about 6,000 cubic yards of gravel, with satisfactory results.

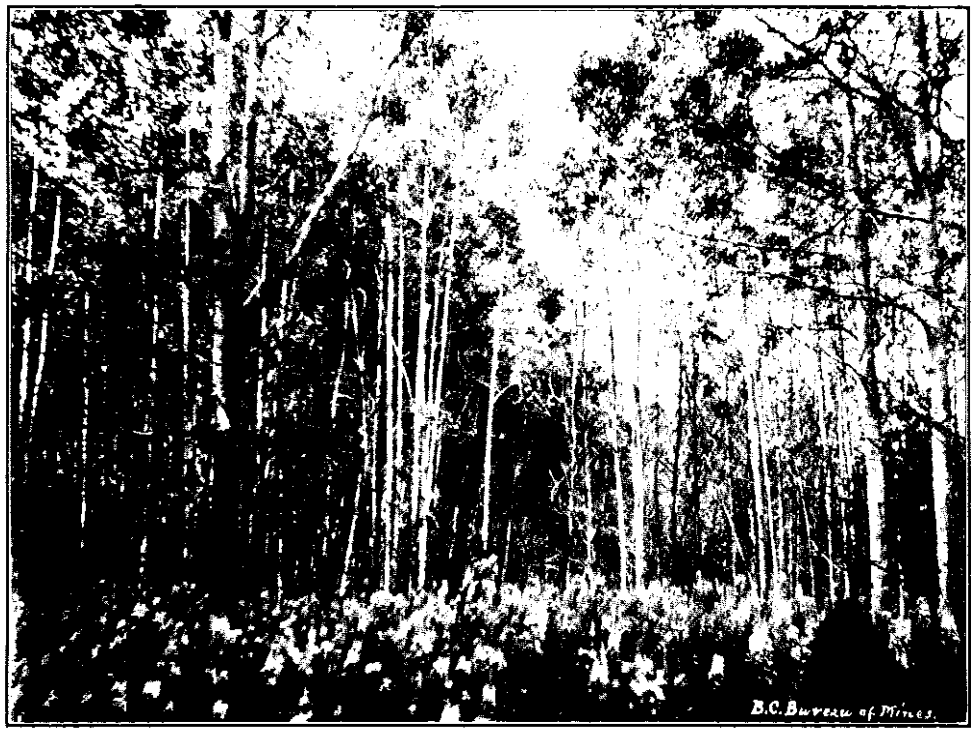
RUBY CREEK.

On this creek not more than 10 men were operating at any time during the season, and the work done was chiefly of an exploratory nature.

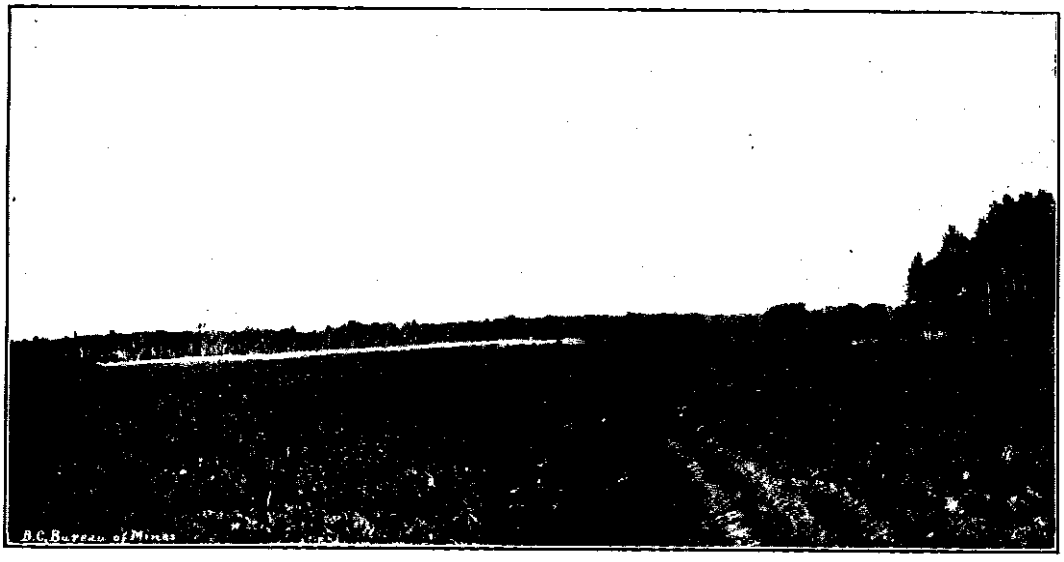
The Ruby Creek Mining Partnership, under the management of Mr. Robert Mackay, employed from three to six men drifting and prospecting the extent of the pay gravel, which was found to be at least 170 feet wide. Its full extent to the east was not determined, on account of the excessive flow of water from that direction. It may be remembered that these operators were reported last year as having struck bed-rock at a depth of 47 feet, and that from 25 to 30 feet in depth of this material was "pay gravel," and they have now demonstrated that the pay streak is at least 170 feet wide, and also that it is too heavy for individual operation, but it appears to be an inviting property for hydraulic operation. There is only one man on the creek this winter.

WRIGHT CREEK.

About 12 men were operating on this creek during the season, some of whom obtained excellent results, whilst others were not at all successful. Among the latter were the operators upon the English Counties Hydraulic Syndicate's leases (Lincolnshire and Surrey), Messrs. Gierke & Co., who uncovered over 1,400 square feet of bed-rock, at an expense of about $2,200, and secured less than $100 worth of gold. This is the third season they have operated on these leases without having found the rich "paystreak" which is believed to exist thereon.



NECHACO DISTRICT--PEA-VINE AND FIRE-WEED HIGHER THAN HORSE'S BACK.



PRAIRIE--NORTH OF NECHACO RIVER--NEAR STONY CREEK CROSSING.

Otter Creek.

Beyond the operations of four or five men prospecting a group of leases near its mouth, nothing was done on this creek during the summer, but Mr. Carmichael is on it this winter preparing for extensive operations next season on the group of leases on Upper Otter held by himself and partners, which have recently been reconveyed to them by the Otter Hydraulic Company, which failed to perform its part under the bond held on the properties.

O'Donnel River.

On this river a large number of leases had been located in 1902, 1903 and 1904, upon many of which no work whatever was done. These leases, together with those on Bull creek, a tributary of O'Donnel, were bounded last fall (1904) to Mr. O. B. Perry, of San Francisco, a condition of the bond requiring him to prospect the properties this season. For this purpose he had a boiler and pump taken over there early in the season, and proceeded to prospect a section of the property by sinking small shafts. Of these he sank eight (I believe) within a comparatively small area, and at a depth of about 26 feet struck a layer of very adhesive clay, and concluding that the dredges which he contemplated installing there would not work satisfactorily through such material, he abandoned the whole proposition without once going to bed-rock. There were about 60 lease applications covered by the bonds which he held, and as leases had not been issued for all of these, they were abandoned by the applicants and declared void, with the exception of three on Bull creek and three on O'Donnel, where good prospects had been found and where a gang of men is prospecting this winter. This was very disappointing, as it is believed that there is a large area of auriferous ground in that valley that will repay investigation and prospecting.

On Graham creek nothing was done beyond a little prospecting.

Volcanic Creek.

This creek, which lies about 20 miles to the north of Atlin, was located from the head to the mouth in 1901 and abandoned. In 1904 it was located in lease form, but the impression having gone abroad that it was good enough for individual operation and would be so operated if thrown open, the lease applications were refused and subsequently practically the whole creek was located in 250-foot claims. The locators soon discovered that the ground was deep, and so united to sink to bed-rock. A shaft was sunk 45 feet, when the flow of water became more than ordinary pumps would handle, so they closed down for the season without having reached bed-rock, but not before very encouraging prospects were obtained. The claim-owners are very sanguine that the ground will prove as rich as Boulder or Ruby, and are arranging for the introduction of a steam pumping and hoisting plant. It is estimated that about $6,000 was expended in the prospecting already done by these parties, without any return so far.

Prospecting parties have from time to time visited outlying creeks, but while the reports brought in have been such as to lead us to expect the discovery of new diggings at any time, I have nothing of that nature to report as yet.

Barring the shortage of water, the season was very favourable for mining, the fall and winter thus far particularly so, open "sluicing" having been carried on successfully, more or less, on all the creeks. Those operators whose situation enables them to reach the stream channel can, in most cases, sluice all winter.

Notwithstanding the reduced number of men engaged in mining, I confidently believe that, but for the unfortunate scarcity of water, the output of gold would have equalled and perhaps exceeded that of last year; but, while the capitalists who are able to afford the initial expense of conserving and conveying water, may practically obtain all they require, it

appears to be beyond the means of the smaller operators in this district. A *bona fide* effort is being made to conserve the waters of Surprise lake, which, I hope, will be successful before another season has passed, for a dam built at the foot of that lake would conserve, each winter, at least 500,000 miner's inches of water for the next season's operations, that at present is absolutely lost.

The same difficulty as in former years has been experienced in obtaining correct returns of the amount of gold produced, and it does not seem possible to obtain anything like full and proper returns unless drastic means are employed. I have reason to believe that fully $100,000 more than the amount reported has been won from the ground during the year. This, of course, does not represent a corresponding loss of revenue, as a large percentage of it is made up of the amounts produced by small concerns where the total production was under $2,000.

MINERAL CLAIMS.

Still another year has rolled around without much evidence of development in quartz properties beyond the assessment work necessary to keep the claims in good standing. On account of the small number of miners in the district, the placer diggings still continue to overshadow the attractions of quartz mining. The activity and values shown in properties now being developed near Windy Arm, in the northern part of the district (a detailed report of which appeared in the bulletin recently issued by the Bureau of Mines), has led to the location of what appear to be very promising properties nearer Atlin, and in such direction as would seem to indicate that the same mineralised belt passes eastward toward Atlin town.

Some interest is shown in the quartz deposits in and about *Rainy Hollow*, in the Chilkat Division of this district, and all reports from there agree in describing them as of very promising appearance. There were 29 locations recorded from there last year, upon which apparently 24 certificates of work have been recorded this year, so that 40 locations recorded there this year would indicate increased activity there also.

OFFICE STATISTICS—ATLIN MINING DIVISION.

Records issued, 133, representing	133 claims.
Re-records issued, 443, representing	449 "
Bills of sale recorded (placer)	201
Grouping permits issued	33
Abandonments filed	12 "
Leaves of absence granted 184, representing	372
Free miner's certificates issued (individual)	705
" " (individual, special)	3
Free miner's certificates issued (companies)	10
" " (companies, special)	1
Mineral records issued (Atlin, 61; Bennett, 51; Wells, 40)	152
Certificates of work issued (Atlin, 110; Bennett, 22; Wells, 24)	156
Notices filed under "Mineral Act" (Atlin, 8; Wells, 2)	10
Bills of sale recorded under "Mineral Act"	52
Bills of sale recorded (hydraulic)	165
Permits to move stakes issued	7
Applications for mining leases declared void, etc	145
" " " declined	7
" " " withdrawn	3
Hydraulic leases cancelled	32
Hydraulic leases applied for	37
Hydraulic leased issued	40
Water records applied for	4
Water records issued	4
Water records abandoned	*Nil*

OFFICE STATISTICS—ATLIN MINING DIVISION.—*Concluded.*

Water records cancelled	2
Water records in force	66
Bed-rock flume grants issued 1, in force	1
Bed-rock drains licence issued 1, in force	1

Revenue Collected.

Free miners' certificates, individual		$ 3,499 25
" " companies		1,200 00
Mining receipts, lease rentals		8,895 00
" " lease deposits		740 00
" " water records		2,233 25
" " bed-rock flumes and drains		425 00
" " other sources		5,556 70
Leaves of absence		940 00
Royalty on mines and minerals	$5,177.55	
Less amount refunded	40.00	5,137 55
Revenue collected, other than mining		10,423 66
Total revenue of Atlin office for the year 1905		$39,050 41

GOLD RECOVERED—ATLIN DISTRICT, 1905.

Name of Creek.	Individual Miners.			Companies.		
	Ounces.	Value.	Royalty.	Ounces.	Value.	Royalty.
Pine Creek	1,210	$ 19,320 50	$ 95 85	4,684	$ 72,604 30	$1,252 10
Birch Creek	.....	.....	.....	199	3,143 80	22 85
Boulder Creek	1,742	27,008 00	137 55	6,833	105,907 00	2,078 15
Wright Creek	250	3,872 00	1 35	.....	.....	.....
Spruce Creek	5,943	95,086 00	1,114 95	248	3,962 00	39 25
McKee Creek	348	5,575 00	35 50	1,375	22,000 00	400 00
	9,493	$150,861 50	$1,385 20	13,339	$207,617 10	$3,792 35

Summary.

	Ounces.	Value.	Royalty.
Individual Miners	9,493	$150,861 50	$1,385 20
Companies	13,339	207,617 10	3,792 35
	22,832	$358,478 60	$5,177 55

NORTHERN PORTION OF CASSIAR DISTRICT.

(Including the Teslin*, Liard and Stikine Mining Divisions.)

REPORT OF JAMES PORTER, GOLD COMMISSIONER.

I beg to submit my annual report upon the mining in progress in the Northern Cassiar District, which includes the Teslin, Liard and Stikine Mining Divisions.

I regret to say that my expectations for the season of 1905 have not been realised. The actual yield of gold for this past season has been regrettably small, and, on the whole, appearances are not encouraging.

Berry Ck. M. Co.

In my last report reference was made to the Berry Creek Mining Co., Ltd., on Thibert creek, on the success of whose operations the immediate future of this camp largely depends, and I regret to say that definite results were not obtained this season, owing to obstacles which enterprises of this kind too often meet with when operating in a district so remote from civilisation, and to other causes, not the least of which was the almost unprecedented shortage of water supply, caused by a very light snowfall last winter and a very dry spring. To make matters worse, a cave occurred at the mine which buried a great part of the workings and plant, just at the time when washing should have been in progress. All damages have, however, been repaired and everything is in first-class shape for a good run next season, when, I am confident, satisfactory returns will be obtained. The Company moved its saw-mill to the shore of Dease lake, where lumber has been cut this fall for use next season, and will be delivered when required during the winter by dog teams. The ditch undertaking mentioned in last year's report has been almost completed, so far as the earth and rock work is concerned, leaving little construction work, other than the wooden flume, to be done next spring. The completion of this new ditch line will, it is hoped, insure to the Company a water supply sufficient to run the mine even in an unusually dry season.

NOTE BY PROVINCIAL MINERALOGIST.—Through the courtesy of Mr. Alex. Hamfield, the manager of the Berry Creek Company, the following extracts from his official report to his directors are given :—

In February, 1905, the foreman and three men went from Victoria to the mine, over the ice, and as seven men had wintered at the mine, there were ten or eleven men on the ground before spring, who were supposed to have the plant in running order when the main force of men—some 25 additional—arrived on the 8th June. It was found, however, that this advance party had not accomplished the work laid out for it, so that it was July 4th before the water could be turned on to the "giants" in earnest.

"On July 10th," after only a week's run, "the water supply became so short that it was found necessary to close down the mine to one shift a day, and even then it was not always possible to run the mine the full twelve hours. The supply of water was this year extremely short, certainly the worst I have seen in seven years. Old residents declare it to have been the driest year they have known in the thirty years the country has been opened up. Hardly

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*NOTE.—By an Order in Council, approved on 26th January, 1906, the present Teslin Mining Division, of which the Record Office is at Telegraph Creek, will, as from the first day of May, 1906, cease to exist as a separate Mining Division, and the territory now included therein will after that date become merged and included in the Atlin Mining Division, of which the Recording Office and the office of the Gold Commissioner are at the town of Atlin. Mr. James Porter, Gold Commissioner at Telegraph Creek, will, however, after that date act as Deputy Mining Recorder for that portion of the Atlin Division formerly included in and known as the Teslin Mining Division, and with him may be made, as formerly, any records as from the territory in question.

a drop of rain fell in the months of May, June and July, and the snowfall also during the preceding winter was extremely light. A repetition of this shortage will be prevented another year by using the new water supply from the Dease creek ditches. Below is shown the time run in the different pits:—

"No. 1, 5 days; No. 2, 29 days; No. 3, 10 days; No. 4, 5 days; No. 5, 2 days—Total, 51 days.

"It will be seen from this that, out of 150 possible working days, washing could be carried on for 51 only, owing to shortage of water.

"On July 26th a cave, by far the largest we have had, occurred in No. 2 pit, extending up-stream into No. 1 and down-stream into No. 3 pit."

This cave, besides blocking up the pits, broke some of the pipe-line, causing a loss of 13 days' time for repairs, and prevented a proper "clean up" of gold from bed-rock. While the "cave" was most unfortunate as regards this year's output, it will eventually come out all right, as it is, of course, necessary to cause caves, so as to get the gravel down and in the best position for washing, and there is now laid out sufficient bottom and middle gravel to last at least a couple of seasons' washing.

With all this, the actual cost of washing gravel was more than paid for by the gold recovered, although this was comparatively small and did not by any means pay general expenses this year, as could hardly be expected under the circumstances.

The new ditch-line to bring in a supply of water from Dease creek takes the water from one tributary over a low divide and drops it into a second tributary, and from a point some distance farther down this second tributary the water from both tributaries is taken over another divide and run into the headwaters of Berry creek, where, from a lake some 10 miles farther down, the old ditch-line takes the water. This ditch-line, it is estimated, will now give a constant flow of 1,000 miner's inches a day (about 15,000,000 gallons).

Of these ditches Mr. Hamfield says:—

"The ditch from the first tributary of Dease creek is 2,900 feet long, with an average grade of 26 feet to the mile, and will carry about 600 miner's inches of water. The ditch from the second tributary of Dease creek is 10,000 feet long, with grades of from 15 to 26 feet to the mile, and will carry 600 miner's inches of water."

The first ditch is completed, and of the second some "8,700 feet are already dug, leaving only about 400 feet of digging and 900 feet of fluming at the head of the ditch to be finished next summer," the lumber for which flume has been cut and contracted to be delivered on the ground this winter. The cost of these ditches will somewhat exceed $5,500.

In addition to operating the mine, the following work was done last summer:—

"The new plant is finished and in operation. No. 1 pit has been opened up; new buildings have been erected at the mine; experiments for saving platinum have been made; the flume has been re-levelled; two new ditches from Dease creek nearly completed; the saw-mill moved and erected and lumber sawed; and certain improvements made to trails and bridges."

The gross expenditure this past season was in the neighbourhood of $32,000.

With regard to the saving of the metals of the platinum group, which have been long known to occur with the gold in these deposits, Mr. Hamfield says:—

"Experiments were made to concentrate the black sands containing minerals belonging to the platinum group. For this purpose an under-current, and a series of tables covered with cocoa matting, canvas and burlap, were installed at the end of No. 2 sluice."

Although it was this year largely experimental, the mechanical concentration was quite satisfactory, During the 21 days that the concentrating plant was in operation it yielded 250 pounds of concentrates, and this amount could have been greatly increased by a man in attendance with some experience in concentration.

"Assays of these concentrates, made at the British Columbia Government Assay Office, gave 60 ounces of platinum to the ton of concentrates, and assays obtained in San Francisco gave up to 15 ounces of platinum and 7 ounces in gold per ton. These results were obtained almost entirely from top gravel, and as the bottom gravels will naturally contain more of the heavier minerals, the concentrates from the latter should be very much better than this year's output."

Rosella.

The Rosella Hydraulic Mining and Development Co., of Rosella creek, was busy the entire summer installing a hydraulic plant which was not completed in time to permit of any piping.

Seattle Pros. and Dev. Co.

During the season of 1904 the Seattle Prospecting and Development Company secured some hydraulic and creek leases on McDame creek. During this past season the company sent in a force of men with dredging machinery, which, however, it was unable to get on to the leases, only reaching a point on McDame creek a few miles above its confluence with the Dease river and being unable to proceed farther, as there was not water enough in the creek this year to float the scow on which the machinery was being transported. A small portable saw-mill was, however, set up and lumber cut for next season's use. The machinery will be forwarded to its destination next spring.

CLEARWATER RIVER.

The placer finds on the Clearwater, which I noted in my last report, have not, I am sorry to say, met the expectations of those interested. A strong force of men began operations early in the season, working by hand methods, and at first with good results, but the "pay-streak" running into deeper ground the force was discharged. I understand it is the intention of the company to install machinery on the ground next year. The claim is on the first north fork of the Clearwater, some 12 miles up from the Stikine, and distant from Telegraph creek in a westerly direction some 35 miles.

TESLIN MINING DIVISION.*

Consolation creek, in the extreme northern part of the Teslin Division, which last year attracted some attention, has apparently not turned out as well as expected. Last spring several of the holders of claims there represented that the ground could be worked to better advantage in winter than in summer, so "lay-overs" were granted for the open season and it is hoped something worth while will be found there this winter.

Lincoln creek is a new creek, from a mining standpoint, which flows into Gladys lake some distance to the eastward of Consolation creek, and has its source considerably to the south of that of Consolation creek. A "discovery" and several other claims were staked and recorded on this creek during the past summer, but, owing to the remoteness of the district, I know very little at present concerning the locality.

QUARTZ MINING.

There has been less attention given to mineral prospecting this past year than in any in the history of the district, and only the usual assessment work has been done on the claims held.

* See foot-note, page 76.

The output of gold of the district for the year may be placed at about $16,000, exclusive of the extreme northern or extreme southern portions, from which I have no returns.

Office Statistics—Northern Cassiar District.

Revenue collected for free miners' certificates issued.....		$ 384 75
"	from general mining receipts.....	2,192 00
		$2,576 75
"	from other sources	2,164 49
		$4,741 24

SKEENA MINING DIVISION.

Report by John Flewin, Gold Commissioner.

I have the honour to submit herewith my annual report on the condition of the mining industry in Skeena Division for the past year.

The past season has been marked by new discoveries, notably on the Telkwa and Copper rivers and on Portland canal. In the development of the former camps, transportation problems will retard matters for the present. On Portland canal, however, no such difficulty exists, for most of the discoveries are within a short distance of salt water, and the canal offers perfect anchorage and is navigable in all weathers.

Portland Canal.

American Girl.

C. B. Bussell, of Seattle, Wash., who took a bond a year ago on the *American Girl Group* of mineral claims, expended $6,000 upon the property during the summer, suspending operations in September last. Forty feet of tunnel was driven on the *American Girl* claim with a 30-foot cross-cut to test the ore body. It is said that a large body of ore was encountered, carrying good values in gold and silver.

On the *Silver Lake Group*, owned by Messrs. Harris and Rearick, some stripping and cross-cutting was done, but the most of the season was spent in cutting out a trail, some 10 miles long, from the mouth of Salmon river.

J. Wardlaw Stewart and partners did considerable work on the *May Bee* and *Louise* claims, which lie about one and a quarter miles from the *American Girl* on American creek. A trail was slashed and graded and the ledge stripped and prospected in a number of places, four open cuts 20 feet long having been run. The ore on all these properties is similar, being a high-grade silver and copper ore.

Dan. and Andrew Lindeborg have done the following work on their claims on the divide between American creek and Salmon river:—

Rambler.—One open cut 16 feet long, 9 feet deep and 3 to 8 feet wide.

Buena Vista.—One open cut 10 feet long, 4 feet wide and 8 feet face.

Bonus.—One open cut 16 feet long, 4 to 6 feet wide and 6 feet deep. In addition to this, they have slashed and cleared a lot of trail, and are now wintering at Bear river, where they have built a house, intending to resume work early in the year.

On the *Ruby* and *Morning Star* claims, owned by Messrs. Noble and Collison, the following work has been performed:—One prospect tunnel 15 feet long; one open cut 15 feet long; one open cut 8 feet long; one open cut 20 feet long; one open cut 20 feet long. There are two well-defined ledges on these claims.

Jas. Lydden and J. L. Ensch recorded three claims on American creek in May, and have since done the following work on them :—

Stop and Rest claim.—One tunnel 10 feet long; two open cuts 7 feet long.

Sunshine.—One and a half miles of trail, bridge across canyon of American creek, and some stripping on the ledge.

Ketchum.—Twenty feet of tunnel.

On Glacier creek, where there was quite an excitement in July on account of the discoveries by a prospector named Ike Thompson, the following work was recorded :—

Homestake Group, owned by M. K. Rodgers and J. E. Stark.—One tunnel 17 feet long; two open cuts, each 12 feet long, in rock and gravel; one open cut 6 feet long.

Northern Bell Group, same owners.—One open cut 15 feet long; one open cut 7 feet long, in rock; one tunnel 13 feet long and ledge stripped 20 feet long.

1038 063 *Silver Bow Group*, same owners.—One open cut 30 feet long; one open cut 35 feet long; one open cut, in solid rock, 10 feet long.

Roosevelt Group, G. Chambers owner, 25 feet of tunnel.

Following the location of the *Hattie*, *Maud* and *June* on Glacier creek in the beginning of July, a number of prospectors flocked to the creek and in a short time the *Columbia*, *Lucky Seven*, *Little Joe*, *Copper King*, *Sunbeam*, *Invincible*, *Glittering Blade*, *Silver Cup*, *Olga*, *Danube* and others, were recorded by different parties. The work done on some of these locations has shown evidence of the presence of high-grade galena ledges, but of what extent remains to be proven. On the *Columbia* the following work was recorded by Messrs. Rush and Bagg :—One and a half miles of trail built; one open cut on ledge 5 feet, and some stripping on ledge done.

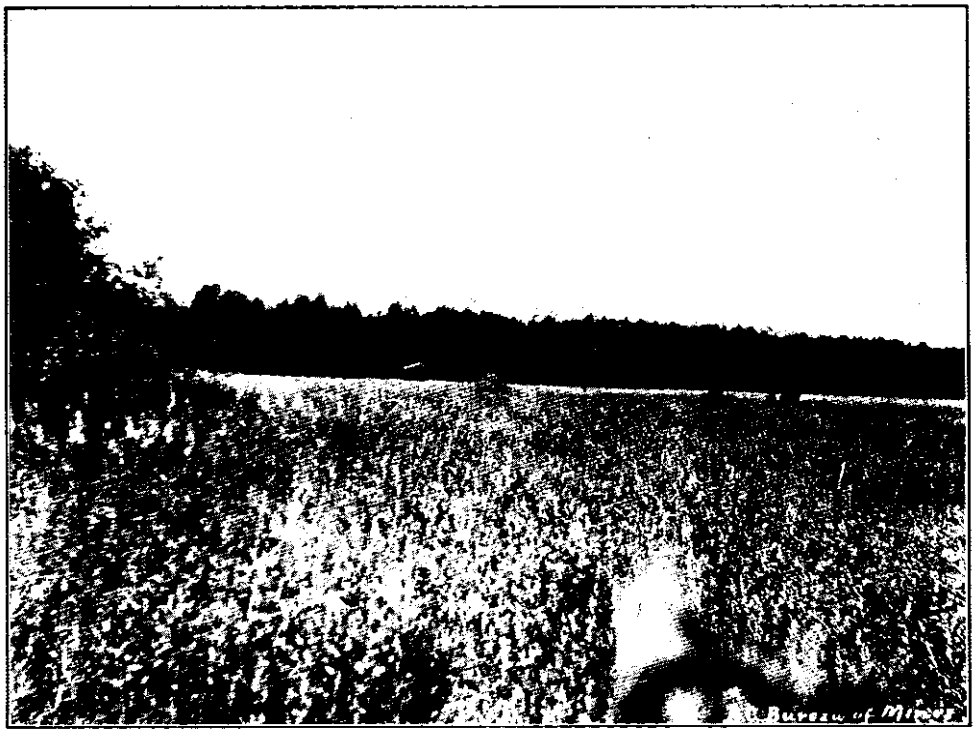
A discovery of cube galena and zinc blende was also made at Georgia creek, which flows into the Canal at Blue point, twenty miles from the head. Messrs. Stark and W. Flewin here located the *Black Prince Group*, a showing of six feet of ore, four feet being galena and two feet zinc blende.

Maple bay, half-way up Portland canal, shows the greatest signs of activity of any of the Northern coast camps. Early in September Messrs. Collison, W. Noble and W. R. Flewin bonded the *Copper King Group*, situated at this point, to the Brown-Alaska Smelting Co., of Hadley, Prince of Wales island, with a shipping privilege for five years on a royalty basis of 49 % of the net smelter returns, with an eighteen months' option of purchase. The company immediately commenced operations on a large scale. It has built houses for the men, driven several prospect tunnels to prove the ledge, and is now engaged in running an upper and a lower tunnel, intending to drive an upraise from the lower to the upper. One of these tunnels is in 60 feet and has already tapped the ledge, which shows a splendid body of ore, the values being considerably higher than the surface showings, which averaged 4 % copper for a distance of 3,000 feet. Mr. A. R. Barrow, C. E., is engaged surveying for the aerial tramways, of which there will be three. The contract is also let for the piles and wharf lumber.

Shortly after the bonding of the *Copper King Group*, the same owners bonded the *Blue Bell*, situated at the south end of the same mountain, to the same company. Work has just been commenced on this property, which is said to be on the same ledge as the *Copper King*.

OBSERVATORY INLET.

No further work has been done on the *Bonanza* and *Hidden Creek Groups* in this camp, although recently the owners granted a 90 days' option on the same to a company represented in Vancouver.



PRAIRIE–PLEASANT VALLEY, UPPER BULKLEY VALLEY.

CABIN–SILVERTHORNE'S RANCHE, PLEASANT VALLEY, UPPER BULKLEY.

On the *Aldebaran* and *Black Bear* mineral claims, Frank Roundy has recorded the following work:—Blasted one open cut on face of cliff 20 feet long; stripped and uncovered the ledge 98 feet, exposing a large body of copper-silver ore; run an open cut in loose earth and rock 20 feet long and 12 feet wide; run one rock cut 14 feet long; stripped loose rock and earth off vein a distance of 30 feet on north side of Black Bear gulch. The ledge is a mile and a quarter from the beach.

Two new locations were made about six miles from this property in November by two prospectors, the ledge showing silver glance and copper sulphide, but owing to the lateness of the season no work was done on them.

UNUK RIVER.

In this camp the Unuk River Mining, Smelting and Transportation Co. have completed the waggon road to a point six miles east of the new boundary line between Alaska and British Columbia, the monument being about 21 miles from the salt water terminal of the road, and have things in good shape to finish the work during the coming summer, thereby enabling them to get supplies into the property and to commence shipping. The company has expended to date about $100,000 in this camp. It has recently staked five miles of the Unuk river for a dredging lease and made application to the Gold Commissioner for a lease of the same. It is the intention, if the lease is granted, to put in a complete up-to-date dredging plant next year.

Some good-looking quartz claims have been staked on the tributaries of the Unuk river by Messrs. Bucke, McKenzie and Divelbiss, the assays showing free gold. A large amount of work has been done around Canyon creek, but no assessment work has been yet recorded, although a number of good trails have been built and one tunnel of 30 feet has been driven. The ore here is a galena and easy to operate and develop. The chief claims are owned by Messrs. Rowlee and Estep, who have done a lot of cross-cutting and trail building. The prospects are very bright for this developing into a good camp in a year or two. The waggon road has been completed through the coast granite into the mineral belt, which extends indefinitely back of and parallel to the Coast range.

Locations have also been made by Messrs. Albert Berhalter, J. Lyons, J. W. Daily and Homer F. Daily on Sulphate creek and Glacier creek, in both instances on large bodies of steel galena.

QUEEN CHARLOTTE ISLANDS.

Very little work has been done on the islands during the year, although there has been quite an excitement on Graham island on two occasions. A number of claims have been staked for parties represented by Messrs. C. Harrison, of Masset; Dr. E. S. Rowe, of Victoria; and Frank Vandale, of Port Simpson. It is the intention of the parties interested to place a diamond drilling outfit on the ground early in the spring, in order to ascertain what the find really amounts to.

Some parties are prospecting for coal on Moresby island, but no locations have been made, although I am informed that a find has just been made on the east coast of that island.

On the *Mildred* mineral claim, situated on Copper bay, Capt. C. R. Sheldon has stripped the ledge 300 feet, built a blacksmith shop and a house 12 x 18 feet, and started a shaft on the ledge.

On the *Golden Gate* claim, Abraham Heino has sunk his shaft a further distance of 15 feet, while on the *Skincuttle Entrance* claim he has driven his tunnel 20 feet further.

PRINCESS ROYAL ISLAND.

The *Princess Royal Group* has been steadily working during the season, with very encouraging results, a number of shipments of ore having been made, giving good returns. A new company has been formed in London, England, with a capital of £500,000 sterling, to

take over this property and some adjoining ones. It is the intention to utilise the waterfalls from Cougar lake to generate power for an electric power and lighting plant, in order more economically to handle the ore, which in the past has had to be handled a number of times, both by pack-train and boat, in order to get it to salt water.

On the *Homestake Group*, Messrs. Howden and Nowell have recorded assessment work and intend shortly to Crown grant their property.

Geo. A. Kelly has sunk a shaft 20 feet on the *Bay View Group*.

Statutory assessment work was performed on the *Cassie* mineral claim by E. A. Cleveland, P. L. S.

On the *War Eagle Group*, Byron McConkey sank a shaft 25 feet at a cost of $750.

Assessment work was also recorded on the *Independence Fraction*, *Nora*, *Thistle* and *Rose*.

On Pitt island assessment work was done on the *Standard* and *Reindeer* claims. In addition to this, assessment on four claims was paid in cash in lieu of work. These claims are owned by a company which is represented by Mr. E. G. Russell, of Victoria, and contain a large body of magnetite iron ore.

GRIBBELL ISLAND.*

On this island statutory assessment work was recorded on the properties of the Canadian American Mining Co., of Bellingham, and also by the Gribbell Island Copper Co.

KITIMAT ARM.

On the *Golden Crown Group* the following work was recorded by Messrs. Steele and Dunn:—One drift 12 feet long, in solid quartz, and a large number of open cuts.

Lindeborg Bros. have recorded the following work:—*Bimetallic*, *Bullion*, *Independence* and *Terminus*; built three miles of trail and ran tunnel 18 feet.

KITSILAS CANYON.

In this camp statutory work was performed upon the *Golden Crown*, *Lucky Jim*, *Ruby*, *Granite*, *Noble Five*, *Great West*, *Northland* and *Elsie* mineral claims.

LORNE CREEK.

The Dry Hill Hydraulic Mining Co. has had, on an average, 15 men employed on its property all season. For various reasons the clean-up was not as satisfactory as anticipated, the total amount being $12,800, while the working expenses were $20,000. Shortage of water during the summer hampered operations, while later the accidental cave-in of a large bank of boulders and gravel, which caused the death of J. D. Jefferson, of London, England, one of the company's employees, blocked the flume and delayed operations for some time. The company anticipate a good clean-up the coming season, as the property is in better condition than ever before for economical working.

The Lorne Creek Hydraulic Company had also made preparations to do considerable work on the *Ibex* and *Nanette* claims, but owing to the unfortunate death by drowning of their manager, Mr. John P. Fults, Jr., in the latter part of June, with seven others, at Oliver's Riffle on the Skeena river, a short distance below the mouth of Lorne creek, little or nothing was accomplished.

TELKWA RIVER.

There was a large influx of prospectors to this camp during the season and a great number of locations were made, but as yet insufficient work has been done to prove what the camp may amount to, although the indications are that there will be a very extensive area with high grade ore opened up here. The following work has been recorded in the camp for the year:—

* Attention is also directed to an article on Gribbell island written by Mr. W. M. Brewer, which follows this report on page 85.

Copper King, Wm. Hunter owner.—One open cut 16 feet long, 10 feet wide and 10 feet deep.

Copper Queen, same owner.—One open cut 16 feet long, 12 feet wide and 10 feet deep.

Princess of Copper, same owner.—One open cut 15 feet long, 10 feet wide and 12 feet face.

Rainbow, same owner.—One open cut 30 feet long, 6 feet deep and 8 feet wide; one 4 by 6 foot shaft, 10 feet deep.

Prince, same owner.—Trail work from cabin to mine, one mile.

Waresco, same owner.—One open cut 10 feet long and 8 feet wide; also one-quarter mile of trail.

King, same owner.—One shaft 17 feet deep. P. R. White has run one open cut on the *Sunrise* mineral claim, 12 feet long, 10 feet wide, and 4 to 9 feet face; run two cross-cuts, each 10 feet long, 3 feet wide and 4 feet deep.

For Mr. E. G. Russell and associates, Wm. McCullogh has recorded work as follows:—

Sundown.—One open cut 24 feet long and 5 feet deep; one open cut 14 feet long and 5 feet deep.

Lucky Jim.—One cross-cut 15 feet long, 10 feet wide and 10 feet face; one cut 8 feet long, 5 feet wide and 5 feet deep in solid rock.

Nob Hill.—Trail from Hunter basin, and one open cut 20 feet long and 5 feet wide; also did some stripping on ledge.

Gold Hill.—One cross-cut 20 feet long and 5 feet face in solid rock; also one and one-half miles of trail.

Sunset.—One cross cut 15 feet long and 5 feet face; three open cuts, each 5 feet by 5 feet in solid rock.

Prince of Copper.—One open cut 30 feet long, 10 feet wide and 5 feet high in solid rock.

Harry Howson, for himself and W. D. Lukeas, of Chicago, has recorded the following work:—

Granville.—One open cut 16 feet long, 12 feet wide and 10 feet deep in solid rock.

Virginian Queen.—One open cut 16 feet long, 10 feet wide and 12 feet deep in earth and rock.

Kamloops.—One open cut 30 feet long, 5 feet deep and 10 feet wide in solid rock.

Morning.—One open cut 12 feet long, 10 feet wide and 12 feet face in solid rock.

Evening.—One open cut 10 feet long, 10 feet wide and 8 feet face in solid rock.

W. J. Carr has done the following work on his claims:—

Cumberland, near the *Hunter Group*.—One open cut 20 feet long, 6 feet wide and 2 to 6 feet deep.

Wonder.—One open cut 10 feet long, 6 feet wide and 6 feet face in solid rock.

Cracker Jack.—One open cut 10 feet long, 6 feet wide and 6 feet face in solid rock.

Russell.—One open cut 6 feet long, 6 feet wide and 4 to 8 feet face; one open cut 4 feet deep and 12 feet long; one open cut 6 feet long, 5 feet wide and 5 feet face.

On the pioneer location in this camp, owned by Messrs. R. E. Loring, W. B. Forrest and Hankin Bros., H. C. Hankin has recorded the following work:—

Forrest Group.—Ten feet of tunnel and four open cuts 20 feet long, 6 feet wide and 8 feet face.

Tremont Group, same owners.—Eight feet of timbered tunnel on one lead and 7 feet of timbered tunnel on the second lead on the *Belmont* claim; also one mile of trail work.

Lake View Group.—A new location made by the same owners on the headwaters of Copper river last summer. The following work has been recorded:—One mile trail work; one open cut 15 feet long and 5 feet wide; one open cut 15 feet long, 5 feet wide and 6 feet face; one shaft 10 feet deep, and one open cut 15 feet long and 5 feet wide.

Highland Chief, Thos. E. Hankin, owner.—One open cut 15 feet long, 6 feet wide and 8 feet face.

May Flower, Margaret Loring, owner.—One open cut 20 feet long and 5 feet wide.

Grizzly, E. C. Stephenson, owner.—Open cut 20 feet long and 5 feet wide.

Enterprise, Fred. A. Hankin, owner.—One open cut 20 feet long, 5 feet wide and 8 feet face.

Blue Bell, same owner.—One open cut 20 feet long and 5 feet wide.

Idaho, H. P. Taylor, of Salt Lake City, owner.—One shaft 24 feet.

Mohawk, F. M. Dockerill, owner.—One open cut 9 feet long, 7 feet wide and 8 feet face; one open cut 8 feet long, 4 feet wide and 4 feet deep in solid rock.

Cottonwood, *San Diego* and *Henderson Fraction*, John C. Boyd, owner.—One open cut 33 feet long; one cut into bank 18 feet long and 8 feet deep; one open cut 18 feet 6 inches long, 4 feet 6 inches wide and 18 inches deep.

Copper Queen, situated on Mount Charleson, C. G. Harvey, owner.—One cut 12 feet long, 5 feet wide and 10 feet face; one cut 13 feet long, 8 feet wide and 6 feet face; one cut 15 feet long, 8 feet wide and 15 feet face in solid rock, and five miles of trail cut.

Vancouver, owned by Messrs. D'Arcy Macdonald and W. N. Clarke.—One open cut 15 feet long, 4 feet wide and 5 feet face in solid rock; one cross-cut 4 feet long and 2 feet deep.

On the *Coronado Group* on Copper river, owned by Messrs. Pearl R. Fleming and J. F. Halley, the following work was recorded:—One shaft 13 feet deep and 4 by 8 feet wide; one open cut 15 feet long, 8 feet wide and 6 feet face; built ore bin 15 feet long, 10 feet wide and 4 feet deep. A 4-ton shipment of ore was made from this property to the smelter, having been packed out by Barret's pack-train to Hazelton, thence by S.S. "Mount Royal" down the Skeena to Port Essington to connect with the S.S. "Tees" for the south. This property is now under bond to Mr. Jas. Dunsmuir, who also holds an option on the claims owned by Messrs. E. G. Russell and Wm. McCullogh.

Strikes of good ore were also made on the Morice river and Driftwood creek; also on the divide between the Telkwa and Morice rivers by J. E. Stark, who penetrated west almost to the headwaters of the Kitimat. He located a ledge but had no time to do any work on it.

The following are the office statistics for the year:—

Free miners' certificates	423
Mining claims recorded	338
Certificates of work	194
Affidavits	36
Bills of sale	39
Certificates of improvements	1

Revenue.

Free miners' certificates	$1,723 25
Mining receipts, general	2,492 95
Total	$4,216 20

GRIBBELL ISLAND.

The following article has been kindly contributed by Mr. W. M. Brewer, now connected with the Tyee Copper Co., who has had occasion to visit the island two or three times this past season:—

"Near the southern entrance to Granville channel, about 400 miles north-westerly from Victoria, is located a group of islands, the largest of the group being Princess Royal. Immediately to the north of the northerly end of this island, and separated from it by a narrow channel, lies Gribbell island, comprising an area of some 50 square miles.

"This island has received more attention from prospectors during the past seven or eight years than any other one of the group, excepting Princess Royal. Syndicates composed of residents of Bellingham, in the State of Washington, have been operating on Gribbell island on two groups of mineral claims since 1899, and a total of about $60,000 has been expended up to the present time for development work by the two companies. One of these is designated as the Canadian-American Copper Mining Co., and the other as the Gribbell Island Copper Company.

"Geology.

"The island may be considered as one enormous mountain, the summit of which reaches an elevation of some 4,000 feet above the sea. The evidences of glaciation are very pronounced, there being several exposures of bare rocks, covering areas of variable extent even to five or six acres, which show plainly the groovings and channellings produced by erosion, which invariably record the effects following the movements of the enormous glaciers which passed over this portion of the continent during the Ice Age. In this particular locality this work of erosion is still going on, for there is hardly a winter during which snow and ice slides of great extent do not occur on these bare mountain sides.

"Except on these spots, however, the island is heavily timbered with cedar, spruce, hemlock, and some Douglas fir. The underbrush, which is principally devil's club and sallal, is practically impenetrable, while the fallen timber and precipitous mountain sides render anything like thorough prospecting extremely difficult and hazardous.

"So well is this fact illustrated on the claims of the Gribbell Island Copper Company that the miners, when constructing trails from the beach to the workings, about 2,000 feet in elevation, built ladders by felling two trees side by side and nailing cleats across from one to the other. In this way the visitor to these claims finds himself climbing a series of ladders for about half a mile in distance by horizontal measurement and nearly 2,000 feet by vertical.

"The similarity of the geological formations on Gribbell island as compared with those on Texada island, nearly 400 miles to the south-east, or at White Horse, in the Yukon Territory, is very striking, especially with regard to the occurrence and character of the ore bodies, but the geology cannot be said to be exactly similar, for on Gribbell island the granitoid rocks, especially in the vicinity of the ore bodies, have a decided gneissic structure, which is certainly absent in the other two districts mentioned.

"Another feature of dissimilarity which is noticeable is the fact that, so far as at present exposed, the ore bodies, instead of occurring at the contact of crystalline limestone and igneous rocks, as is the case both at White Horse and on Texada island, occur between a gneissic granitoid rock on the footwall side, and a diorite on the hanging wall side; but with regard to the hanging wall this is merely a conjecture based from the conditions on the outcroppings and not from any underground exposures, because sufficient cross-cutting has not been done in any place to determine either the character of the permanent hanging wall or the width of the main ore body.

"A well-defined diorite dyke is noticeable on the beach at the landing place used by the Canadian-American Mining Co. This dyke, according to the most reliable information the writer could obtain, forms a prominent landmark through the island. Its average width is about 12 feet, and its line of strike about N. 20° E. On the easterly side of this dyke no occurrence of minerals has yet been discovered.

"The country rock on the westerly side of the diorite dyke referred to has always been classed as a granite, but a closer examination with an ordinary lens caused the writer to be of the opinion that this rock is composed of hornblende and feldspar, and should therefore be classed as syenite. A very noticeable feature connected with it is observed in a tunnel 600 feet in length, which has been driven for the purpose of intersecting the ore body which outcrops on the surface. This feature is the change of structure and grain of the rock from a coarse-grained with well-defined large crystals to a fine grain rock with gneissic structure, but so far as can be observed with an ordinary lens, composed of the same hornblende and feldspar, and apparently having no other minerals associated with these.

"CHARACTERISTICS OF ORE BODIES.

"The ore bodies, so far as they have been exposed by open cuts on the outcrop by tunnels, and by a shaft, are masses of considerable extent made up of crystals of variable size of bornite, shot through a matrix of garnetite and feldspar; the latter occurring in particularly large crystals of a pinkish colour. Much of the garnetite is made up of large sized garnets almost perfect in their crystallisation, and of such beauty as would make them treasured specimens in the cabinet of a mineralogist.

"There is one peculiarity with regard to the foot-wall of some of the ore bodies, which is that it resembles for about a foot in thickness a sandstone, and in this can be seen grains of chalcopyrite, but whether in sufficient quantity to give it any commercial value I should consider quite doubtful.

"From the greenish colour of much of the ledge matter, there is evidently considerable epidote associated with the other minerals which make up the matrix.

Canadian-American Co.

"Southerly from the point where the main outcrop on the Canadian-American Company's property has been exposed by open cut work, there occurs a steep bluff which has all the appearance of being a continuation of outcroppings capping an ore body, but no work has been done to establish this fact. The development work performed on this property consists of some open cuts made on the outcrop, a short tunnel situated about 30 or 40 feet below the outcrop, which was apparently started with the intention of cross-cutting the ore body, but instead of doing so, the tunnel was merely run until at the face about three feet of ore was exposed, when a shaft was started and sunk about 37 feet in ore. At that depth the water interfered with sinking to such an extent that, having no pump at hand, it was concluded by the management to drive a cross-cut tunnel, starting from a point on the mountain side about 200 feet lower elevation than the short tunnel referred to. At the time of the writer's visit this tunnel had been driven 600 feet, but had not yet intersected the ore body on which the shaft had been sunk, and is really a waste of money.

"About 425 feet from the mouth of the tunnel a lens of ore has been cross-cut and drifted on for about 30 feet. The ledge matter in this is made up of the same minerals as are found in the main ore body, that is to say, large crystals of calcspar, feldspar and garnets, also some epidote with masses and crystals of variable size and bornite occurring as impregnations, distributed with variable regularity through the matrix.

"The line of strike of this ore body is almost parallel to that which outcrops higher up the mountain, nearly due north, but the dip is at an angle of about 60 degrees towards the west, while the dip of the main ore body is about 65 degrees towards the east.

"From a survey made, it will be necessary to continue the long cross-cut tunnel for probably 100 feet, and also to turn its course northerly, in order to make an upraise connect with the shaft referred to, and to determine the conditions of the ore body below the bottom of that shaft.

"Judging from the extent of the outcrop, the fact that the shaft has been sunk 37 feet all in ore, and the continuity of the outcrop along the line of strike of the main ore body, it certainly appears as though this property, if development is continued on the proper lines, should, in the near future, be placed in a position to ship a considerable tonnage of ore. The tonnage, of course, would depend largely on the cost of transportation, and the necessity for more or less close sorting. Judging from the dumps which have already been accumulated, the writer is of the opinion that it will be found more profitable in the end to consider the ore bodies as low grade propositions, rather than to attempt close sorting to secure a high grade product.

Gribbell Island Mining Co.

"About two miles north-westerly from the property of the Canadian-American Mining Company is situated the property of the Gribbell Island Mining Company. This consists of a large group of claims located in a block. The work done consists of one tunnel 354 feet long, driven in granite along the line of a fault, and several shorter tunnels, shallow pits and open cuts. The surface outcroppings show indications of mineralisation to a considerable extent. In fact, there is apparently a fissured zone in the syenite country rock (locally called granite) filled with felsite, garnetite, epidote and sometimes limestone, through which is disseminated particles and masses of bornite and occasionally chalcopyrite. This fissured zone containing the mineralised material is picked up at intervals along a general north-westerly line of strike for a distance of about 3,000 feet. In this distance work has been done to a limited extent at six different points where this mineralised material outcrops, but nowhere has enough work been done to demonstrate sufficient facts to warrant any opinion other than that there is a possibility of the occurrence of an ore body.

"The long tunnel demonstrates nothing, and, in my opinion, should never have been driven, because the same amount of money and labour expended at some other point would have demonstrated the value of the property, especially if such had been done at a point about 1,500 feet to the north-west, and at some 500 feet higher elevation, where the outcrop shows greater mineralisation than elsewhere, and a typical sample assayed 1.79 copper, .19 oz. gold, and .70 oz. silver per ton.

"Shipping Facilities.

"There are but very few propositions located more advantageously, when the question of shipping is under consideration, than are those on Gribbell island. The mountain side, from the points where permanent workings would naturally be located at both the Canadian-American Company's property and also the Gribbell Island Company's property to a deep-water harbour, in a cove well sheltered, has quite a precipitous incline, rising about 800 feet in a distance of 2,600 feet to the former company's property, while the proposition owned by the last-mentioned company, although at a higher elevation, is not much farther distant from the shore line. At the present time connection between the landing at the beach and the property owned by the Canadian-American Company is made by a well-constructed 'tubbed' road, about three-quarters of a mile in length.

"TIMBER AND WATER SUPPLY.

"With regard to the supply of timber on Gribbell island, it is noticeable that the trees have a scrubby growth as compared with those farther down the coast, but the supply is ample for mining and fuel purposes. Cedar, hemlock, spruce and some fir are the varieties of timber noticeable on this and the adjacent islands.

"When the water supply is taken into consideration, the writer found that right there is a condition which, if properly utilised, will minimise the cost of mining, for the reason that a magnificent power can be developed from a stream which flows from a lake situated some 400 or 500 feet higher elevation than the outcroppings on the Canadian-American Company's property, and any machinery required for mining plant can be run by water-power instead of by steam."

HAY FIELDS, GOVERNMENT RANCHE, BULKLEY VALLEY.

PRAIRIE-PLEASANT VALLEY BULKLEY VALLEY.

THE NORTHERN INTERIOR PLATEAU

—:o:—

Lying between the Fraser and Skeena Rivers.

REPORT OF W. F. ROBERTSON, PROVINCIAL MINERALOGIST.

The general scheme of the topography of British Columbia consists of parallel mountain ranges running N.W. and S.E., with intervening valleys and waterways. Of these ranges, the Rocky Mountains, on the eastern boundary of the Province, and the Coast range, following the seaboard on the west, are the strongest and most persistent, but the altitude above sea-level of these ranges diminishes with northing and, as the general level of the intervening valleys and plateaux is higher in northern than in southern British Columbia, the height of the ranges above the surrounding country is thus still further diminished.

In the southern part of the Province, between these bounding ranges of mountains, we have intermediate and parallel ranges of less importance, although often quite as high, of which the most important, the East Kootenay, Selkirk and Gold ranges are distinctly defined mountain ranges. As these intermediate ranges proceed north they gradually diminish, until at about 53° north latitude they are replaced by rolling hills and plateaux.

This great northern plateau is the source and feeder of most of our larger rivers, the Fraser flowing south, the Peace to the Arctic ocean, and the Skeena to the northern Pacific; in fact, only in this comparatively level lake country do the streams have the opportunity of uniting and forming rivers of any great size.

In the southern part of the Province the mountain ranges, while admitting of railways and roads being easily built along the intervening valleys, viz.:—in a N.W. or S.E. direction, offer serious barriers to roads running east or west; a fact which has greatly retarded the development of that section. In this northern interior plateau no such obstacles exist, and roads may be run in any direction with easy grades, deflected only sufficiently to avoid the lakes which form such a large part of the country.

The course, therefore, which a railway may take across this part of the Province is regulated only by the portal through which it penetrates the eastern barrier, the Rockies, and that by which it goes out through the Coast range. Whatever route may eventually be selected for a railway across this portion of the Province must of necessity run very near several of the large lakes of the district, and as these lakes are all navigable, and often connected by navigable streams, this system of waterways will prove valuable as feeders to the railway, and will at the same time bring under the influence of railway transportation an area of country much larger than would be possible by a road unassisted by water communications.

The main summer trip of the Provincial Mineralogist in 1905 was through this northern interior plateau, and extended from the Fraser river at Quesnel, westward to the Skeena river at Hazelton. With the trail along the old "overland telegraph" route between these two points as a base, trips were made to the north and south, so covering a belt of country which seems to offer the best and probably the most direct route from the Rockies to the Coast range at the latitude of Port Simpson. It may, consequently, be assumed as probable that within this belt will be the eventual location of the Grand Trunk Pacific Railway.

At present this section of the Province is remote from all modes of cheap transportation, and, consequently, any substantial development, whether agricultural or mining, can not be expected; in fact, only the probability of an early relief from this state of isolation has given that encouragement necessary to induce prospecting in both these branches of industry.

In view of these facts, this trip, taken at the request of the Government, has of necessity been mainly exploratory, and in the absence of development, the facts noted serve only to suggest the possibilities of the section traversed, and may be said to have the same bearing on these possibilities as have surface croppings on the development of a mine.

This section of British Columbia is of the greatest historical interest, as it was that part of the Province, certainly of the mainland, first visited or explored by white men, for in 1793, Sir Alex. Mackenzie, a partner in the North-West Fur Co., made his way up the Peace river, and thence to the Fraser, and following up the Blackwater crossed a low divide and reached an arm of the Pacific ocean; a trip which he has described in his "Voyages through the Continent of North America," published in London in 1801.

Mackenzie's explorations were followed up by Simon Fraser, another partner of the company, who established, in 1805, a trading post at Fort McLeod, and another in 1806 at Fort St. James, on Stuart lake, the establishment of Fort George, at the junction of the Nechaco with the Fraser, following in 1807. The North-West Co. was afterwards absorbed by or amalgamated with the Hudson Bay Co., and these interior posts have continued to be since that date, and are to-day, the only centres of white civilisation in the district.

Until about 1860 the district was entirely in the hands of the fur trading companies, the very nature of whose business and whose monopoly thereof caused them to discourage all white settlement or even exploration. In 1860 the discovery of placer gold on the Fraser carried civilisation and exploration through to Cariboo and Quesnelmouth, and this being followed in a few years by the explorations for and the construction of the Collins Overland Telegraph Co.'s line, to a great extent opened up the whole district. The trail along the right-of-way of this, our first telegraph line, is even to day the chief thoroughfare through the district, and has had such a marked influence on this section of the country as to deserve special notice.

The "old Telegraph trail" stands to-day as a monument to one of the boldest, most enterprising, and promptly executed projects, until it was given up, of private origin, that this continent has witnessed, and yet here in British Columbia on the scene of its execution and in the country which has derived the most lasting benefits from its operations, its memory has become so obscured by the short period of 40 years that such data as have been obtainable regarding it have had to be gleaned from brief notices in a dozen books, written by aliens, or gathered from the recollections of the few "old timers" still alive, who happened to know of its history. Among these may be mentioned Mr. R. B. McMicking, now manager of the telephone system of Victoria, who was in 1866 the telegraph operator on the line at Quesnel.

That "nothing succeeds like success" is thus amply verified. This grandly conceived project failed to achieve commercial success, through no fault within itself, and it was buried and forgotten, only to be brought back to memory by a few of those who, having seen its monument, could read the inscription thereon.

In 1864, although land telegraph lines were accomplished facts, subaqueous telegraph cables were still considered impracticable, save for comparatively short lines, and there was no telegraphic communication between Europe and America. The lack of these facilities was the more keenly appreciated as, on both sides of the Atlantic, land telegraph lines were in successful operation, extending, in America, across the continent.

It is true that the Field Atlantic cable was even then under construction, but that it was destined to failure was predicted by many of the eminent electricians of that day. That such

was the fact is demonstrated by the financing of the "Overland Telegraph" line, now under discussion, by the directors of the Western Union Telegraph Company, then the greatest telegraph corporation in existence.

In 1858 the first Atlantic cable was attempted, but, although it was laid successfully, it never worked, owing to defective insulation, and it very soon broke. A brief history of the great Overland Telegraph line is as follows:—

In 1864 a company, formed largely of the directorate of the Western Union Telegraph Company, undertook to connect America and Europe by telegraph. The original idea was due mainly to Mr. Percy McD. Collins, who had been formerly the U. S. Consular Agent at the mouth of the Amur river in Russia. The scheme contemplated a line of telegraph from San Francisco, up the Coast to British Columbia; through that Crown Colony, as it was in those days, to the Yukon; then through Russian America, now Alaska, to Bering sea, which was to be crossed by a comparatively short cable, connecting in Siberia with a line of telegraph to be constructed to the mouth of the Amur river, where it would connect with the Russian Government telegraph line already constructed, and so continue throughout Europe.

For a proper conception of the immensity of this undertaking, it must be remembered that in 1864 the United States has just concluded the Civil War, the Pacific tier of Territories was unsettled and almost unexplored, while British Columbia, the Yukon, Russian America and Siberia were entirely unexplored, save by the fur trading companies, and in British Columbia by the gold miners who had just penetrated as far as Cariboo. All supplies had to come from Europe or from the Atlantic free-board States, "around the Horn," costing three times what they would to-day, and local labour was very scarce and high-priced.

The necessary charters and rights of way having been obtained from the British and Russian Governments, the command of the expedition for the necessary explorations, etc., was entrusted to Col. Charles S. Bulkley (on leave from the U. S. Army Telegraph Corps), as Engineer-in-Chief. The expedition was organised by Col. Bulkley on a military basis, with Major Wright as Adjutant, and was divided into several sections, to each of which was entrusted a certain portion of the route. The British Columbia section was under the command of Major Frank L. Pope, Assistant Engineer, whose party, including Dr. J. T. Rothrock, and Edward Scoville as Astronomer, left San Francisco for British Columbia on May 17th, 1865.

The route adopted in British Columbia was from New Westminster, following up the Fraser river by the Cariboo waggon road as far as Quesnel. At Quesnel the Fraser river was crossed and the line was surveyed in a general N. W. direction to Fraser and Francais lakes, and eventually on to Hazelton, on the Skeena river, by way of the "Bulkley valley," so called, as was the river flowing through it, after the Chief of the Expedition, Col. Bulkley, in which valley the horses of the party were wintered during the winter of 1865-6. During 1866 the survey was carried through to Telegraph creek, on the Stikine river. Along the survey line the right of way was cut out 50 feet wide through the timber, and an excellent trail was constructed.

In a written account of the undertaking, kindly supplied by Mr. R. B. McMicking, an active participator in the events, he says:—

"With marvellous energy and enterprise the work of construction was commenced in 1863, the line entering British Columbia from the south in 1864, in longitude 122° W., being carried thence to New Westminster, from which point it followed the valley of the Fraser river and the Cariboo waggon road northward to Quesnel, a distance of about 450 miles, which point was reached in 1865. Offices were established along the way, and from Quesnel southward the line was soon opened for commercial business. The enterprise proved a great

boon to the early colonists, both by reason of the large expenditure of money necessary in its construction and operation, as well as by the facilities it offered for speedy communication between the widely separated settlements.

"In 1865, also, a branch line was run across the San Juan archipelago to Vancouver island, connecting Victoria, the capital of British Columbia, with the main line at Swinomish, Wash. This branch was about 74 miles in length, and included five sub-marine cables of a combined length of 16 miles.

"From Quesnel the main line crossed the Fraser river to the westward, and had reached the Naas river, about 400 miles distant from Quesnel, when the second Atlantic cable was successfully laid and operated, July 29th, 1866.

"The construction party of about 250 men, on receiving news of the completion of the cable, remained in camp two or three days awaiting developments, and at the end of that time, finding the cable continuing to work well, they set out for civilization, leaving their tools, stores and materials to the tender mercies of the Hudson Bay trapper and the native red man.

"In addition to the work done in British Columbia, 350 miles of wire had been strung in Siberia and 300 in Russian-America (Alaska), and a cable 60 miles long was on the spot ready to be laid across Bering Straits. The original expenditure in the construction of the British Columbia section of the inter-continental line reached the large sum of, roundly, three million dollars."

When the project was abandoned, the line from New Westminster to Quesnel and Barkerville was continued in operation by the Western Union Telegraph Co. until purchased in 1870 by the British Columbia Government, which in turn handed it over to the Dominion Government, upon British Columbia's entering Confederation in 1871.

On the line from Quesnel northward things were left as they stood; the line, as far as constructed, was never used and gradually fell; and to-day only one or two poles can be seen standing, while miles of wire have been trodden into the ground by pack animals and can be seen sticking out of the mud at intervals, still perfectly sound and not at all rusted. The greater part of the wire has, however, been taken by the Indians for various uses. With it their houses are tied together; they made it into nails, fish spears, traps, etc., and even constructed most ingenious suspension bridges with it. A cut of a bridge so constructed at Ahwillgate accompanies this report, showing a structure that proves the Indians to have considerable knowledge of the principles of bridge building.

The present Dominion Government telegraph line to the Yukon follows the old line as far as the latter went, utilising the old right-of-way cutting, but having to replace the poles and wire.

The "old telegraph trail" has ever since been the main thoroughfare through this northern Interior, and from it trails branch off to various districts, that for the Omineca leaving it at Fraser lake.

There can be little doubt but that the explorations caused by this telegraph enterprise had an influence on the territory investigated, indirect perhaps, but none the less effective and lasting. It is a noteworthy fact that the negotiations for the purchase of Alaska from Russia by the United States were begun in 1866, just about the time when the reports of these surveys would reach the United States, and that these negotiations emanated from Washington.

It is notable, with regard to British Columbia also, that the placer gold discoveries in the Omineca district began in about 1867, and in northern Cassiar, about Dease lake, in 1872,

and that both these districts were adjacent to the line of the surveys. The transportation of telegraph material to Hazelton and Telegraph Creek brought to notice the possibilities of navigation on the Skeena and Stikine rivers, and undoubtedly had much to do with the settlement of these two towns.

How much the remainder of the Province benefited from the preliminary surveys and subsequent construction, and by the attention drawn to it throughout the world as the route of the telegraph line from America to Europe, it is impossible to say, but enough has been said to show that it ill-becomes British Columbia to allow this enterprise to go unremembered and unhonoured.

The following is extended from a diary of the trip of the Provincial Mineralogist's party. All bearings given are magnetic (the variation is from 23° to 25° E.). Temperatures were taken with a standard alcohol maximum and minimum thermometer. Altitudes were taken from two pocket aneroid barometers, set at the Coast and checking on return. The altitudes are given as they were read, but it is noted that they are found to be from 200 to 250 feet higher than those obtained by the Dominion Geological Survey:—

On July 12th the Provincial Mineralogist, accompanied by Mr. John Kiddie, left Victoria by C. P. R. steamer for Vancouver; thence the next day by C. P. Ry. to Ashcroft, arriving there on the evening of the 13th. On the 14th, at 4 A. M., the stage was taken for the 150-Mile House, on the Cariboo road, which point was reached on the evening of the 15th. To this point Mr. Geo. Watson had preceded the Provincial Mineralogist and had purchased both riding and pack animals for the party.

Owing to the muddy condition of the roads, the freighting team bringing up the camp baggage was so delayed at the 105-Mile House that it was found necessary to send a special team back from the 150-Mile House to meet the freighter and to bring on the baggage.

The baggage and pack saddles reached the 150-Mile at midnight on the 17th, and by 11 A. M. on the 18th the pack-train of 12 horses was under way for Soda creek, which point was reached that evening, after a dusty, hot ride of 28 miles along the waggon road.

The stage road continues from Soda Creek to Quesnel, a distance of 60 miles, but during the summer months communication is maintained between these points twice a week by the steamer "Charlotte," running on the Fraser river. In order to save time, the pack-train was placed on the steamer, and on the afternoon of the 19th the party was landed on the west bank of the Fraser, opposite to Quesnel, where camp was made.

On the morning of July 20th camp supplies, sufficient for one month, were bought at Quesnel and transported across the river. At Quesnel there are two or three general stores at which can be obtained at reasonable prices any supplies needed for camp use.

A short distance above Quesnel there was noted in the east bank of the Fraser river an outcropping of lignite, the seams exposed here, however, not having thickness enough to render them of commercial value. This lignite formation—referred to Tertiary age—is probably very extensively distributed over the great interior plateau of Northern British Columbia, since at various points lignite float is met with in the stream wash, and lignite in place was noted at Fraser lake and on the Bulkley river.

In the afternoon of July 20th, camp was moved out a distance of six miles to 6-Mile creek, where the following day was spent in adjusting the pack saddles to the individual horses. The route followed the old "telegraph trail," which maintains a very consistent north-west direction, and since its purpose was to obtain the shortest line between the two points the easier and more level course was often sacrificed to this directness.

Leaving the lower valley of the Fraser, the trail climbs to the bench land at an elevation of some 400 to 800 feet above the river (altitude of 2,500 feet), which may be considered the general elevation of the country through to the Blackwater, although numerous rounded hills rise 200 to 400 feet higher. Camp of July 20th was located on one of the few small streams of the section, which had its rise in a lake about 1½ miles to the south of the trail, and flowed into the Fraser. From the river the bottom land extends S. W. as a belt about two miles wide and is covered with fine spruce and hemlock timber. The ground rises by a "cut bank," 300 feet high, to the bench, and once the upper level is gained no merchantable timber is found, the forest growth consisting of small jack pine and spruce, with poplar. There is little undergrowth and no grass that horses or cattle will eat, except in occasional marshy basins which support a rank growth of wild marsh hay, not good feed, but serving in the absence of better.

About two miles back from the cut bank at this point there is a depression in the bench land forming swamps and sloughs which occasionally open out into prairie-like intervals on which is found a luxuriant growth of grasses of the ranker varieties, the roots of which are so knitted together as to form a compact surface, which, however, is afloat on a semi-fluid black muck in which, when once the surface is broken, animals sink hopelessly. This depression, more or less marked, continues parallel to the line of the trail through to the Blackwater river, on practically the same elevation, namely from 800 to 900 feet above the Fraser valley.

The bench land from the Quesnel through to the Blackwater consists of boulder clay and associated sands and gravels, no rock formation being visible between these two points. The surface of the bench land, after leaving the terraces near the Fraser valley, is formed of low, rounded hills, showing a tendency to form ridges, usually running in a N. W. and S. E. direction. Among these knolls are numerous basin-like depressions, sometimes with small lakes, but more frequently dry, being drained through the surrounding gravel beds, and having no surface outlet.

On July 22nd camp was moved to Goose lake, a distance of about 14 miles in a N. 80° W. (mag.) direction, following the telegraph line. The route travelled was over the same rolling plateau land, and parallel with the depressed line of sloughs already mentioned. Although the plateau maintains a general elevation, the trail, following the most direct line possible, leads up and down many steep pitches, which could be easily avoided by slight detours, should a road be built into this district. The country passed over this day was clayey sand and gravel beds, save in a few low-lying depressions where the surface was covered with the fine silt and soil washed from higher ground. The vegetation is sparse; the trees are small fir, jack pine and poplars, with little underbrush and no grass suited for cattle feed.

Goose lake lies to the S. W. of the trail, in the depression already noted, and is, in fact, only a flooded slough, with considerable areas of meadow at either end subject to overflow in spring, and estimated at from 500 to 1,000 acres. These meadows, near the lake, support a growth of swamp hay and on the higher portions "blue joint" and goose grass, which serve for summer feed for any passing stock. The country on either side of the lake consists of rolling hills composed of clayey sand and gravel, not offering any grazing, and sparsely timbered with small fir, spruce and occasional poplar.

On July 23rd camp was moved 14 miles farther up the trail to a bench above Pelican lake, where a small spring supplied a scant sufficiency of water for camp use, and where a limited amount of horse feed was found in a patch cleared of trees by fire. Pelican lake, lying some 300 feet lower in elevation, is another of the chain of sloughs and stagnant lakes in the depression running through to the Blackwater.

About eight miles out from Goose creek the trail crossed a creek with good feed, and along the trail were noted several marshes with a growth of swamp grass. The general country traversed this day continued to be of the same character as that already passed, clay, sand and gravel of glacial origin. The timber was second-growth jack-pine and fir, with little underbrush, and some timber or pine grass which the horses refused to eat.

July 24th, camp was moved to the Blackwater river, a distance of six miles. To within almost a mile of the river the trail is along the plateau, when the trail quickly drops to a bench about half a mile wide, running parallel to the Blackwater and 300 feet higher. Another steep descent brings the trail to the level of the river bottom (altitude, 2,200 feet) at the bridge at the "Upper Canyon" of the Blackwater.

On the descent from the plateau to the Blackwater was noted the first outcropping of solid rock formation seen since leaving Quesnel, consisting of a small exposure of a light-coloured schist, which appears to protrude, as a peak, through the drift.

The present trail crosses the Blackwater at the head of the Upper Canyon, by a bridge thrown across a rocky gorge. This present crossing is some three miles farther down stream than was the ford used in the earlier days of travel on this trail.

The canyon appears to be formed by an outcropping ridge, running nearly east and west, of black slates and quartzites, often so much cut up by igneous dykes that, as at the entrance of the canyon, the latter rock predominates to such an extent as to give the appearance of a volcanic flow, containing only occasional particles of the sedimentary rocks. In no part of the rock exposure here seen was there any indication of quartz veins or of mineralisation. This ridge or range of rock extends for some miles down the river, forming the canyons, but does not appear to come to the elevation of the main plateau. In the stream wash were noted pieces of impure lignite derived from some exposure higher up the stream, which, however, was not seen.

The valley of the Blackwater appears to have been cut down from the plateau, and consists of a series of three or four terraces following the river on either side. The lower terraces are covered, at least superficially, with the sediment produced by the cutting down of this valley, and contain much land well suited for agricultural purposes, and the soil, though light, is apparently fertile. The lowest terrace could easily be irrigated, while those higher up support a growth of bunch-grass and other grasses suitable for cattle ranging. This strip of agricultural land followed up the river as far as could be seen, having an average width of from a half to three-quarters of a mile of lower terrace, and about as much more of the higher terraces, before the level of the general plateau is reached.

Above the Canyon the river is not rapid, and opens out into a system of small lakes and marshes over a large watershed which has the elevation of the general plateau. In July, 1905, the river at the ford was about 200 feet wide, with a maximum depth of about three feet and a current which would permit of a loaded pack-horse crossing. The flow of water in the spring must be very great, as there is evidence of the water having reached the floor of the bridge at the Canyon, which is 25 to 30 feet vertical above summer water level.

The valley of the Blackwater has formed from time immemorial a part of the direct route of travel by the Indians between the interior and the Pacific Coast, as it is mentioned by Sir Alex. Mackenzie as being, at the time of his visit, 1793, "a well-beaten trail leading to Salmon House," on Salmon river, which flows into Dean channel. As was the practice of the camp once each week, a "day of rest" was taken here for horses and men, the "day of rest" on the trail being a "moveable feast" regulated by the arriving at good feed for the horses.

The second telegraph cabin stands near the north-west side of the Canyon, and the lineman stationed here was found to have made some attempt at gardening. This year the summer frosts had killed his potatoes, but beets and summer vegetables were found to be growing.

July 26th—Camp at the Blackwater was left at 8 a. m. The trail follows up the low bench to the north of the river for some three miles, then mounts the benches until the level of the plateau, about 500 feet above the river, is gained. The trail continues in a north-westerly direction for some 10 miles, over a slightly undulating plateau, densely wooded with small black pine and occasional clumps of poplar. The soil was similar to that on the plateau to the south of the Blackwater, except that for the last three miles it became decidedly more gravelly. The trail here begins to descend to the valley of a small and unnamed creek, which was reached at 2 p. m. after 14 miles' travel from the bridge, and was the first water encountered in that distance. The weather during the day was very hot, and the lack of water proved very trying to the horses. At night the thermometer registered from 45° to 50°. Camp was made at this creek, although the horse feed was anything but the best.

July 27th—The party was on the trail again by 7 a. m., moving in a N. W. direction. For the first two miles the country is flat, and timbered with small black pine. A change here takes place and the surface of the plateau is more broken by rounded hills, while to the right of the trail lay a lake about $1\frac{1}{2}$ miles long by $\frac{1}{2}$ mile wide and with considerable marsh land at its N. W. end.

At 8:30 a. m.—after four miles travel—the trail descends to the valley and crosses the Chilako river by a single span bridge. The valley of the Chilako at this point is wide and swampy, at an altitude of about 2,025 feet above the sea, and is covered with willow bushes, among which very fair horse feed is found.

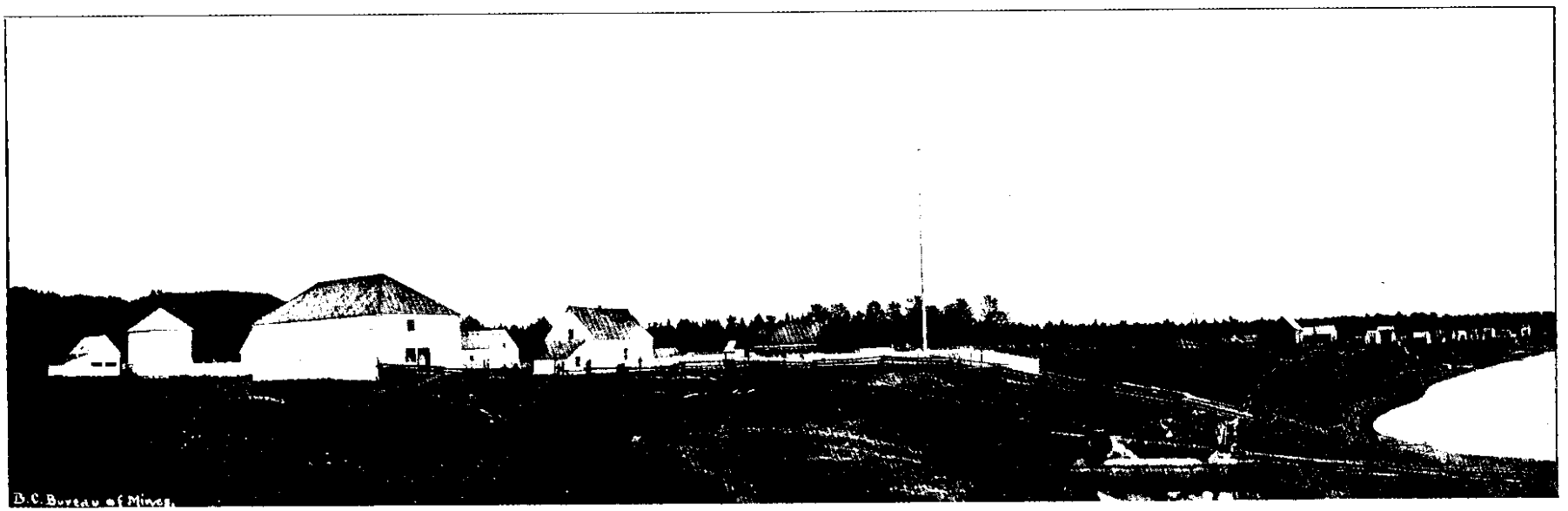
About half a mile from the bridge and just out of the low land the third telegraph cabin is located, a refuge cabin only, no operator or lineman being stationed here.

After leaving the Chilako, the trail rises to the general plateau level, about 2,900 feet, which at first is found to be a series of rounded hills, but these soon give place to more level country. At about noon a splendid meadow, known as Butcher flats, was reached, where camp was made for the night, after travelling 12 miles.

Butcher flats are about 3 to $3\frac{1}{2}$ miles long by about 2 miles wide, with a good creek flowing through it. The flats are nearly level, with bunches of willow dotted over the surface, and support a most luxuriant growth of wild grass and peavine, while along the trail, where seed has been dropped from passing pack trains, timothy is found to grow most luxuriantly. Along the borders of the creek there is a growth of very large cottonwood trees and some large spruce. The soil is good, and is underlain at a depth of some 3 to 5 feet by a gravel containing some clay. The drought of the season, which had affected much of the country passed through, had here left little mark, probably owing to subsoil irrigation.

Judging from the formation of the surrounding country, as viewed from elevations on the trail, there should be in this plateau a number of just such flats, at an altitude not exceeding 3,000 feet, and although in this latitude this is rather high for general farming, the locality seems admirably adapted for cattle-raising, summer grazing being plentiful, while hay for winter feeding can easily be grown. Winters here are severe, and stock would probably have to be fed for about four months.

July 28th—Moved from Butcher flats to the west end of Naltesby lake, a distance of 14 miles by trail, making camp for the night near the telegraph station. From Butcher flats to Naltesby lake there is a wide, flat depression which may be regarded as a continuation of the Naltesby lake depression. In this there are a couple of small lakes on the creek which flows



HUDSON BAY CO.'S POST, FORT ST. JAMES, ON STUART LAKE, ESTABLISHED 1807.

out of Naltesby lake, through Butcher flats, and discharges into the Chilako river to the south of the trail. Along this creek are a number of fine meadows and flats. The trail, however, keeps to the north of the waterway, passing over rolling gravel hills for some five miles, when it reaches the shore of Naltesby lake, along which it runs for about eight miles, the length of the lake.

To the north of the lake the hills rise rapidly, attaining an altitude of about 4,200 feet, forming the nearest approach to a mountain range as yet seen on the trip. These hills are covered with timber, spruce and fir, some of it of very fair size and quite suited for lumber.

To the north of the lake there is very little level ground, and the soil is too stony to be suited for agriculture until the upper end of the lake is reached, where the hills recede, leaving a limited area of rolling bench land with good soil, covered with poplars, etc.

July 29th—Thermometer, minimum, 41°; bar. altitude, 3,100 feet. Moved camp from Naltesby lake to the north end of Graveyard lake, at its outlet, a distance of 12 miles. Graveyard lake is mentioned by Dr. Dawson in his report as Eulatazella lake, which name, however, is now never used by the white inhabitants of the country, perhaps because of the difficulties of pronunciation and spelling; whereas its present local name is descriptive, since in the middle of the large open patch always used by the pack trains as a camping place there are two ancient Indian gravehouses, situated on a knoll overlooking the lake and outlet. Graveyard lake empties northward by an unnamed creek into Clucultz lake, and thence north into the Nechaco river, while Naltesby lake discharges south-east by the creek flowing through Butcher flats into the Chilako. Consequently, between these two lakes is the height of land forming the divide in the watershed of this plateau, and of the succession of lakes which occupy the depression already mentioned. The altitude of this divide would be about 3,200 feet.

The soil, as seen on the trail, is about the same as already noted on the general plateau, while the topography shows a greater prevalence of hills and rounded knolls, as would be expected nearer the height of land. The forest growth consists of jack pine and a few firs, with occasional patches of willow and poplar, affording no feed for stock until Graveyard lake is approached, when a few larger open patches occur, on which there is a quantity of fine bunch-grass, while among the poplars pea-vine is found, with other wild grasses in limited quantity.

It may be noted here, as in many other parts of this district, that wherever any extended clear spot has been made by fire, grass of a very fair quality seems to spring up, indicating greater possibilities for the district than the undergrowth near the jack pine forests would seem to promise.

Forest fires were burning in the district to the west, rendering any extended view difficult; but as far as could be seen, the country lying to the south and west of the trail for many miles was of the same character as that passed over.

It might be further noted that at no part of the trail so far travelled over could there be seen any sign of a mountain range occupying the position of the "Telegraph range" as indicated on the maps. The most that was seen was a succession of disconnected rounded hills, rising but a few hundred feet above the general plateau level.

July 30th—Min. thermometer, 39°; bar. alt., 3,050 feet. Left Graveyard lake at 7:10 a. m., and travelled 14 miles along the trail to a camp on "The Hogsback," near a swampy meadow. The trail crosses Graveyard creek about two miles from the lake and continues in a N. W. direction, passing through a country in which the vegetation continues the same as previously mentioned, but the topography of the surface shows the hills to have become long "hogsbacks," or narrow ridges, probably ancient moraines, having a general N. W. direction for their longer axes, while between the ridges were numberless marshes and marshy lakes

with much wild marsh grass, the lakes often having no visible outlet. The soil on the ridges was sand and gravel, and in many spots there were still standing patches of large fir and spruce trees, which appeared to have escaped the general conflagration which spread over the district. On the trail, about eight miles from Graveyard lake we passed the fourth telegraph cabin, situated near a small stream and a fine meadow of wild hay some 1,000 acres in extent.

July 31st—Min. tem., 40°; bar. alt., 2,975 feet. Moved from "Hogsback" camp to Noolki lake, near the telegraph station, a distance of 14 miles. The first two miles of the trail was along the "hogsback," with lakes at intervals on either side, when the trail rapidly descends and enters a lower and flat country, probably the bottom of an ancient lake as the soil would seem to indicate. About eight miles from the "Hogsback" camp the outlet of Tsinkut lake was reached. There is no bridge over Tsinkut creek and the bottom and sides are clay, rendering fording of the stream impossible, but in the lake a bar was found across the outlet which permitted of fording at low water with little trouble, save that of keeping the pack-horses on the bar and out of deep water on either side.

This lower bench land is the beginning of a large area of country extending across the Nechaco river, and known on the maps of the Lands Department of the Government as the Nechaco District.

From the crossing of Tsinkut creek to the telegraph station on Noolki lake is about six miles. The country passed through consists of easily rolling hills or uplands, covered, for the most part, with bunches of poplars and willows. The soil is light, consisting of clay and gravelly loam, evidently a lake deposit, and judging from the luxuriant growth of pea-vine, fireweed and wild grasses found among the poplars, must be very fertile, and is probably largely the product of the disintegration of the immense areas of volcanic rocks which once capped this country, remnants of which are still to be seen on the higher elevations. (A sample of the soil from this prairie was taken, the analysis of which will be found in the addenda to this Report as Sample No. 1.)

Large areas of open land were seen, free from trees and covered with a fine grass about two feet high, resembling bunch-grass, which cured on the stalk, forming a wild upland hay, most nutritious for stock.

The local Indians at the village of Stony creek, situated two miles from the telegraph station, own a large number of horses and cattle which appeared to be in the best of condition, and it is reported they here manage to get through the winter with the assistance of small quantities of wild marsh hay, which the Indians cut from the various swamps in the neighbourhood.

The summer of 1905 was an exceedingly dry one, yet the vegetation on the uplands did not appear to have suffered much from the drought, from which it is assumed that under normal weather conditions there will be enough rainfall to render irrigation unnecessary. That summer frosts are frequent, is true, but cultivation of the soil will undoubtedly remedy this.

From Noolki lake the telegraph line passes south of Tachic lake and thence nearly due west to Fort Fraser, at the outlet of the lake of the same name, a distance by trail of about 40 miles. The Provincial Mineralogist, however, left the Telegraph trail at Noolki lake on August 1st, following the Indian trail to Stony creek Indian village, a village of about 400 people. These Indians all have exceedingly well-built log houses, with internal "Hudson Bay" fire-places and chimneys, ingeniously built of clay, and show a capacity of a high order for mechanical construction, as is further indicated by the Roman Catholic Mission church which they have built, whip-sawing and planing the lumber without assistance from the whites. While

capable, these Indians are improvident. They put up enough hay only to keep their stock from actual starvation, and while they do make some endeavour to have vegetable gardens, their idea of cultivation seems to end with digging up the ground and planting the seed; after which the vegetables have to struggle unaided against the luxuriant growth of weeds, and irrigation takes care of itself. Despite these conditions they usually manage to have fair crops of potatoes, turnips, beets, etc., although two years ago a summer frost killed all the potatoes and left them without seed for the next year, and consequently, this past year there is very little ground planted.

The lakes of the district are said to swarm with fish—trout, landlocked salmon and white-fish—which in the spring ascend in great numbers Stony creek and other small creeks and outlets of lakes. The numerous fish store-houses, etc., would seem to confirm the statement, but the writer must admit for himself and his party that they were quite unable to get trout to take the fly in any of the lakes.

Noolki lake empties into Tachic lake, the latter discharging through Stony creek into the Nechaco river, some 10 miles to the north-east.

From Stony creek village the trail follows the creek to the river, a distance of six or seven miles, crossing the creek three times, and for this distance is said to be all on Indian reserve land. This land is some of the best in the district—fine, rich soil, clear of trees in patches, and elsewhere wooded with poplar, fir and some birch, with a growth of service-berry bushes laden with fruit, which the Indians dry and preserve for winter use. Among the trees is found a most luxuriant growth of pea-vine, fireweed, barley grass, etc., while in the open there is a plentiful growth of wild hay which extends on to the higher benches. The valley of Stony creek could be easily irrigated, and with such soil is capable of supporting a large community if the ground were cultivated.

The trail leads to the Nechaco about a mile above the mouth of Stony creek, where, on the south side of the river, on the Reserve, there are magnificent flat upland hay-meadows, quite uncultivated. This crossing place of the Nechaco is the one to which all the old and new trails have led since the early gold excitements in the Omineca district. The river here is 600 feet across and the banks are shelving, admitting of a landing being easily made. The current runs six miles an hour, while the depth, even at low water, is sufficient to make a horse swim for three-fourths of the distance. At low water it is a long but comparatively safe swim, while at high water but few horses are able to get across alive. The Stony creek Indians always have canoes on the river, and can be hired to ferry men and baggage across and to swim the horses.

Formerly this trail and crossing were in use to Fort St. James and the Omineca, but of late years the pack-trains have, although it is a longer route, mostly gone by way of Fort Fraser, because the Nechaco at this point is so dangerous at high water, and there is no ferry, whereas at the crossing at Fort Fraser there was formerly a cable ferry, which, unfortunately, is not now running, as the scow was carried off by high water and ice two years ago. A ferry at Fort Fraser, on the main telegraph trail, would accommodate also all through travel from Quesnel to Hazelton, Bulkley valley and Ootsa lake districts, and is much needed.

August 2nd—Min. temp., 42°; max., 68°. Raining; did not move camp.

August 3rd—Min. ther., 41°; bar. alt., 2,610 feet. Camp was broken up at 8 a.m., and the newer Fort St. James trail taken, which leads up the river for about a mile, where it bends off to the north over the plateau, from 100 to 200 feet higher than the river, over which it continues for about six miles from the river. This section, known as the "Nechaco flats" or prairie, has been largely staked for pre-emption homesteads, or, by holders of South African

scrip. The soil is a fine loam, free from gravel or stones, and bears a most luxuriant growth of pea-vine, fireweed, barley grass, and other wild grasses growing among poplar woods, while extensive open prairies are also found. The trail, after leaving the river about two miles, passes through one of these level prairies from one to one and a half miles long by about one mile wide, free from trees, nearly level, and ready for the plough. A sample of the soil from this prairie was taken for analysis, the report of the Provincial Assayer upon which will be found in the addenda to this Report. The growth of peavine and wild grasses on this plateau is most luxuriant. An accompanying cut shows a man on horseback, the horse being hidden by the tall growth of grass. This plateau extends on the bank of the river as far up and down the valley of the Nechaco as could be seen, having a width of from four to six miles.

After crossing the plateau the trail mounts a range of hills, having a maximum altitude on the trail of 4,000 feet, which forms a hilly divide between the waters of the Nechaco and Stuart rivers. Along this hilly range good soil is lacking, and the forest growth is jack pine and small spruce, with little or no grass, except in a few hollows, where marsh grass grows, and which are evidently water holes in spring, and the land fitted for agriculture or grazing is confined to the lower levels.

At a distance of some 17 miles by trail from the Nechaco, camp was made by the side of a small lake near the summit of the divide, where scant feed for the horses was found on the side-hill, the only available camping ground found for the last five miles; for although several large marsh meadows were passed, no water could be found.

August 4th—Min. ther., 37°: max., 72°; bar. alt., 3,300 feet. Camp was broken and a start made at 7:25 a. m., the trail following along the Stuart river slope of the divide, as evidenced by creeks flowing northward. At 12 noon this trail led into the main trail from Fort Fraser to Fort St. James, at a point about half-way between these two points.

The trail from the crossing of the Nechaco to its junction with the Fraser-Stuart lake trail is about 28 miles long, and considering that it has been in disuse for some years, is in very good condition although somewhat obstructed by fallen timber, having a good hard bottom, inclined to be rocky in places. There were several exposures of solid basalt formation.

After striking the main trail the party travelled north for four miles to Rabbit creek, a small creek crossing the trail, in the valley of which, among willow bushes, was found the finest horse feed met so far on the trip, and here camp was made.

August 5th—Min. ther., 44°, bar. alt., 2,890 feet. Left Rabbit creek at 6:40 a. m., and reached Stuart lake south shore at 11:40, travelling a distance of about 15 miles. For the first five miles the trail lay over hilly, broken country, the uplands gravel with jack pine and no grass, while the bottoms were inclined to be marshy and wet, not a district suited to agriculture.

For a distance of 10 miles south of Stuart lake the country is an undulating plateau, covered with poplars, among which are many open prairies of very considerable extent. The soil is a clayey loam of excellent quality, a sample of which was taken for analysis, and the report of the Government analyst upon which will be found in the addenda to this Report as Sample No. 3.

The growth of wild grasses, red top, barley grass, etc., with some pea-vine, was most luxuriant in the open spots, quite sufficiently heavy to be cut for hay, while along the side of the trail, where the seed had sifted out of the apparejos of the pack-trains, a crop of timothy had come up, which showed conclusively the suitability of the soil for such a crop.

This plateau is so flat that the natural drainage is often insufficient, so that the trail for two or three miles is very muddy and clayey, necessitating corduroy, but a few ditches would drain the land very effectively. The poplar is evidently the follower of a growth of large fir, long since destroyed by fire, and could be quickly and cheaply cleared off the land.

The soil around the east end of Stuart lake is much more clayey than that of the Nechaco, and better able to retain moisture. This plateau is admirably suited for mixed farming, and probably wheat can be grown anywhere in this section, once any appreciable area of ground is put under cultivation.

As far as could be seen, this plateau country did not extend for any distance westward of the eastern end of Stuart lake, as the hill ranges seem to approach the shores of the lake, rising to a height of from 600 to 1,000 feet, well timbered with trees of small size.

August 6th—Min. temp., 49°; max., 73°. In camp at Stuart lake, opposite Fort St. James.

Fort St. James, a post of the Hudson's Bay Co., situated on the north shore of Stuart lake at its eastern end, marks the dividing line in the transportation of the present day between the interior and coast routes, since part of the supplies come in via Quesnel by pack-train, while the larger portion comes by way of Hazelton, on the Skeena river; thence by pack-train 60 miles to Babine lake, which lake provides water transportation for 150 miles, followed by a portage of 10 miles over a waggon road to Stuart lake, on which there is a further 45 miles of water transportation.

It is worthy of special note that this post in 1906 celebrates the centenary of its founding. The old buildings have, of course, disappeared and were replaced some few years ago by new buildings. Fort St. James is the distributing point for the Hudson Bay Co.'s posts to the north, Forts McLeod and Grahame, and here in consequence a large stock of supplies is always on hand. The fort buildings consist of the residence of Chief Factor Murray, a store, goods and fur warehouses, salmon caches, stables, and houses for the men; also within the fort compound is a school-house.

Immediately to the east of the fort is the Indian reserve and village of about 50 houses, while about a mile to the west of the fort, and on the lake shore, is the mission village of about the same number of houses, with a fine church and substantial mission house. All the missions in this part of the country are under the Roman Catholic Church, the head mission station being at Fort St. James, now under the charge of the Rev. Father Cocola who, until this past season, was stationed in East Kootenay where his good work among the Indians of that district is thoroughly acknowledged by all classes and creeds of the community, and his advent to this new post at this critical time in the history of the Indians, when white settlers are beginning to come into the district, must be regarded as a most fortunate occurrence, both for the Indians and whites.

The waters of Stuart lake flow south-east by the Stuart river, which, after a course of some 50 miles, joins the Nechaco river, which in turn flows into the Fraser at Fort St. George.

The Stuart river is a large river, navigable at most seasons by large scows between St. James and Quesnel. In fact, a steamer was taken from Quesnel on to Stuart lake some years ago, but has long since been "out of commission" and most of the iron work has been used for other purposes.

Attention is particularly drawn to these inland waterways, which, it is felt, will have an important influence upon the development of the district, since the greater portion of the land available for agriculture is found in the valleys of these rivers or adjacent to the shores of the lakes.

To the north of Stuart lake the mountains rise close to the shore, and near to Fort St. James rise to a height of about 2,500 feet above the lake, in a series of limestone peaks. From Fort St. James there opens to the northward a low, wide draw or depression in the hills, along which, it is reported, there is land fit for farming.

Any observations as to climate or temperatures made on a trip through a district, except such as are registered by the timber and other plant growth, must be considered as purely accidental, varying with the season or year. The only systematic meteorological observations that have been taken in the district have been at Fort St. James, on Stuart lake, and, thanks to the courtesy of Mr. Baynes Reed, of the Meteorological Office, Victoria, we are enabled to publish these, covering a period of eight years, from 1895 to 1903, inclusive. These figures may be taken as the extreme, as far as severity of the winter is concerned, for from the earliest days of the Hudson's Bay Co. we find that, although Fort St. James was the central post, all the pack-horses were sent from there to Fort Fraser to winter, as being a milder climate, much more so than the distance of 40 miles farther south would seem to account for.

A phenological report is, also by the courtesy of Mr. Baynes Reed, included in the meteorological observations. This report was compiled by Mr. Murray of Fort St. James, and is of interest from its bearing upon the agricultural possibilities of the country.

METEOROLOGICAL OBSERVATIONS.

FORT ST. JAMES, STUART LAKE,
BRITISH COLUMBIA.

Latitude, N. 54° 28′; Longitude, W. 124° 12′; Height above sea, 2,200 feet.

MONTHLY AND ANNUAL SUMMARIES FOR THE YEARS 1895-1903 (INCLUSIVE).

ANNUAL SUMMARY.

YEAR.	TEMPERATURE.			PRECIPITATION.							
	Max.	Min.	Mean.	Rain.	Days.	Snow.	Days.	Total.	Gales.	Fogs.	Thund'r Storms.
1895	96.5	-35.9	32.7	13.23	76	73.8	48	20.61	23	6	8
1896	90.0	-44.6	30.5	10.48	62	87.6	46	19.24	2	3	3
1897	89.0	-41.1	34.0	11.56	54	76.9	38	19.25	2	1	11
1898	88.5	-35.1	37.2	6.74	46	20.0	8	8.74	1	4	0
1899	93.0	-47.0	33.2	5.56	25	50.0	20	10.56	1	4	0
1900	81.0	-38.6	30.8	9.04	30	41.8	15	13.22	14	4	5
1901	82.0	-35.9	32.8	6.92	25	57.5	33	12.67	10	1	1
1902	88.0	-39.0	33.2	8.51	41	74.8	40	15.99	33	1	10
1903	87.0	-35.9	34.7	18.49	69	48.0	23	18.29	61	2	6
Summaries	795.0	-353.1	299.1	86.53	428	530.4	271	138.57	152	27	44
Means	88.33	-39.23	33.23	9.50	48	58.9	31	15.39	17	3	5

MONTHLY SUMMARY.

JANUARY.

Year.	Temperature.			Precipitation.		
	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	49.0	-35.9	-0.5	0.09	11.6	1.25
1896	39.9	-44.6	-1.2	0.54	37.1	4.25
1897	38.9	-41.1	11.2	0.00	25.9	2.59
1898	39.9	-14.1	18.6	0.00	0.0	0.00
1899	42.9	-47.0	18.6	2.33	16.0	3.93
1900	44.0	-29.7	11.0	0.50	4.5	0.95
1901	38.9	-35.9	8.7	0.00	12.0	1.20
1902	39.0	-20.1	10.4	0.00	11.5	1.15
1903	48.0	-34.1	15.4	0.46	2.1	0.67

FEBRUARY.

Year.	Temperature.			Precipitation.		
	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	46.0	-25.6	12.5	0.27	14.9	1.76
1896	46.5	-26.6	19.6	2.20	12.5	3.45
1897	35.4	-21.5	14.7	0.20	12.4	1.44
1898	42.0	-10.6	18.6	0.00	0.0	0.00
1899	45.0	-31.0	18.2	0.18	0.0	0.18
1900	33.9	-38.6	5.5	0.70	17.8	2.48
1901	50.0	-31.9	14.1	0.00	2.5	0.25
1902	41.0	-12.0	16.6	0.00	14.5	1.45
1903	46.5	-24.6	19.0	0.12	2.5	0.37

MARCH.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	53.0	-22.1	24.7	0.05	10.9	1.14
1896	46.0	-32.9	16.6	0.29	6.7	0.96
1897	45.5	-30.9	14.6	0.40	10.0	1.40
1898	46.9	-24.4	28.8	0.00	4.5	0.45
1899	51.5	-35.0	16.4	0.00	10.0	1.00
1900	45.0	-30.2	12.7	0.31	7.5	1.06
1901	50.0	4.1	29.3	0.30	4.0	0.70
1902	52.0	-39.0	18.0	0.00	4.3	0.43
1903	55.1	-35.9	18.9	0.12	4.3	0.55

APRIL.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	64.0	9.1	35.3	0.21	4.4	0.65
1896	57.5	2.0	30.6	0.39	4.4	0.83
1897	61.5	16.2	38.4	1.21	2.0	1.41
1898	70.0	25.2	43.7	0.67	.....	0.67
1899	58.0	11.0	33.1	0.03	.....	0.03
1900	64.0	14.2	32.2	0.30	.....	0.30
1901	56.0	0.0	30.0	0.60	6.0	1.20
1902	60.5	7.2	32.4	0.25	.....	0.25
1903	60.5	3.5	33.9	0.14	15.8	1.72

MAY.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	78.0	18.2	44.8	1.62	.....	1.62
1896	70.5	19.2	42.2	0.39	.....	0.39
1897	82.0	23.2	47.2	1.88	.....	1.88
1898	85.5	28.2	54.0	0.30	.....	0.30
1899	64.0	11.0	39.3	0.70	1.0	0.80
1900	65.0	20.2	39.9	1.41	.....	1.41
1901	66.0	14.2	40.0	1.35	.....	1.35
1902	73.0	22.2	44.2	1.30	.....	1.30
1903	70.0	18.2	43.0	0.52	.....	0.52

JUNE.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	89.0	21.0	50.2	0.91	.....	0.91
1896	90.0	22.2	48.9	1.51	.....	1.51
1897	89.0	28.2	55.6	1.91	.....	1.91
1898	85.5	24.2	56.4	0.94	.....	0.94
1899	83.9	28.5	49.3	0.00	.....	0.00
1900	77.5	22.2	46.3	1.37	.....	1.37
1901	73.0	26.2	44.9	1.65	.....	1.65
1902	79.0	24.2	47.9	1.90	.....	1.90
1903	87.0	26.2	56.0	3.40	.....	3.40

JULY.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	96.5	28.7	53.6	2.26	.....	2.26
1896	85.5	27.2	55.7	1.27	.....	1.27
1897	84.0	25.2	54.8	2.06	.....	2.06
1898	88.0	32.2	56.0	3.04	.....	3.04
1899	93.0	29.5	57.3	0.00	.....	0.00
1900	81.0	31.2	51.3	1.55	.....	1.55
1901	73.0	24.2	48.7	1.45	.....	1.45
1902	88.0	28.2	52.4	1.61	.....	1.61
1903	78.0	26.7	54.7	1.30	.....	1.30

AUGUST.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	77.5	25.7	51.6	2.51	.....	2.51
1896	82.5	24.7	52.9	0.40	.....	0.40
1897	85.0	25.7	57.1	1.03	.....	1.03
1898	88.5	25.2	58.2	0.38	.....	0.38
1899	85.0	19.9	50.6	R.	.....	R.
1900	70.0	18.2	47.4	0.68	.....	0.68
1901	82.0	25.2	50.9	0.15	.....	0.15
1902	79.0	23.2	52.5	2.03	.....	2.03
1903	81.5	25.2	52.3	3.09	.....	3.09

SEPTEMBER.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	72.0	14.2	39.8	1.65	4.2	2.07
1896	78.0	15.7	43.1	0.36	.....	0.36
1897	70.0	20.2	46.0	1.39	.....	1.39
1898	80.0	22.2	47.4	0.65	.....	0.65
1899	67.0	18.9	43.0	0.95	.....	0.95
1900	68.0	19.2	41.9	0.50	.....	0.50
1901	70.0	16.2	41.6	0.40	.....	0.40
1902	79.5	17.2	46.2	1.16	.....	1.16
1903	68.5	19.2	42.7	1.47	.....	1.47

OCTOBER.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	65.0	14.2	37.3	1.69	.....	1.69
1896	55.0	8.6	34.2	1.68	1.0	1.78
1897	67.0	15.2	40.7	1.48	.....	1.48
1898	56.5	8.1	34.6	1.33	.....	1.33
1899	62.6	1.0	29.5	1.00	6.0	1.60
1900	54.0	2.1	31.9	0.12	2.0	0.32
1901	60.0	16.2	38.2	0.20	1.0	0.30
1902	77.0	12.2	43.4	0.24	3.3	0.57
1903	64.5	4.6	38.5	1.76	.....	1.76

NOVEMBER.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	55.0	- 7.7	28.0	1.38	19.0	3.28
1896	40.5	-36.4	-0.3	0.27	8.6	1.13
1897	56.0	-34.6	10.2	0.00	19.4	1.94
1898	46.0	-15.2	20.9	0.02	8.5	0.87
1899	45.0	11.0	28.9	0.15	2.0	0.35
1900	43.0	-27.4	19.5	0.90	3.0	1.20
1901	48.0	2.0	27.4	0.50	21.0	2.60
1902	55.0	-25.6	24.5	0.00	18.2	1.82
1903	57.0	-24.6	23.8	1.11	10.5	2.16

DECEMBER.

Year.	Max.	Min.	Mean.	Rain, in.	Snow, in.	Total, in.
1895	40.9	-30.9	15.6	0.59	8.8	1.47
1896	45.5	-16.6	21.8	1.84	17.3	3.07
1897	37.9	-16.6	17.3	0.00	7.2	0.72
1898	43.0	-35.1	14.8	0.01	7.0	0.71
1899	39.9	-31.2	12.2	0.22	15.0	1.72
1900	43.0	-15.6	22.9	0.70	7.0	1.40
1901	48.0	- 7.0	20.2	0.32	11.0	1.42
1902	45.5	-35.9	9.9	0.02	20.5	2.07
1903	46.0	- 2.7	24.2	0.00	12.8	1.28

PHENOLOGICAL REPORT.

FORT ST. JAMES, B. C., 1905.

DATE.	PLANTS, BIRDS, ETC.	DATE.	PLANTS, BIRDS, ETC.
Feb. 27th	Snowbirds arrived.	May 8th	H. B. Co. commenced ploughing; seeding barley, oats and vegetables followed right along.
Mar. 15th	Rooks "	" 22nd	Blue Violet and Dandelion blossoming.
" 22nd	Geese reported.	June 2nd	Wild Rose and Columbine blossoming.
" 23rd	Mallard Ducks seen.	" 4th	Blue and White Clover "
" 25th	Geese "	" 11th	Highest water in Stuart lake.
" 26th	American Robin "	" 14th	Wild Strawberries ripening.
" 31st	Bluebirds "	July 16th	Hay cutting commenced.
April 23rd	Canoes left for Quesnel (275 miles, five days down stream). Found Stuart, Nechaco and Fraser rivers free of ice; may have been open for a week or so.	" 28th	New potatoes for dinner.
		Aug. 19th	Commenced taking up potatoes.
		Nov. 28th	Stuart lake frozen over opposite Fort St. James.
" 26th	Golden woodpecker seen.	Dec. 31st	NOTE.—At the end of the year the deep part of Stuart lake was still unfrozen; this is exceptional.
May 1st	Stuart lake clear of ice.		
" 2nd	Swallows seen.		

A. C. MURRAY, *Observer.*

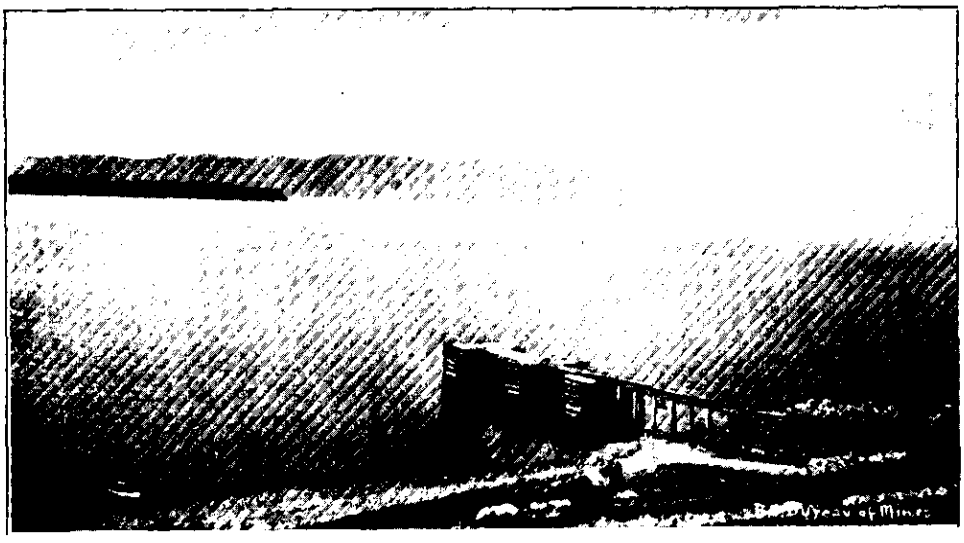
August 7th—Min. ther., 41°; max., 71°; bar. alt., 2,475 feet. Leaving Stuart lake at 7.40 a. m., we retraced our steps along the trail for 15 miles to Rabbit creek, through country already described, arriving at 12:45 p. m., making fast time, as the trail was good and the horses anxious to get back to good feeding grounds.

August 8th—Min. ther., 43°; max., 70°. Left Rabbit creek at 7:50 a. m., travelling south over the trail towards Fraser lake. At 9:50 passed the junction of the Stony creek trail, and at 10:45 a. m. we reached the summit of the divide between the Stuart and Fraser lake watersheds, which had a barometric altitude of 3,300 feet. Along the divide where this trail crosses it, the conditions were found to be the same as on the Stony creek trail, namely, rocky, barren land, with scrubby trees and no grass on the uplands, but numerous marshy lakes and swamps with marsh grass. At 12:10 p. m. we reached Trout creek, a small stream flowing eastward into the Nechaco, along the valley of which a swampy meadow was found extending westward for two or three miles, providing excellent, though not very solid, feed for the pack-train.

The trail between Stuart and Fraser lakes is very fair, though very crooked and badly in need of being brushed out. Wire for a telegraph line between these two points has been distributed along the trail by the Dominion Government, but has never been erected and lies in coils on the trail.

August 9th—Min. temp., 41°; max., 66°; bar. alt., 3,200 feet. From Trout creek to Fort Fraser, a distance of about 14 miles by trail, was made between 7 a. m. and 12:30 p. m. The trail, until within about 6 miles of Fort Fraser, is on the divide, rough, rolling hillocks of gravel and broken rock, with little soil, and with numerous exposures of the rock formation of the hill range which, wherever seen, was a fine-grained, hard basaltic rock, apparently a succession of volcanic flows. About six miles from the Fort the trail descends gradually on to benches and plateaux bordering the Nechaco river, where the jack-pine of the divide gives way to poplar, birch, cottonwood, willow and alder, with innumerable service-berry bushes, laden with berries, which form an important article of food for the Indians. The woods are generally free from underbrush, but there is usually a most luxuriant growth of fireweed, pea-vine and wild grass. The soil is a light loam, common to the valley of the Nechaco, capable of growing any crop, but the better for some irrigation in the dry years. Analyses of the soil are given later in this Report.

August 10th—Min. temp., 41°; max., 67°; bar. alt., 2,650 feet. Camp remained on the shore of Fraser lake just below the H. B. Co.'s post, on the north side of the lake at its outlet.



STUART LAKE, LOOKING WEST FROM FORT ST. JAMES.

CHIEF FACTOR'S HOUSE -H. B. CO.'S FORT St. JAMES, STUART LAKE.

The Provincial Mineralogist took a canoe and crossed to the southern shore of Fraser lake, about two or three miles from the outlet, to examine certain coal croppings there being prospected. On the shore there are outcroppings of carbonaceous shales, with small seams of coal of a thickness of a few inches. A few yards from the shore a shaft down about 20 feet, and a drift of about the same length, exposed a small and much-disturbed seam of coal.

To the south-east of these outcrops and back about two miles from the lake, and some 500 feet higher, in a small gully opening to the south, are two other outcroppings of coal-bearing strata, but, as far as work had been then done, no seam of workable size had been exposed.

The coal has every appearance of being a lignite; it "slacks" on exposure to the air, in many instances shows a woody structure, and is in a lignite formation, but the samples of the coal, as taken from the outcroppings, gave the following analysis:—

	Moisture.	Volatile Matter.	Fixed Carbon.	Ash.	Coking Qualities.
Sample No. 1	3.8	17.2	58.0	21.0	Non-coking.
" No. 2	4.3	14.2	33.7	47.8	" "
" No. 3	3.9	23.1	54.9	18.1	" "

These analyses show a percentage of ash altogether too high for commercial coal, but it must be noted that the samples were from practically surface exposures and may improve with depth. The percentage of moisture is too low for a lignite and would represent nearer a bituminous coal, as would also the proportions of volatile and fixed carbon.

Within a few hundred yards of the coal exposures on the lake shore is a belt of recent granite of very considerable, though undetermined, extent, while similar though smaller intrusions of the same granite occur in the vicinity of the coal croppings further south. These masses of igneous rock are probably younger than the coal-bearing formation, and their occurrence has probably been the cause of the alteration of the coal from a lignite to something approaching a bituminous coal; but such occurrence has so disturbed the adjacent country that whatever coal may eventually be discovered will probably be found to be much faulted and broken, rendering it improbable that any commercial coal field will be found in the immediate vicinity of the coal exposures seen, and upon which some little prospecting has been done.

Fraser lake is about 20 miles in length in an east and west direction, and its width is about one and a half miles. The waters of Lac de Francais or Francais lake, the large lake lying to the west, empty through the Stellako river, some twelve miles in length, into the western end of Fraser lake, which in turn discharges to the east by a short and unnamed stream, only about three-quarters of a mile long, into the Nechaco river. On this short connecting stream is the Fort Fraser Indian reserve, a village of about 30 houses and a Roman Catholic church. These Indians live by hunting in winter, the chief catch being beaver and marten skins. Their food consists of salmon, which are caught as they pass into the lake from the Nechaco. This source of supply has of late years been exceedingly variable and constantly diminishing. In 1905 it was almost nil; but from the large number of salmon "caches" erected on the shore, the salmon must formerly have been very numerous and constituted at one time not only the Indians' chief article of food but their principal commodity of barter with other Indians, whose villages were not near a salmon stream. Fraser lake also supplies them with white fish, which are caught in the fall and winter through the ice, but their main-

stay is rabbit and service-berries. These berries are gathered in August and are placed in great spruce bark boxes, and stones heated in a fire are thrown in on top of the berries, gradually cooking them. After the berries are "cooked" they are moulded into flat cakes, about twelve inches long by six inches wide by three-quarters of an inch thick, and these are laid on slats over a slow fire until thoroughly dried, when they are put away for winter use. In the southern part of the Province service berries are simply dried in the sun, in the same manner as are currants.

The Indians of this district are shiftless and improvident, not so much from lack of ability as from lack of necessity; for, before the whites overran their hunting grounds, beaver and salmon were plentiful and a living was easily made. The buildings and warehouses of the Hudson Bay Company and the churches are evidences of the Indians' skill as carpenters. These they built, squaring the logs and whip-sawing, planing and tongue and grooving all the boards for the interior finishing. They own a number of horses and cattle, which are largely left to "rustle for themselves" in winter, but little hay being put up, and that being coarse swamp hay.

The Hudson Bay Company's post at Fraser lake, in charge of Mr. Ed. Peters, consists of a store (well equipped with a stock of necessaries, but few luxuries), a warehouse, factor's house and stables, and is situated on the north shore of the lake at the outlet. A portion of the warehouse is used by the telegraph operator and lineman stationed here, as house and office. Supplies for this post come, in the spring, from Quesnel, and in the fall from Hazelton, as the pack-trains are bound in or out from the Fraser river valley, where they winter. Thanks to the personal efforts of Mr. Peters, the Hudson Bay Company has made successful attempts at cultivating patches of land around the post. The writer saw a five-acre field of ripe oats—good, long stalks, and full, ripe heads—and other fields of Russian barley, common barley, wheat and timothy. The vegetable garden contains potatoes, beets, carrots, turnips, and, in fact, most of the more usual vegetables, all doing well, while around the house were in bloom many of the hardier flowers. In fact, the produce was about what would be found in eastern Ontario or Quebec. As market for this produce is absolutely lacking at this remote point, the extent of ground cultivated is limited by the amount of the home consumption.

The Provincial Mineralogist obtained from Mr. Peters samples of wheat, two kinds of barley, oats and timothy, just as they stood in the field on August 11th, all ripe for cutting, which were sent to the Department for transmission to the New Westminster Exhibition, where they received a diploma. Mr. Peters also keeps a few milch cows, which do very well on the open rolling hills near the post, but he says he finds it advisable to stall-feed these for four months in the winter.

Some 25 or 30 years ago the Hudson Bay Company's post was situated on the south side of the lake, at its eastern end, and around the site of the old fort are fields of timothy which are still cropped, although never cultivated. While these crops are in themselves small, they are important in showing what the district can produce, even with the rather primitive appliances available.

The Yukon telegraph line passing through Fort Fraser continues north-west along the north side of Fraser lake, then follows up the Endako river, and passing to the north-east of Burns and Decker lakes, crosses over the height of land between the drainage areas of the Fraser and Skeena rivers, following down the Bulkley river to Hazelton.

August 11th—Min. temp., 45°; max., 69°; bar. alt., 2,650 feet. Remained in camp at Fort Fraser, fitting out for the trip to Hazelton and making enquiries as to the trails via Cheslatta lake.

August 12th—Min. temp., 41°; max., 72°. Departure this morning was delayed by one of those unpleasantnesses incidental to travel by pack-train, namely, horses lost or strayed, and a start was not made from camp until 1:30 P. M.

Instead of continuing westward over the old telegraph trail, the Provincial Mineralogist struck southward towards Cheslatta lake, following an old Indian hunting trail for the most part. Leaving the present Fort Fraser, the outlet of Fraser lake was forded opposite the Indian rancheric. The river here is about 400 feet across and fairly swift, but with a good gravel bottom, and at low water permitting of loaded horses fording. In the spring, however, packs have to be crossed in a canoe and the horses swum.

From the ford a broad trail, almost a road, leads to the site of the old Hudson's Bay post, a distance of about two miles. From here the original survey of the old telegraph line led south of Fraser lake, and this old trail, now almost obliterated through disuse, was followed for about three miles, when camp was made in a patch of timothy, the remains of the cultivation from the old fort. The land to the east of the lake is a flat bench, with good deep soil, covered with poplar, birch and willow, with some small spruce and fir. This flat continues through to the Nechaco river, which river here is flowing north.

August 13th—Min. temp., 45°; bar. alt., 2,650 feet. Left camp on the south side of Fraser lake at 9:30 A. M., taking an Indian hunting trail leading south. For about three miles from Fraser lake the country is rolling hills, mostly covered with alder and poplar, but containing some open patches with fair grass, sufficient for a small pack-train, although not enough to afford even summer grazing for cattle. At three miles out the trail passed along the end of the lake, extending some four or five miles to the westward and at an elevation of some 300 feet above Fraser lake. The trail leads over the height of land between Fraser and Cheslatta lakes, and, according to barometric readings, is from 1,000 to 1,200 feet higher than the first-mentioned lake.

The country crossed is a succession of rocky hills, rounded in form, the rocks exposed on the trail being granite and basalt with what appeared to be a highly altered argillite. The soil is poor and shallow, and the timber growth is chiefly dense alder brush with jack pine and small spruce. The trail is crooked and rocky, and so overgrown with alder brush that one has to force one's way through to find the trail for the horse.

A distance of 17½ miles was made this day over a trail of this sort, in a rainstorm so cold as to seem sleet, the wet bushes keeping one soaked all the time, and rendering this day's travel the most trying of the whole trip. Camp was made about 5 o'clock at a small slough with scant feed for horses, where, with great difficulty, a fire was made.

August 14th—Min. temp., 33°; max., 57°; bar. alt., 3,200 feet. A start was made at 8 A. M., still in the rain, through tangled brush on a very indistinct trail, over rocky and swampy ground, barren of useful vegetation. The country was still hilly for about five miles, when a succession of elevated terraces or plateaux was encountered, composed of boulder clay and gravel, with occasional areas covered with fragments of basaltic rock. In the middle of one of these rocky areas was found a blazed post marked "good grazing"! About noon, after travelling some 10 miles, the trail suddenly plunged down into the valley of a creek flowing into Hallett lake, the wide valley of which was covered with large cottonwood trees and small poplar, among which was found a most luxuriant growth of fireweed and pea-vine, with good wild grass, but little open country. Camp was pitched here beside the creek, about half a mile from Hallett lake, the horses being pretty well played out.

Hallett lake has a length of about five miles in a S. W. and N. E. direction with a width of about one mile, discharging to the N. E. into Kennedy lake, a lake of some size; and

thence into the Nechaco. The altitude of the lake appears to be about 3,100 feet. The water of the lake is deep and beautifully clear, with gravelly shores, and is reported to contain trout and white fish in large quantity, but, although serious attempts were made, the trout would not rise to a fly in August. In the creek, however, a few small trout were caught, and the creek was seen to be full of a species of land-locked salmon, about 12 to 15 inches long, similar to those found in Lac La Hache, in Cariboo. These fish had evidently gone up the creek to spawn. This creek is reported as flowing out of a small lake near the summit of the ridge to the north.

August 15th—Min. temp., 38°; bar. alt., 3,100 feet. Left Hallett lake at 8:40 A. M., travelling in a south-westerly direction for about 19 miles, and about 4:20 P. M. reached Cheslatta lake. From 8:40 until 10 o'clock the trail led along the low hillside, skirting Hallett lake, the soil being sandy and barren, supporting only jack-pine, save in the bottoms adjoining a few of the small creeks entering the lake, and these had no appreciable area. From 11 to 11:30 the trail skirted an unnamed lake about two miles long, which evidently flowed into Hallett lake. At the upper, or south-west, end of this lake there is an extensive swamp meadow covered with willows, the rising ground on either side being sand and gravel with jack-pine. This land had been apparently staked as a "purchase claim of 320 acres, by Francis Ferrin."

After leaving this flat the trail continued for the next six miles over comparatively level country, a sandy plateau devoid of feed or water, and covered with scrubby jack-pine and poplar. As this plateau approached Cheslatta lake it was found to form a terrace or bench, skirting the lake for some miles. When within a mile of the lake the trail rapidly descends from the bench-level to the lake, 200 or 300 feet lower, striking the lake near its outlet. The trail from Hallett lake to Cheslatta is excellent, well drained, hard and, save in a few spots, free from brush.

August 16th—Min. temp., 41°; max., 59°; bar. alt., 2,900 feet. Camp remained at the foot of Cheslatta lake. Cheslatta lake, at its outlet, is shallow and marshy and the outlet, a sluggish stream, flows for some two miles bordered by rushes and marsh grass, when it widens out into a marshy lake about two miles long, mostly covered with rushes, from which the waters discharge through a river two or three miles long into the Nechaco river.

On the south side of the outlet of Cheslatta lake was seen an Indian fishing camp, then deserted, and here were found two or three patches of potatoes and turnips, planted by the Indians in clearings made in the poplar woods. The vegetables were found to be of good size and in good condition, despite total lack of cultivation subsequent to planting.

August 17th—Min. temp., 43°; max., 58°. Camp was moved for a distance of about 13 miles along the north shore of Cheslatta lake to a creek cutting down through the bench land, where camp was made about 1½ miles up from the lake and at about 200 feet higher elevation. The trail for the greater part runs along the top of the bench which skirts the lake, occasionally dipping to lake level. Cottonwood and poplars chiefly are seen along the trail, with occasional patches of jack-pine. Fireweed and pea-vine grow most luxuriantly almost all along the trail in the woods, while on the higher rolling hills there are a number of open patches of considerable size, covered with a good quality of wild upland hay. Service-berry bushes are very plentiful, but the berries were not nearly as large or numerous as near Fraser lake, nor were they as ripe, an indication as to the climates of the two districts. The surface soil on the benches is exceedingly good, but is underlain at a few inches depth by gravel, of which the general bench is composed.

August 18th—Min. temp., 45°; bar. alt. of bench, 3,100 feet. Heavy rain during the night, which continued in the morning and delayed the start, but as the weather cleared later

the pack train was under way at 11:45 a.m., and the trail was followed westward for a further distance of about 10 miles, camp being pitched on a point of land projecting out into the lake, which point was formed by the washing down of the material from the benches by a creek, forming a flat delta of some 100 acres of splendid land, on which were growing some exceedingly large cottonwood, poplar, spruce and balsam, with alders near the creek bed. The soil on the delta is a fine rich loam, and the growth of grass is most luxuriant.

This is only one of some six or eight similar spots met with along the lake, which would each form a splendid small farm, with a limited amount of hillside grazing on the benches. These isolated patches are the only areas, however, found along the lake suitable for agriculture, while on the south side of the lake the hills follow the shore closely, and, judging from the timber growth, are probably composed of very sandy or gravelly soil, and have few open places which could afford grazing, presenting the appearance of an unbroken forest of small jack-pine and fir.

August 19th—Min. temp., 39°. At 8 a.m. the party was on the trail again, travelling along the lake shore until 12:30, when the west end of Cheslatta lake was reached, some 12 miles from the last camping place. Until within about one mile of the end of the lake the country is hilly, often composed of angular fragments of basalt, coming so close to the lake as to force the trail over the broken slide rock. Towards the end of the lake the hills become lower and more rounded and the country freer from timber. The lake depression extends to the westward as a marshy valley, through which a sluggish creek finds its way to the lake, through marsh hay meadows and muskegs, with occasional areas of firm prairie, while the rolling hills to the north extend for four or five miles, and over a large portion of them there is excellent grazing on good, sound, upland hay. Such timber as there is is jack-pine and poplar of small size.

This valley, for 10 to 12 miles westward from the lake, is of the character described, and admirably suited for cattle ranging, the bottom land providing sufficient wild hay for winter feeding. The valley rises from Cheslatta lake to a low summit some 350 to 400 feet higher than the lake, when the ground slopes off gradually towards Ootsa lake. Local trappers and Indians report that in winter the west wind sweeps through this valley to such an extent as often to keep the hills free from snow, permitting of winter grazing for cattle.

The trail from Bella Coola, on the coast, a distance of 180 miles, strikes the west end of Cheslatta lake and then turns west to Ootsa and Francais lakes.

At the head of the lake there is a small settlement of Indians, who are more than usually industrious and intelligent. For the convenience of prospectors and others they voluntarily run a post office and have some small supplies for sale. These Indians, belonging to the Fraser lake tribe, have a small bunch of cattle and horses and appear to make a decent living from ranching, rather than from hunting.

Camp for the night was made some six miles west of Cheslatta, where a branch from the main Ootsa trail branches off to the north to about the middle of Francais lake. Along this branch trail a number of homestead pre-emptions and South African land scrips have been recently staked off. This section was not personally visited, but surveyors who had been working there this past summer report the land as good, with much open country with grass, the timber chiefly poplar and small fir, a continuation of the section later described as bordering on Maitland lake.

August 20th—Min. ther., 24°; bar. alt., 3,250 feet. The night started very windy and rainy, but towards morning cleared, and we had the first frost of the trip, the thermometer registering 24° Fahr. during the night. Camp was moved westward a distance of about 11

miles, to the shore of a small lake about half a mile in diameter. About three miles west of the last camp, or about nine miles from Cheslatta lake, the summit was passed, when the country began to slope gradually to the westward, towards Ootsa lake.

Near the summit, on either side, the growth of trees and grass is stunted, showing the effect of very frequent high winds and cold weather, but with a very slight drop in elevation proceeding westward, the vegetation became very luxuriant. The trees were chiefly poplar and small spruce, with occasional birch, among which were numerous open patches, not large in area, covered with wild grass, while under the poplars and on the borders of the open patches the pea-vine and fireweed were more than waist high. The soil is a light, sandy loam, which in the natural state seems to retain sufficient moisture, but it is suspected that irriga tion would be needed with cultivation. There are few running streams, but there are a number of lakes which could be used as reservoirs, from which water could be distributed over at least a portion of the district.

About nine miles from the previous camp, or 15 miles from the end of Cheslatta lake, the trail passes through a little valley, or draw, in which "Skin Tyee," a renegade Indian from Hazelton, has a cabin and hunting lodge. The cabin is on the left of the trail, and on the right there are a couple of Indian graves. Just beside the graves the trail forks, the left-hand branch continuing on to Ootsa lake, while the right-hand trail leads north past Maitland's ranch to Francais lake at "Siwash John's" cabin, about 20 miles from the head, or west end of the lake.

August 21st—Min. ther., 31°; bar. alt., 3,200 feet. Travel was continued in a general S.W. direction for about eight miles, when the north shore of Ootsa lake was reached, about midway from its ends. Proceeding some three miles farther west along the lake, camp was made for the night in an open spot near the lake, in fir and poplar woods, with all around a most luxuriant growth of pea-vine and wild grass. By this trail it is, therefore, a distance of about 25 miles from Cheslatta lake to Ootsa lake.

About three miles before Ootsa lake was reached the proportion of clear land became much greater, the country having been comparatively recently swept by fire. Just where the trail strikes the lake there are immense meadows of marsh grass, where the Indians have for years been in the habit of putting up stacks of hay, so as to winter the horses, on which, in the fall, they bring in from Hazelton their provisions for their winter's trapping and hunting in this neighbourhood.

August 22nd—Min. temp. 24°; max. 62°; bar. alt., 3,200 feet. A start from camp was made only at 10:30 a.m., the delay being occasioned by one of the horses of the pack-train wandering off and dying. Poor feed and rough trail had by this time considerably weakened most of the horses.

The trail led along the rolling hills parallel to the general course of the lake, though sometimes a mile or two from it, for about seven miles, when, after dipping down to the lake shore at a point some 10 or 12 miles from the western end of the lake, it strikes N.W. in a more or less direct line for the west end of Francais lake. Camp was pitched about four miles from Ootsa lake, near the head of a small creek which flows south. Ootsa lake has a length of about 40 miles in a general east and west direction, with a width varying from one to three miles. The water is deep and clear, with a gravelly bottom. Fish are reported to be plentiful, trout, whitefish and land-locked salmon, all of large size, from 12 to 24 inches long. In summer, however, they could not be induced to take a fly, and those seen were taken in nets by the Indians, who, apparently, have no trouble in netting sufficient to dry for their winter supply. The whitefish are particularly fine, better even than those of Lakes Superior and Winnipeg.

The land to the south of the lake is hilly, with little or no level or gently sloping hillsides, and is covered with a dense forest growth of jack-pine and small spruce with no open patches of any importance. The hills rise from the lake shore, getting higher and higher in round-topped masses until, at a distance estimated at about 20 miles to the S.W., they gradually merge into a bold, rocky range of high mountains, the summits of which are covered with perpetual snow and glaciers, which undoubtedly have a direct effect upon the climate of the district and serve as a barrier to the warm winds of the Pacific ocean.

Between Cheslatta and Ootsa lakes on the south, and Francais lake on the north, there is a strip of country averaging some 20 miles in width, N. and S., probably one-quarter of it draining to the south and the remainder to the north. To the north of Cheslatta lake the country is hilly, with small lakes and poor soil. To the north of Ootsa lake, as far west as the point where the trail leaves it, viz., 10 miles from its western end, the country consists of low rolling hills, reaching a maximum elevation of some 400 to 500 feet above the lake, and mostly composed on the surface of soil of excellent quality, with large areas of open country well covered with upland hay, or, where timbered, with poplar and small fir. To the west of the point mentioned the country is broken and hilly, and little of it is suitable for agriculture, nor is there any timber of commercial value. On the Ootsa lake slope there are no streams of any size, and the configuration of the ground would render it difficult to bring on water for irrigation should it be required. Whether this would be generally necessary could not, of course, be ascertained in one visit, and there are no past records to consult.

The elevation of this general slope would be from 3,100 to 3,500 feet above sea level, and while it will probably prove suitable for hay and the raising of cattle, the elevation, combined with its proximity to the snow-capped mountains to the south, renders it doubtful if vegetables, etc., could be profitably grown.

August 23rd—Min. temp., 25°; bar. alt., 3,400 feet. Camp was moved a distance of about 14 miles in a north-west direction, to the west end of Francais lake. The first few miles of the trail was over a series of low, barren hills with much fallen timber of small size, the soil being poor and rocky. Three or four small lakes, apparently draining northward, were passed, when the trail descended rapidly for about two miles to an altitude of about 3,100 feet, the summit crossed being 3,600 to 3,800 feet. The last nine miles of trail was through a dense forest of jack-pines, over a comparatively level country, the soil of which did not appear capable of supporting any very luxuriant growth.

Camp had to be pitched on the south side of the Nadinaka river, where it flows into Francais lake from the west. Along the river valley are marshy flats, having a width of about half a mile, and extending westward up the river as far as could be seen. These flats were covered with a rank growth of marsh hay and willow bushes, and appear to be flooded each high water, and were not high enough above the river level to permit of their being drained even at low water.

August 24th—Min. temp., 34°; max., 62°; bar. alt., 2,800 feet. The day was spent in getting the horses and camp outfit across the head of Francais lake. A raft was constructed on which two men crossed to the north shore, where they found a canoe in which the party and baggage crossed, the horses swimming across the river.

August 25th and 26th—Min. temp., 29°; max. 62°. In camp on the north side of Francais lake. The day was spent in repairing the canoe for a trip down the lake and in triangulating the head of the lake from a measured base-line.

August 27th—Left the pack-train in camp and started east, down Francais lake in an Indian dugout canoe, paddling and rowing from 10 A. M. until 7 P. M., travelling some 17 miles, finally making camp on south shore of lake.

August 28th—Min. temp., 24°; max. 62°. After 1½ hours paddling, making about three miles, we arrived at a collection of three or four Indian houses, known as "Siwash John's," a winter hunting headquarters of a family of Hazelton Indians. There is an Indian trail along the south shore from the head of the lake to this point, but it is in poor condition and seldom used by whites. From Siwash John's a trail leads southward to the Cheslatta-Ootsa trail at "Skin Tyee's" cabin, a point already noted.

Leaving the canoe, this latter trail was followed in a southerly direction for eight miles to Tatalaska lake, where Maitland and a number of other pre-emptors and "scrippers" had this past season taken up land for farming.

The south shore of Francais lake, for the distance travelled, is composed of low but sharply-rolling hills rising from the water's edge, save in two or three intervals where small creeks flow in, along which are narrow valleys, with a very limited area of arable land near their outlets. These hills, as exposed on the lake, are seen to be composed of basalt and similar rocks, covered with but a thin coating of soil.

"Siwash John's" rancherie is located on a draw of this description, up which the trail leads through a forest of cottonwood, poplar and alder, with occasional spruce of good size. About two miles from the lake shore the ground rises rather suddenly to an elevation of about 200 to 300 feet above the lake to a rolling plateau country, draining to the north. The surface of this plateau consists of gently-rolling rounded hills or knolls, among which are a number of small lakes.

A large proportion of the country is open and free from trees, while the remainder is sparsely covered with poplar and, in the hollows, willows. The soil is a light sandy loam, very fertile and supporting, in the open parts, a splendid crop of upland wild hay and pea-vine.

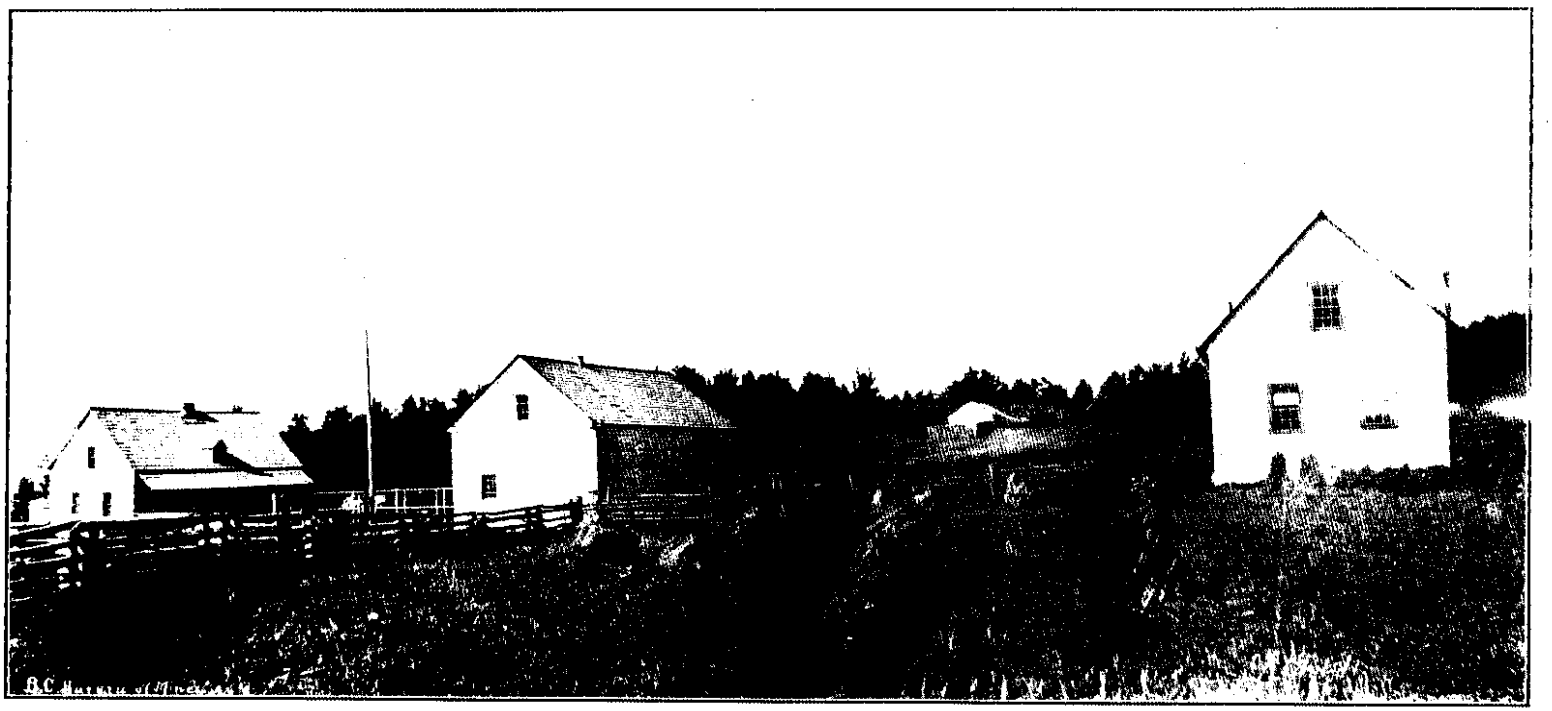
In the neighbourhood of Maitland's ranche, on Tatalaska lake, there were several thousand acres of land practically clear, or that could be cleared with little expense. The ground is clear of stumps and brush, and not even a small stone was to be seen on the surface. In a number of places a mowing machine could be put on at once and a good crop of upland hay cut. The land seems adapted to hay or grain, and will doubtless grow all the vegetables should summer frosts not interfere.

There is plenty of water for stock in the lakes, but the configuration of the ground puts irrigation out of the question. The snowfall is not great, a couple of feet at the most, while the rainfall in summer will usually be all that is required.

Between Francais and Ootsa lakes there appears to be an area, roughly estimated, as about 30 miles long, in a N. W. and S. E. direction, by about six or seven miles wide, which is of the character described, and sufficiently clear of trees for immediate cultivation, while such poplar timber as is standing could be easily cleared away by the time it was required for cultivation. In this district there are as yet no permanent settlers; Maitland has the frame of a cabin built, but this is the only attempt so far made at permanent settlement by whites.

On the north shore of the lake the ground rises rapidly to a succession of hills, estimated as from 800 to 1,500 feet above the lake, with very few level or gently sloping portions, and all covered with a growth of small jack-pine and spruce. In the 20 to 25 miles of the west end of the lake visited, there are two creeks of good size entering, and around the mouths of these there is a limited amount of arable land.

There is reported to be on the north shore of the lake, about midway from the ends, a considerable extent of open bench country, upon which a number of locations have been made recently, and a trail therefrom cut north to join the main telegraph trail near Burns lake. This section was not, however, seen by the writer.



HUDSON BAY CO'S POST FRASER LAKE—WITH BARLEY FIELD IN FOREGROUND.

August 29th—Rowed and paddled the canoe from "Siwash John's" to the west end of lake, a distance of 20 miles.

August 30th—Mim. temp., 36°; bar. alt., 2,800 feet. Broke up camp on Francais lake about noon, and moved north-west along the Indian trail to the Bulkley valley, for a distance of six miles, camping for the night in a clearing of some 20 acres, around an old Indian cabin and fishing station, on Grave Post creek, a small creek draining to the south-east.

For a couple of miles from Francais lake the country is open in patches of a few acres each, the woods being chiefly poplar; the surface is rolling and hilly, with some small lakes, and rises along the trail to 500 or 600 feet above the lake. The soil is excellent and sustains a heavy growth of pea-vine under the poplars, and in the intervals grow pea-vine, wild barley and upland grass, making very fair summer feed. About four miles from the lake the trail passes for about a mile through a low-lying, wet, spruce swamp, with a growth of large timber, which seems to be part of a draw in which are a number of small lakes and creeks, discharging to the south into the drainage of Lake Francais.

From the head of Francais lake, besides the trail taken directly over the hills, there is a second Indian trail to the Bulkley valley. This follows up the Nadinaka river westward to its source in two small lakes, then turns north over a low summit to the valley of the Morice river, the north shore of which it follows down to its junction with the Bulkley river at Pleasant valley. This trail is the one most used by the Indians, for though it is longer, and inclined to be soft in spring, along it there is more feed and better hunting.

August 31st—Min. temp., 32°; bar. alt., 3,200 feet. A start was made from Grave Post creek at 9 a. m. and the trail was followed in a general northerly direction until 6 p. m., when, after a "drive" of about 22 miles, camp was made for the night in the valley of the Buck river, at the junction of the first creek entering from the west. From 9:40 until 11 a. m. the trail led due north for five miles to the end of the lake, or rather two connected lakes, having a length of about six to seven miles in an E. and W. direction. The trail followed along the north side of these lakes through rolling-hill country, mostly covered with poplar, but with occasional open spots, on which there was a luxuriant growth of fireweed and pea-vine, while in the more extended clear spots the pea-vine seems to have been replaced by a wild upland grass. After leaving these long lakes the trail turns abruptly north for some miles through a spruce swamp, in which the trail is bad, being soft and much cumbered with roots and fallen timber. After passing the swamp the trail follows along an open side-hill, covered with upland grass, to a pass between the higher hills, and crossing a summit at an altitude of about 3,600 feet, follows down the valley of the Buck river—a tributary of the Bulkley, and consequently in the Skeena watershed. On the slope to the north of the summit there is an extensive area of high, open grazing country, but at this time of the year it was found to be devoid of water, and so not available for camping.

September 1st—Min. temp., 38°; bar. alt., 2,900 feet. After crossing the summit the previous day, the valley dropped quickly, the elevation of the camp on Buck river being some 700 feet lower than the summit. Camp was broken at 9:10 a. m., and, after travelling some 16 miles, tents were again pitched for the night on the banks of the Bulkley river, about three miles below the mouth of the Buck, in an extensive flat valley, locally known as Pleasant valley.

The Buck river is a considerable stream even in summer, having a width of from 20 to 30 feet and a depth of 12 to 18 inches, with a velocity of about 6 miles an hour. The valley of the Buck, in the lower portion, has been cut through glacial clay and boulder deposits, and is often little more than a gorge, with a little flat land along the bottom, first on one and then on the other side of the creek. The trail follows along the west bank of the stream, being now

and then forced up on to the bench, some hundred feet higher, but soon descending again to the valley bottom. There are a number of small intervals in the bottom affording good feed for stock, but the benches above are, as a rule, barren and covered with jack-pine of small size.

About six miles up from its confluence with the Bulkley river, a stream locally known as Bob creek flows in from the east, on which a number of years ago some placer gold mining was done, but, as far as can be learned, without yielding any very great returns. This creek has been abandoned for years, save by itinerant prospectors or Indians, who take out a little gold dust in a crude way.

A short distance below the junction of Bob creek the trail leaves the valley of the Buck, and cutting N. W. over the bench through a spruce forest, strikes the Bulkley about three miles below the junction of the Buck. By this trail the distance from the head of Francais lake to Pleasant valley, on the Bulkley, is about 44 miles, and occupied in continuous travel by pack-train some 18 hours. The head of Francais lake is distant by trail from the head of Cheslatta lake some 42 miles, which would make Pleasant valley distant from Bella Coola by trail some 266 miles. From Pleasant valley to Hazelton the distance by trail is estimated at about 100 miles.

Between Francais lake and the Bulkley valley there are few exposures of solid rock formation, even on the higher elevations, the hills near the trail being rounded on top and, at least superficially, covered with soil. At some little distance on either side of the trail there are higher peaks, usually presenting at least one precipitous face and indicating, even from a distance, by their formation, that they are entirely composed of the close-grained, dark basalt which seems to have capped the whole district so far travelled through. This basaltic flow seems to be still in horizontal sheets, not having been subjected to any subsequent upheavals, although land-slides of considerable magnitude have occurred probably from the disintegration of softer underlying ash beds, which has resulted in the tilting and apparent faulting of large masses of these basalt beds.

On the Francais lake slope all the loose rock and boulders seen were also basalt or some closely allied volcanic rock, and the same was true of the Bulkley slope, on the higher elevations, although in the valley, which is some 600 to 800 feet lower than the Francais lake country, the surface is covered with glacial clay and drift, with occasional out-croppings of a lignite-bearing formation.

September 2nd—Min. temp., 38°; max., 72°; bar. alt., 2,200 feet. Camp remained at Pleasant valley, on a land pre-emption taken up and held by Jas. B. Silverthorn, and the day was spent in riding up the valley to the east. Pleasant valley, so-called, extends on the south side of Bulkley river for several miles east and west from the junction of the Buck, and is a flat, level valley-bottom, a few feet only above high water level of the river, and flanked by a couple of successive benches gradually grading into rolling hills, forming the plateau already mentioned as travelled over. While the soil of the plateau does not appear from the vegetation to be particularly fertile, being the boulder clay just as it was originally deposited, that of the benches and valley bottom is a lake-bottom deposit (probably the sedimentary deposits of old level lakes or of a sluggish river, formed from the disintegration and re-assortment of the high-plateau materials), and is a light, sandy loam mixed with humus, which, although light and possibly requiring irrigation, is exceedingly fertile.

The growth of pea-vine and wild grass previously met with at various points has been properly spoken of as luxuriant, but all growths previously encountered were completely eclipsed by that found in the Bulkley valley, and particularly at this point. It is no exaggeration to say that the pea-vine over large stretches was as high as a man's shoulder, and so thick as to offer a serious impediment to a man's progress through it on foot or even on horseback.

This rank growth is found on the bottom lands, and while on the benches the pea-vine is missing, there is a crop of wild grass sufficiently plentiful to cut for hay and affording the finest kind of grazing for stock. The amount of this bottom and bench land considered available for immediate cultivation is roughly estimated at 10,000 acres, of which possibly one-half is clear of trees and the rest sparsely timbered with poplar and cottonwood, with a few willows, which offer no serious obstacle to immediate settlement. The fall of Buck river is sufficient to enable the water thereof to be brought on to the benches at a comparatively small cost, should the lightness of the soil render this necessary after cultivation. Up to the present time this heavy growth of grass has stood until rotted by the snow, one summer's growth serving to fertilise the next, and lying as a mat on the ground, undoubtedly served to retain the moisture and so perpetuated the heavy growth. It is, therefore, difficult to say whether irrigation will be necessary when the ground has been repeatedly cropped and when the pea-vine has disappeared, as it certainly will disappear when cropped or eaten down by stock, for pea-vine grows from seed, and if the vine is destroyed before the seed is ripe the crop will not reappear.

September 3rd—Min. temp., 40°; bar. alt., 2,250 feet. Left camp this morning at 9:10, continuing down the flat on the south side of the river for a distance of about three miles from J. B. Silverthorne's pre-emption, all over flat bottom land such as described. The river was here forded. At low water the ford is shallow, and has a good, firm gravel bottom, but during high water it must be dangerous. The trail then follows the north bank of the river for about two miles along bottom land covered with poplar, cottonwood and willows. On this side of the river the bottom land is narrow, and does not present any great area of arable land, while a range of rough hills follows the river down to about this point, Barrett's ranche, where the range culminates in a precipitous face of basalt rock. West of this point the country from the river northward rises by a series of rounded, grass-covered foot-hills, in a distance of about eight miles, to a height of 400 to 600 feet above the river.

Barrett's ranche is located just to the west of the basalt bluff mentioned, and extends from near the river back over the first of the low hills, connecting with what is known as the "Dominion Government ranche," which covers several square miles of high rolling hills, much of which supports a growth of wild upland hay. At Barrett's ranche a couple of good log houses have been constructed, and a large log stable and barn, the former not as yet occupied, the latter filled with wild hay of excellent quality. In a field adjoining the barn is a stack of hay of perhaps 150 tons, which had been cut with mowing machines on the hillside. No cultivation of the soil has as yet been attempted, yet this is reported to be the fourth crop of hay which has been taken from this land, and it appears to be an excellent one, of a round-stemmed wild grass, much resembling in appearance the regular bunch-grass.

From Barrett's ranche the trail strikes due north for about six miles, until it connects again with the main telegraph trail at the "Government ranche" on Barrett's lake. The "Government ranche," so called, is said to be owned by Messrs. Charleston and Barrett, who have a contract for packing supplies to the cabins along the Dominion Government's Yukon telegraph line, and who winter their pack-trains here, having no difficulty in putting up any desired quantity of wild upland hay. A log house and barn have been erected here, and have been used for some years as the winter headquarters of the pack-trains mentioned.

The main telegraph trail was followed north-west from Barrett's lake about two miles through spruce woods, when camp was made for the night on a large open spot near a creek flowing south into the Bulkley. The distance from the Pleasant Valley camp was estimated at about 14 miles.

From this point north-westward may be said to be the arable part of the Bulkley valley. Strictly speaking, it is not the valley of the Bulkley river, since the river occupies only a deeply worn canyon on the south-western edge of the main valley—the valley of the great ancient river or lake flanked on the north by the Babine range of mountains and on the south by a range known locally as the "Hudson Bay range."

Between these two ranges, which are some six to eight miles apart, is a stretch of easily-rounded hills, hillside and flats, some 200 to 400 feet above the level of the present river. This land all drains eventually to the river, but contains several small lakes which catch and unite the smaller streams. The soil is a clayey loam, and is probably an old lake-bottom deposit. Until the base of the main range is approached, the land has been, except in swampy places, cleared of the original growth of spruce and fir, evidently by fire, the second growth consisting of poplar and willow, and covering about half the area, the remainder being clear and covered with pea-vine, fireweed and wild hay.

September 4th—Min. temp., 41°. Camp was moved north-west along the trail for a distance of 14 miles to the "Le Croix ranche," on Round lake, a lake about a mile in diameter. The trail runs along nearer the foot of the northern range and some four miles from the Bulkley river, on an undulating plateau, the greater portion of which land appeared to have been recently taken up either by pre-emption or by South African war scrip, but as yet there are few permanent settlers. Following the course of the river there appears to be a gravelly ridge covered with small spruce and fir. To the north of, and between this and the Babine range, is the good land, which lies at a lower level than the ridge near the river, and forms a comparative depression which runs parallel to the river for many miles. In this depression are the rolling hills and the small lakes, probably the bottom of the ancient water-course, the present river having cut a new channel for itself. The soil is a clay loam, and in the hollows a blue clay, seemingly very fertile. This general description holds good for the whole distance travelled down the river to Moricetown.

In the vicinity of Round lake there are, however, several occupied homesteads, that of Gabriel Le Croix being in the most advanced state of cultivation, and so best exemplifying the possibilities of the district. The Le Croix ranche is situated on the northern shore of Round lake and extends up a gently sloping hillside, mostly clear land, which had borne that year fine crops of hay and oats, and afforded feed for a herd of dairy cattle. In the garden near the house was found as fine a crop of potatoes as could be seen anywhere; also beets, turnips, carrots, cabbages, cauliflowers, cucumbers, rhubarb, peas, beans, etc., with corn and tomatoes—these latter, however, not having ripened. The small fruits—strawberries, raspberries and currants—do well. There are not as yet in the district any fruit trees old enough to bear. The cattle seen were in the very best condition. The milch cows are stabled for from three to four months in winter, and all stock fed for about that length of time.

Summer frosts did not cause trouble in 1905, but are reported as being of no unusual occurrence. These will, however, disappear as a larger proportionate area of the country is brought under cultivation.

This section is fairly open country. The timber is mostly poplar, which can be quickly cleared and the land made ready for the plough.

September 5th—Min. temp., 29°; bar. alt., 2,300 feet. During the night we had frost, which touched the vegetables in the Le Croix garden, followed by rain, which delayed departure in the morning until 10:20 o'clock, when, after following the trail for about six miles through a succession of spruce swamps, the townsite of Aldermere was reached. There is no town here, merely two log saloon-hotels, in one of which is a store, containing a reasonable stock of essential supplies. The townsite is located on a high dry bench about half a mile

from the junction of the Bulkley and Telkwa rivers, and about a mile from the telegraph station on Tyee lake, the telegraph trail proper keeping well back from the river on the hillside. Camp was made on a low flat on the bank of the Bulkley, just opposite the mouth of the Telkwa.

September 6th—Min. temp., 25°; max., 60°; bar. alt., 1,900 feet. The day was spent in replenishing supplies at the Aldermere store, swimming the horses across the Bulkley, the baggage being taken over in canoes, and making camp on a gravelly flat at the mouth of the Telkwa river.

The Bulkley river is a large and swift stream here, and even at very low water is difficult to cross with horses. The banks on the south side of the Bulkley, near the mouth of the Telkwa, are rocky and steep; in fact, there is a short canyon and rapids at this point, up which it is difficult to take canoes, so baggage is ferried across, below the rapids, while in crossing from the north to the south side of the river the horses have to be taken a mile higher up the river, where they can swim across and make a landing on the south bank. There is a good beach on the north side at the canoe crossing, so that in coming from the south horses can be crossed.

There was a bridge across the river at this point, built three or four years ago by Messrs. Limin & Davis, who were prospecting for coal on the Telkwa; but this was constructed with a central crib-work pier in the river, which was promptly washed out at the first high water.

September 7th—Min. temp., 23°; bar. alt. (bench), 1,950 feet. The main trail on the Bulkley was here departed from and a trip was taken up the Telkwa river to inspect certain mineral locations which had recently been made there, and as the party was to return to this same point, all superfluous baggage and supplies were left here, and by the courtesy of Mr. Arthur Webster were stored in a house he was occupying, belonging to Messrs. Limin & Davis.

It was learned that all the prospectors had gone away from their claims in the hills, driven out, it was reported, by a snow-storm about the 23rd of August; consequently, a local prospector, Mr. White, was engaged as a guide to this section to show where the properties were. It was, however, subsequently found that his knowledge was general rather than specific, and a few only were found of the claims located.

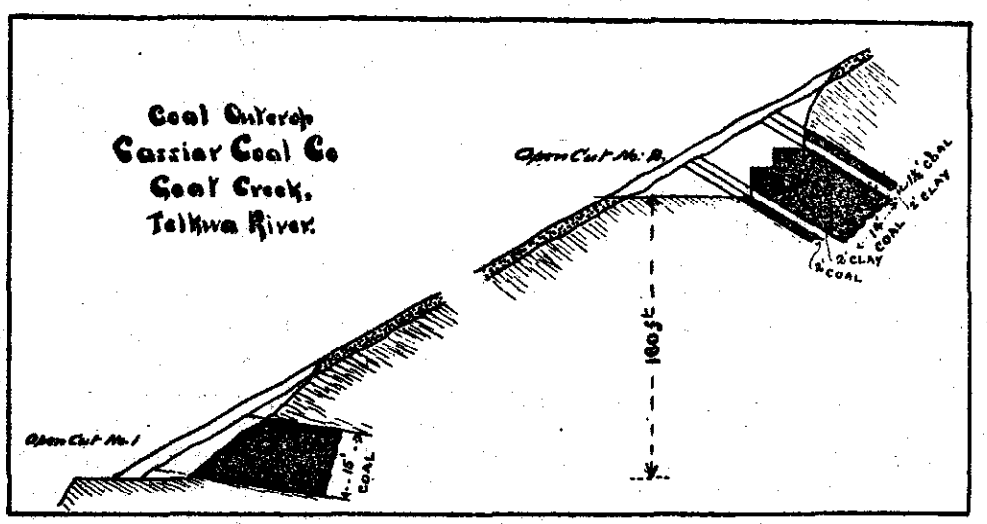
The trail up the Telkwa is on the right or east bank of the river, and after leaving the flat at the mouth runs along a gravel bench, the whole valley of the Telkwa being composed of rounded gravel wash, into which the present stream has cut its channel. About two miles up the Telkwa trail, a trail leading up Goat creek branches off to the left. About four miles up the trail crosses over Goat creek by a ford, known as the "first crossing of Goat creek," and follows up the opposite side of the creek for about four miles to the "second crossing," a distance from the Bulkley of about ten miles. Camp was made at the second crossing, but there is very little feed for horses, and great trouble was experienced in holding them. The trail is very good up to the first crossing, being over gravel bench land, but after making the crossing it continues on the creek bottom, through spruce woods, for two miles, at an altitude of 2,500 feet. It then climbs a long, steep, clayey hill, reaching a bench with an altitude of 3,300 feet, a rise of 800 feet in about two miles—about as bad a trail as could be.

COAL.

Cassiar Coal Co.

Just before making the first crossing, and within a hundred yards of the trail, there were some open cuts, made by the Cassiar Coal Co. in the development of its coal lands. The development work done is naturally rather superficial as yet, since there will be no market for coal until the railway is an accomplished fact, and serves rather to demonstrate the presence of coal, with its probable extension,

than to prove the extent of the beds and the conditions under which they will have to be worked. The coal outcroppings in question occur in a low foot-hill, having a maximum height of some 300 feet above the creek bed. This hill is perhaps better described as the edge of a clay bench cut by the water-courses. The entire surface is covered with a wash, some feet deep, of clay, the outcroppings being further masked by a luxuriant growth of underbrush, etc., rendering any prospecting difficult if not impossible, unless carried out in a most systematic manner and by the aid of detailed surveys; and as this is expensive work, it is perhaps too early as yet to expect much in this line. The work done, as far as could be found at this point, consisted of two open cuts.



No. 1 Cut was found about 100 feet from the creek and about 50 feet higher than the creek bed. Here the clay surface-wash had been removed for a width of some 10 feet, exposing the face of a seam of coal which, as far as could be determined from the exposure, had a thickness of some 15 feet, and appeared to be dipping into the hill (up the creek) in a N. 30° E. direction at a very slight angle, probably not exceeding 5° to 10°.

The roof and pavement of this seam, as exposed, were clay, which, it is suspected, is the surface disintegration of a shale, to which it will probably alter as depth is gained. As is always the case even with the best of coal, the croppings are very much broken up and the interstices filled with clay, and here the coal has not been cut into more than a couple of feet, so that no very flattering idea of the probable quality of the coal is obtained. The most that can be said is that there is a seam as described, and that it appears to lie regularly and undisturbed. No sample was taken of this exposure, as such would not have done justice to the probable ultimate quality of the seam.

No. 2 Cut.—Some 150 feet higher up the hill, and about 75 feet further to the north, is No. 2 Cut, which is much more satisfactory, in that it presents a better exposure of seams, in all probability quite distinct from that seen in No. 1. This No. 2 Cut exposes, in ascending series:

An underlying clay or clay shale;
Coal, 2 feet thick, of fair quality;
Clay shale, 2 feet thick, containing "iron stones" ($Fe S_2$);
Coal, 14 feet thick, which was sampled down the whole face; the analysis of which is given herewith;

Clay shale, 2 feet thick ;

Coal, 1½ feet thick ;

Clay shale, overlying, and only partly exposed.

These measures dip N. 30° E. and the same direction as in No. 1 Cut, but at an angle of from 20° to 25°.

A short distance above these exposures and above the "first crossing," Goat creek has cut the edge of the hill in which the coal measures occur, so as to produce an almost perpendicular bluff extending from the creek bed up to a height of 300 feet. About half-way up the face of this bluff, and quite inaccessible without constructing apparatus, was seen a longitudinal exposure of a coal seam, which from its position and size appeared to be the same seam seen in the No. 2 Cut, just described. This exposure is about a quarter of a mile from No. 2 Cut and shows that extent of the seam. In the bluff the seam is nearly horizontal, the dip of 20° noted in No. 2 Cut having flattened out as it got under cover.

A further description of these exposures is given later in this Report (pages 122, 123), in an extract from a report thereon by Mr. F. H. Shepherd, of Nanaimo.

The following is the analysis of the sample of the 14-foot seam taken only about six to eight feet in from the absolute outcrop, and represents the average of the seam as at present exposed. If a sample could have been obtained from a greater depth and freer from surface influences, it would probably show a materially better analysis.

Analysis from 14-foot Seam of Coal on Cassiar Coal Co., No. 2 cut, on Goat Creek, Telkwa river basin.

Moisture	6.6 per cent.
Volatile matter	29.0 "
Fixed carbon	56.9 "
Ash	7.5 "
(Non-coking.)	100.0 per cent.

This analysis indicates the coal to be a fair quality of bituminous coal, with a percentage of ash in this surface sample higher than it should be, while the percentage of volatile matter is lower, and the percentage of fixed carbon higher than is usually found in a bituminous coal.

This coal-bearing formation is probably of Tertiary age, and under normal conditions should still be evidenced a lignite, but as to what the unusual conditions were which produced the change evidenced in the coal as found, the easiest and most probable explanation lies in the fact that the immediately adjacent higher mountains are found to be composed almost exclusively of volcanic overflow rocks, basalts, tuffs, etc., which represent a later period in geological history than do these coal measures. This volcanic overflow we have found to have at one time covered the whole of the interior plateau, and its absence in any particular place is probably the result of erosion and disintegration of the deposit. In the surrounding mountains the volcanic rocks are found little disturbed, often only slightly tilted, although frequently faulted, while the valleys, basins and gulches are the effect of erosion. It is possible, therefore, that the entire coal formation, as it may exist here, was covered by this molten overflow, and that the exposures found have been rendered "get-at-able" by the removal of the overlying formations by erosion.

If such was the case, as is supposed, the superincumbent weight and heat of this molten mass would undoubtedly have changed a lignite into coal of the character found. Not only would such geological conditions have had this marked beneficial effect upon the coal, but they would have a much more important bearing upon the value of the field from a practical point, inasmuch as, in the old wide valley of the Telkwa, the greater part of the coal known is found

at an elevation superior to that of the larger area of the valley; hence, except for possible action of faulting, the greater part of the coal originally deposited over this area would appear to have been removed by subsequent erosion.

If, however, the supposition as to the volcanic rocks overlying the coal is correct, then the coal might be expected to be found underlying many of the remaining hills, which, as exposed on the surface, are undoubtedly of volcanic origin; in which case there is no visible limit to the extent of the field, and the chances are that underlying the solid formation the coal would be found better and under more easily workable conditions than under the clays of the present valley.

If, on the other hand, as has been reported by certain engineers who have examined the district, these igneous mountain masses surrounding the exposed coal field are igneous bosses thrown up directly from below, and not a volcanic overflow, then these volcanic rocks must be the absolute and final boundary of the coal field. In such case, which is not assumed to be proven, the area of the field would be very limited, since the coal, at least here, is found near the border of the valley and is dipping towards and, it is hoped, under these surrounding volcanic rocks. A volcanic flow must, of course, have had points of issue, remaining to-day as "stems" (perhaps of great size, practically volcanic bosses or upheavals), and whether these may be underlying these particular hills is a question which can be determined only by extensive works, or by explorations in detail.

Coal exposures were later noted in the valley of the Bulkley, at an altitude of some 1,800 to 2,000 feet, also in the main Telkwa, at an altitude of about 2,400 feet. There will be described later exposures on the locations of the Transcontinental Development Company, situated some four to five miles higher up Goat creek, at the junction of 4-Mile creek, at an altitude of 3,400 feet, while over the water-shed, on the Copper river slope, coal exposures have been carefully surveyed which lie at an elevation of about 4,000 feet. These latter are in a district bordering on the main Coast range, and this has probably been elevated by the same upheaval, and is, therefore, not connected with the basin at present under consideration.

(The chronological order in which this Report has been carried out will here be temporarily departed from, in order to keep together the descriptions of the coal deposits visited.)

The coal exposures next seen (September 9th) were those of the Transcontinental Development Syndicate, situated on Goat creek, about two miles above the "Second Crossing," at the junction of 4-Mile Creek with Goat, and are reached by a short trail branching off to the left from the main Goat creek trail leading to Hunter basin.

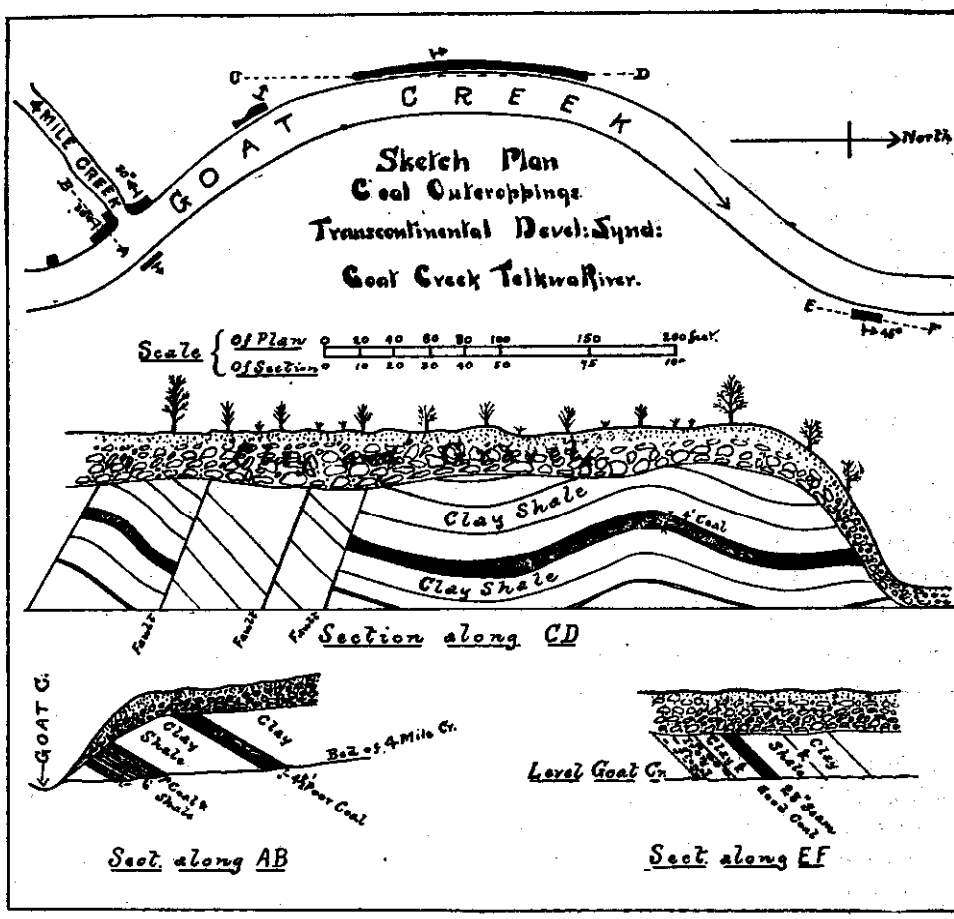
Preliminary surveys and development of these areas had been carried on during the summer (1905), under the direction of Mr. Arthur Webster, who had been seen at the mouth of the Telkwa on his way "out," and from whose description and sketches the locations were found. Mr. Webster's work had been confined to a short season with a small force of men, and, as much of the time had been occupied in the construction of a log cabin for the workmen and in preliminary surveys, the amount of actual development work done was slight and was confined to the stripping of coal outcrops where cut by the creek. The location and extent of the outcrops seen can best be indicated by the accompanying sketches.

The valley of Goat creek at this point is about 2,000 feet across, to the base of the high banks, the bottom land being from 20 to 40 feet above the creek. The coal measures are here, at least locally, so very much contorted, faulted and eroded, that it was found impossible to correlate the various exposures found, or to form any idea as to the probable extent of the deposits; so that, consequently, description will be confined to the individual exposures.

Where 4-Mile creek flows into Goat creek, on the west side, it cuts through a coal outcropping which is found dipping S. 70° W., at about 30° angle. The underlying seam is

COAL SEAM OUTCROPPING ON GOAT CREEK, TELKWA.

COAL OUTCROP, KITIMAT COAL Co. TELKWA RIVER.



about six feet thick, and consists of narrow bands of good coal, interstratified with bands of shale in about equal proportions. Above this, and separated by about 15 feet of clay shale, is a bed four and a half feet thick of coal, also mixed with clay partings. No attempt had been made to trace these seams under cover.

On the east side of Goat creek, at this point, a narrow seam of coal was noted in the creek bottom, on which no stripping had been done, and which appeared to be dipping to the north-east.

A short distance down stream, on the west side, a four-foot seam of coal, impure with shale partings, has been exposed by the creek for a distance of over 150 feet. These measures are found to be so faulted and contorted as to render it uncertain as to whether or not they are in place.

Some 150 feet down the creek from the last exposure, and on the east side, a 28-inch seam of coal was seen, dipping at a fairly steep angle. The coal in this seam is almost free from shale partings and is of very good quality, as the following analysis by the Provincial Government Assayer indicates :—

Moisture	0.8 per cent.
Volatile matter	8.2 "
Fixed carbon	81.6 "
Ash	9.4 "
(Non-coking).	100.0 per cent.

Near certain fault planes, samples of the coal so affected approach in character to an anthracite, but the quantity of such is unimportant.

On September 14th the coal areas of the Kitimat Development Syndicate were visited. On these the exposures were reported to be chiefly on the main Telkwa river, above the junction of Goat creek. The trail was followed up the south bank of the river for from 2½ to 3 miles above the mouth of Goat creek, where coal measures were found outcropping on the trail, with evidences of an old tunnel, long since caved in, so that no measurements as to the thickness of the seam could be obtained. The tunnel appeared to have dipped to the south into a clay-shale hill. The dump was carefully examined, and from its evidence it appeared that the coal in the seam was so very much mixed with clay-shale partings as to be of no commercial value.

On the north bank of the river, about a quarter of a mile below this, in a bluff about 30 feet high, formed by the river cutting into a lower foot-hill, there was seen a splendid exposure of coal. It was found impossible to cross the river to the bluff, as the bridge was gone, so a photograph, which accompanies this Report, was taken from the south bank, a distance of some 50 to 60 feet. Here is exposed, in a perpendicular face from the water up, a coal seam judged to be from 18 to 20 feet thick, dipping N. 25° E. at an angle of about 15°. There were visible certain shale partings and bands, but there appeared to be bands of coal of workable thickness.

Since the seam could not be actually measured by the writer, the following extract is given, taken from a report made in 1900 by Frank H. Shepherd, M. E., for Mr. Samuel Robins, of Nanaimo, and others:—

"The first outcrop encountered and hereafter referred to as the 'lower location' is on the north bank of the Telkwa, the seam forming a perpendicular bluff of about 30 feet and ending in the swift waters of the river. It was necessary to be lowered by a rope to obtain a complete section of the seam, which, notwithstanding the difficulty of the position, was carefully taken as follows:—

"Roof			Gray shale.	
Coal	2	feet	3	inches.
Shale			2	"
Coal	7	"	3	"
Shale			2	"
Coal	4	"	6	"
Shale	1	"	0	"
Coal	4	"	3	"
Bone and shale	1	"	9	"
Coal	2	"	2	"
Shale			1	"
Coal			5	"
Total	24		0	"
Total coal	20	"	10	"
" shale	3	"	2	"
" seam	24		0	""

The total coal, above the 1 foot 9 inches of shale, is 18 feet 3 inches, which would be considered the workable portion of the seam. Strike of seam, 292° (mag. variation, 25° E.); angle of dip, 16° 30'; course of dip, 22°. This is a splendid outcrop and sufficiently hard to have withstood the torrents of the Telkwa for an "evidently long period."

Character of the Coal.

"This is an altered coal possessing a high percentage of fixed carbon, due to its contiguity with the igneous rocks which underlie the whole of the field. The result has been to raise the fixed carbon and to reduce correspondingly the volatile hydro-carbons, and appears to have been fairly uniform in its action."

Continuing, Mr. Shepherd gives the actual section of what he calls the "upper location," and which is probably identical with the exposure described as on the claims of the Cassiar Coal Co. on Goat creek.

The "lower" and "upper" locations are about three-quarters of a mile apart, and the ground is covered with heavy vegetation, rendering a rapid exploration impossible. (The Provincial Mineralogist makes this distance nearer three miles.)

"The upper location is shown on a steep precipitous bluff and is inaccessible, but is again exposed on a small creek (Goat creek) a little to the east, where the following section was taken:—

"Roof			sandstone.
Coal	4	feet 0	inches.
Shale		5	"
Coal	3	" 5	"
Hard shale		1	"
Coal	1	" 7	"
Bony shale		3	"
Coal		4	"
Black sandy shale		1½	"
Coal	1	" 0	"
Bone		1½	"
Coal	1	" 0	"
Bony coal		2	"
Coal	1	" 10	"
Shale	1	" 4	"
Coal	1	" 1	"
Total seam	16	" 10	"
Total coal	14	" 4	"
" shale	2	" 6	"
Workable coal	13	" 2	""

Boring for Coal.

On the Bulkley, just where the Telkwa flows in, there is an exposed bluff of a fine-grained, light-coloured rock, which extends underneath the surface gravels and wash for some distance up the valley of the Telkwa. This rock formation has been popularly described as a "sandstone," and has been supposed to be a member of the local coal measures, probably from its general appearance and the fact that sandstones are associated with the carboniferous coal measures of England and the eastern portion of America.

Messrs. Limin and Davis, who were among the original holders of coal locations on the Telkwa, brought in a hand-power diamond drill and with this put down bore-holes at a number of points. Of these no definite information is obtainable, but it is reported by the workmen that in none of the holes was coal found. One of these holes was put down in the rock exposure at the junction of Bulkley and Telkwa, erroneously supposed to be a sandstone, while other holes were put down farther up the Telkwa valley, a pit having been sunk through the gravel to bedrock.

The fact that this formation is not a sandstone became evident upon closer examination, and some five samples were taken from different points, one (3,784E) being part of the diamond

drill core obtained at a considerable depth. These samples were sent to Professor Dresser, of Montreal, for microscopic examination, who classes them, one and all, as of volcanic and not of sedimentary origin. The exact text of Prof. Dresser's report is appended as a foot-note.*

As a matter of fact, the Provincial Mineralogist was unable to find any rock associated with the coal formation on the Telkwa which could properly be classed as a sandstone, such sedimentaries as were seen being all argillites, usually of fine texture.

September 8th—Camp remained at the "Second Crossing," the Provincial Mineralogist and three others proceeding on foot up a small creek which here joins Goat creek from the south, into what is locally known as Loring's Basin, where Mr. Loring, Indian Agent at Hazelton, the Hankin Bros. and Forrest have for some years been prospecting, and have done considerable work. An old Indian hunting trail was followed up for about four miles to Loring's cabin in the creek bottom, at the lower end of the basin, at an altitude of 3,900 feet, some 700 feet higher than the "Second Crossing."

Loring's Basin, Goat Creek.

From the cabin a foot-trail was found leading up the mountain, following which, up to an altitude of 4,400 feet, a tunnel was found which had been driven in 60 feet in a N. 70° E. direction. For the first 20 feet this tunnel was driven through a dark-coloured, fine-grained volcanic rock, probably a basalt, devoid of mineralisation. For the remaining 40 feet the tunnel is in a light-coloured, soft, igneous dyke, felsitic in character, containing a considerable amount of iron pyrites disseminated throughout it in small, fine crystals. A sample of this dyke matter was taken for assay and was found to contain about 1 oz. of silver to the ton, with no appreciable amount of gold or copper. In the bluff above the tunnel the same light-coloured felsitic rock was found to outcrop, but on this outcrop no work had been done.

Following a very indistinct trail over slide rock still farther up the mountain to an altitude of 5,100 feet, some fresh workings were found, on which about one assessment had been done. No vein could be seen, but there was a copper stain in the fissures of the volcanic country rock, not presenting commercial values.

These were all the openings which could be found by tracing up trails, and were the only workings the guide knew of, and, consequently, were the only workings formally inspected. It was, however, learned from Mr. J. H. Scott, an English mining engineer, who visited the property later with Mr. Hankin, one of the owners, that there were various other workings.

There are three groups of claims, all owned by the Loring-Hankin-Forrest Syndicate.

Forrest Group.

Consists of eight or nine claims adjoining and running in a general north-east and south-west direction along the hillside, at an elevation of about 5,000 feet. They are the *Eldorado*, *Naiad*, *Oread*, *Discovery*, *Monteagle*, *Montcalm* and *Montchief* in a line with the *Telkwa* and *Daisy*, adjoining the *Oread* and *Discovery* on the north-east. The general country rock of the vicinity is altered volcanic, the

* 3,784A, 3,784D, 3,784E.—Bulkley river, mouth of the Telkwa.

These three rocks are microscopically indistinguishable from one another. They are composed of angular grains of feldspar, quartz, and microcrystalline aggregates resembling fragments from the groundmass of a quartz-porphyry, with oxidised iron ore and shreds of mica.

They are evidently pyroclastic rocks, that is, they were formed by the consolidation of the fragmental material of a volcanic eruption, and may be classed as volcanic agglomerates, or altered tufas.

3,784B, 3,784C.—The same locality.

These are volcanic rocks. The former has a fine microcrystalline groundmass, consisting of an aggregate of quartz and feldspar flecked with minute green crystals of some bisilicate. In this groundmass are set numerous phenocrysts, *i. e.*, porphyritic crystals, of orthoclase, plagioclase, biotite, hornblende and quartz, with scattered grains of pyrite. The hornblende is green in colour, and the greatest angle of extinction observed in the zone of the clinopinacoid was 14 degrees.

The rock is a quartz-porphyry.

Specimen 3,784C is essentially similar in composition, but is in a more advanced stage of crystallization. It might be better classed as a granite-porphyry.

upper members of the series being basalts and a part of the general volcanic capping of the district, which in these hills can be seen lying in such regular, clearly-defined layers, approaching the horizontal in position, as to have led the prospector to assume that they were of sedimentary origin, which theory is, however, disproved by a microscopic examination of the samples, which one and all prove to be highly-altered volcanics, and are apparently a part of the general volcanic eruption which covered the whole interior plateau. In the *Forrest Group* there are one or more large felsitic dykes, lighter in colour than the country rock, on the borders of which the mineralisation seems to have occurred. The following work is reported on the various claims, by Mr. Scott :—

Eldorado—A 15-foot open cut with 8 feet of tunnel therefrom ; a 41-foot adit tunnel, 22 feet of which is mineralised ; a 6-foot open cut with 15-foot tunnel.

Naiad—A 32-foot tunnel and an 8-foot open cut.

Discovery—A 78-foot adit.

Monteagle—An 8-foot adit and a 25-foot adit.

Telkwa—Open cut 20 feet long, 8 feet wide; 7-foot open cut, with 22-foot adit, and a 7-foot open cut.

Daisy—A 20-foot open cut, a shaft 14 feet, and an 18-foot open cut, with a 10-foot adit.

Mr. Scott further adds in a memorandum written to the Provincial Mineralogist: "At several places on the *Eldorado*, *Naiad* and *Telkwa* there are good shewings of ore from 4 to 22 feet, easily traceable through the three claims."

As indicating the character of the ore, there are given the following assays made by this Bureau on specimens obtained from Mr. Hankin :—

	Gold, Oz.	Silver, Oz.	Copper, Per Cent.
Eldorado—20-foot tunnel	.06	1.0	4.5
" 48-foot "	.02	0.4	5.5
Naiad—30-foot tunnel	.04	4.6	3.1
" 15-foot "	.02	0.4	0.5
Telkwa—32-foot tunnel	.28	2.0	6.3

About half a mile to the south-east from the *Forrest Group* and farther up Hankin basin is the *Tremont Group*, consisting of three claims, the *Loring*, *Hankin* and *Forrest*, held by the same owners.

Still farther up the basin is the *Stevenson Group*, upon which, however, very little work has as yet been done.

September 9th—The party left the "Second Crossing" of Goat creek at 10 a.m., following up the bench on the south-west side of Goat creek. About one mile out a trail was found branching off to the left, which led down to the Webster coal locations already described.

The following is the report of the microscopic examination of samples obtained in this vicinity :—

No. 3,733.—Country rock from 60-foot tunnel, *Forrest Group*, Goat creek, Telkwa valley.

This is a dark gray rock, having a very fine texture, and carrying specks of iron and copper pyrites.

In the thin section it shows small phenocrysts of feldspar and skeleton-like crystals of hornblende, largely filled by particles of iron ore. These are embodied in a groundmass which has a finely microcrystalline or a cryptocrystalline structure, and is probably a devitrified glass. The rock is an altered volcanic, and was originally a very fine porphyrite.

No. 3,734A.—Dyke from same locality.

A dull gray fine-textured rock, which shows in the hand specimen lighter gray and greenish porphyritic crystals, or phenocrysts.

The groundmass, which was originally fine-grained, is wholly altered to a mass of decomposition products, an important part of which seems to be kaolin.

Orthoclase, plagioclase, and basaltic hornblende form the phenocrysts.

A few larger crystals of quartz are also present. The rock is of volcanic origin, and the structure indicates that it forms a dyke, or is a marginal phase of an intrusion. It may be classed as a hornblende porphyrite.

For about two miles from the Second Crossing the trail is over bench land and low hills, when it drops into the valley of 4-Mile creek, which creek it follows up to its source in Hunter basin. The distance from the Second Crossing to Hunter basin is about five miles, in which distance the trail rises some 2,300 feet, on to an altitude of 5,500 feet. This portion of the trail is a trail in name only. It is poorly laid out, scarcely cut out, is steep and has no "bottom," no foothold for horses, and is quite incapable of standing traffic of any amount.

HUNTER BASIN.

Hunter basin lies at the head of 4-Mile creek, at an altitude of some 5,500 feet, and is an amphitheatre surrounded by hills rising precipitously for from 1,000 to 1,500 feet higher. Timber-line was found to be at an altitude of about 4,500 to 5,000 feet, there being no timber in the basin save a few scrub spruce found in a little draw. The hills to the east and south present perpendicular faces to the valley, while those to the north and west, as is usual in northern latitudes, have a more gradual slope and are covered by sufficient soil to permit of grass taking root, which affords very fair feed for horses. These perpendicular exposures show the rock formation to be entirely of volcanic origin, chiefly basalt and allied rocks, stratified in layers of considerable thickness, with a dip to the east; the perpendicular faces to the west giving the impression that the whole has been subjected to a series of step-faults running north and south, the major faults occasioning the basins and the drains through which the creeks flow. No dykes could be seen cutting the formations and measures were not much disturbed, save by the faults mentioned. The entire basin and the sides, to a height of 1,500 feet, is covered with broken slide-rock from the surrounding cliffs, completely masking the solid formation.

Camp for the night was made in the lower part of the basin, difficulty being found in getting a pole suitable to hold up the tent.

September 10th—The weather was clear, the temperature having dropped the previous night to below freezing. Camp was not moved, the day being spent examining claims staked in the vicinity.

In the basin there are two small cabins belonging respectively to Wm. Hunter and the Carr Bros., prospectors, who have claims staked on the cliffs some 1,000 to 1,500 higher up. From these cabins a trail, fit for foot passengers only, on its upper reaches, winds through a draw to the south. The claims in the vicinity had, for the most part, been only recently staked, and very little development work was found on any of them.

The working season here for out-of-door work, must be very short, and the difficulty and expense of carrying on work under such conditions so great as to deter all efforts at development until railway transportation is assured and supplies much diminished in cost.

King. The *King* mineral claim was among the first staked in the basin, the location being made in 1903 by Wm. Hunter, after whom the basin was named. This claim is in a draw or break in the cliffs to the south of the basin, at an altitude of some 6,500 feet, or some 1,000 feet above the cabin. Here a prospecting shaft had been sunk to a depth of from 16 to 18 feet and roughly timbered with poles packed up from below the cabins. The work done showed a fissure in the country rock, having a strike S. 45° W., and which, where the shaft was put down, had a width of about two feet, but which on the surface, as traced for a few feet in either direction, pinched down to as many inches in width, and no further widenings had been developed, nor did the ore body quite hold its own with the depth of the shaft. This ore body, though small, contained some very pretty ore, copper sulphides, chiefly bornite, with yellow copper towards the ends of the lens. Specimens of the ore brought away assayed 63.42 % copper, with 81.6 oz. silver, and .04 oz. gold to the ton.

Waresco. To the right of the trail up to the *King* claim, at about 300 feet above the cabins, there were found the stakes of the *Waresco* claim, located by L. H. Bishop in 1904, and on which not more than one assessment had been done, this consisting of an open cut. In a crushed zone, some six to seven feet wide, and cutting the country rock nearly vertically in a N. 45° E. direction, is a vein of rather undefined width containing copper ore—copper glance, bornite and pyrite—of which it was estimated about half a ton had been taken out and was on the dump. The development as yet is too slight to show what quantity of ore is likely to be found, but the quality of the ore is all that could be desired. Selected ore taken from the dump assayed:—Copper, 51 %; silver, 180 oz.; gold, 0.16 oz. to the ton.

To the left of Hunter's trail the stakes of a claim were found, on which the name of the claim was illegible, but the locator was M. S. Carr. This location had apparently been allowed to lapse and was re-staked in 1905. A small amount of stripping had been done, but no mineral, other than a little copper stain, could be seen, nor was there any defined fissure or vein visible.

Rainbow. To the north of the *King* claim and at about the same elevation on a bluff overhanging the basin, and separated from the main mountain behind, several places were noticed where work had been recently done. It was, however, found impossible to determine definitely as to what claim these belonged, but, as best could be made out, they were mostly on the *Rainbow* mineral claim, located by Wm. Hunter.

The country rock is a red basalt, resembling a jasper. The whole mass of this detached bluff appears to have been faulted or slid down from the higher mountain to the south, causing many small fissures.

Near the No. 2 stake was found a fissure, which was traceable on the surface for some distance, with a width of from one-half to six inches, and contained a micaceous variety of specular iron with a small amount of sulphide, of which mineral some half-ton lay on the dump at this point.

In an open cut on the very edge of the bluff is another fissure of greater width, the extension of which could not be seen, however, and from which some four tons of this micaceous iron had been collected and laid aside on canvas sheets.

Near the No. 1 and discovery stakes is a small pit some four feet deep, sunk on a crushed zone in the country rock, along one wall of which was found a small vein of yellow copper ore one or two inches thick, but lacking in continuity.

This micaceous iron, as here found, is a rather unusual variety, and has been taken by many of the prospectors for galena, silver glance or copper glance, but proves on analysis to be iron oxide in this peculiar form, and in the foliations of which there must be some copper-silver sulphides or oxides not entirely visible, as will be seen from the following assays of two distinct samples from different localities:—

Samples from *Rainbow* mineral claim:—No. 1.—Specular iron with a little copper carbonate, assayed—copper, 7.6 %; silver, 36.8 oz.; gold, 0.08 oz.

Sample No. 2.—Copper, 6.6 %; silver, 58 oz.; gold, 1.68 oz. to ton.

Another sample of this specular iron, found at Webster's cabin, locality unknown, assayed:—Copper, 22.5 %; silver, 5.6 oz.; gold, trace.

In a number of other spots small amounts of work were observed, for which no location posts could be found, but in none of these was there seen any defined vein or indication of mineral in quantity.

On the north side of the basin there are a number of locations on which no work has been done, and which appear to have been staked on float rather than on rock in place, as the surface is covered with loose material.

September 11th—Camp in Hunter basin was left at 10 A. M., the trail leading through the upper basin to the most southerly end, where, by a "switch-back" trail, it climbs the western hillside, reaching an elevated grassy plateau (altitude about 6,500 feet), which during the short summer season provides excellent grazing. Standing at this elevation the plateau is seen to have a general slope to the east, and the basin appears to be "scooped" right out of it. The trail circles eastward along the south end of the basin, then turning south and west crosses over a glacier some 2,000 feet across, leads around the head of Mud or Tenas creek, and finally drops down a steep gully, overgrown with stunted spruce, balsam and juniper bushes, into the narrow valley of Glacier creek, about a mile below the basin in which it heads. The distance travelled was only about five miles, but it represents a good day's work for a pack-train. The altitude of this creek-bottom is about 5,500 feet, the same as Hunter basin, and this seems to be about the altitude of most of the basins in the district.

Glacier creek and Sunrise creek, a parallel stream about two miles farther to the south, flow nearly due west, and empty directly into the headwaters of the Telkwa river, which flows north.

Camp was made in the bottom of the creek valley, in a clump of spruce and balsam, good feed for the horses being found in adjoining marshes.

September 12th—Camp was not moved, the day being spent in the examination of claims on the high ridge separating Glacier and Sunrise creeks.

Sunrise.

The first claim visited was the *Sunrise*, owned and located by P. R. White, who was acting as guide to the party. This is located on the south end of Sunrise mountain, as this high ridge between the creeks is called locally, at an altitude of 7,700 feet and within some 500 feet of the summit. The hillside here slopes at an average angle of about 30° to the creek-bottom, 2,500 feet below, and is covered with large angular masses of basalt showing porphyritic structure, usually red in colour, but frequently dark or light gray, so that but few exposures of rock in place were to be seen.

But one assessment had been done on the property, and owing to the natural difficulties of the location, some 2,000 feet higher than any possible camping place, but little work had been accomplished. There was exposed in a peak of solid formation, not covered by slide rock, a vein having a strike S. 55° W., with a dip of about 30° to the north-west.

The whole neighbourhood is much cracked along the cleavage planes of the basalt, and the vein seems to follow one of these planes, but from the very nature of the rock in which it occurs, it is not very clearly defined in its length.

3,757A.—*Sunrise* mine. Country rock in vicinity of.

This is a rather fine-grained rock of even texture and has a bright colour. It has the general aspect of an impure jasper.

In the thin section occasional well-defined crystals of feldspar appear, indicating the igneous origin of the rock. These crystals are enclosed in a field composed of minute grains of quartz, and probably also of feldspar, scattered through a base of red iron oxide.

3,757B.—*Sunrise* mine. Country rock.

In the hand specimen this dark green, massive rock shows irregular masses of epidote. No other mineral is distinguishable in it.

In the slide it is found to be a greatly altered greenstone. Chlorite and epidote are practically the only minerals that can be recognised. As these are both secondary minerals, it is really impossible to say what this rock originally was, more nearly than that it was a very basic eruptive.

H. B. CO'S FIELD OF RIPE OATS FORT FRASER—FRASER LAKE—AUGUST 10TH, 1905.

The vein matter, silicified crushed material, is about 24 inches wide where a small open cut has exposed it, and contains specular iron with a little copper, and from samples taken is found to carry less than one per cent. copper, with no gold or silver.

As was pointed out to the owner at the time, a rusty outcropping of silicious rock, either a bed or a vein, to which no attention had been paid, and on which no work was done, seemed to offer much greater possibilities. A sample of this rusty quartz was taken, on which the Provincial Assayer gives returns of copper, 0.4 per cent; silver, 1.4 oz.; gold, $4.

On the way up to the *Sunrise*, the stakes of the *Fox* mineral claim were passed, on which no work has been done. The formation here is a series of small step-faults and slides from the mountain. On the surface a quantity of very pretty azurite was seen in the float, but it could not be traced to the parent body.

Sunset. Immediately below the *Sunrise* claim and probably adjoining it, at an altitude of 6,500 feet, is the *Sunset* mineral claim, located by Wm. McCullough in 1905. The formation is the same as in the preceding claim, and, in fact, appears to be a slide from the upper part of the mountain. The work done consists of a small side-hill cut, and exposes on a slip fissure a few stringers of calcite and micaceous iron, not giving any promise of valuable mineral.

Still further down the hillside from the last claim were found the stakes of the *Morning* mineral claim, staked by F. M. Dockerill on June 6th, 1905. The formation is the same, and there was no sign of any work having been done, nor could any evidence of mineralisation be seen on the location.

Samples of the rock formation in this vicinity were taken and sent to Professor Dresser, of Montreal, for microscopic examination, and the text of his report thereon is given in a foot-note appended hereto.

September 13th—It was the intention to proceed from Glacier creek down to its junction with the Telkwa, and thence up that stream to its source, to inspect a number of locations made there this past summer by Huston, Topping, and others, but it was found that the guide had no definite knowledge of the trails or the location of the claims, and as all the prospectors were out of the country, it was like "hunting for a needle in a hay-stack"; so, when in the early morning of the 13th it began to snow heavily, and we were at least two days' journey from the Bulkley, with "grub" almost gone, it was decided, with regret, to abandon further explorations in that direction, and to strike back for the Bulkley.

There is no trail down Glacier creek, and the creek valley is little better than a muskeg, but with some difficulty the horses were led down the creek valley for some three or four miles, keeping to the hillside on the north side of the creek. We then struck off to the north over a comparatively open muskeg country for about three miles, into the valley of a small creek flowing south into Glacier creek. This small creek heads in a marshy divide, from which Red creek flows north into Goat creek and so into the lower Telkwa. Following the west side of Red creek from the Telkwa there is an old Indian hunting trail, known as "Moose-skin Johnnie's trail," used in the fall and winter by the Indians to reach their hunting grounds at the head of the Telkwa. This trail is about as bad as it is possible to be, and climbs away up on the hillside, presumably to get more solid bottom for the trail, but is not properly cut out, and simply served the Indians to pass over twice a year.

3,760.—*Sunset* mine. Rock in vicinity of.

This rock is in most respects similar to 3,757B. In the thin section, however, it shows a considerable amount of calcite in addition to epidote and chlorite. A few crystals of feldspar are also seen. They are very turbid from decomposition, but are the only original minerals left in these two rocks.

This rock is a much altered porphyritic, basic eruptive, probably a diabase, or gabbro.

Camp was finally made on Red creek, about four miles above its junction with Goat creek, where a small opening afforded scant pasturage for horses.

September 14th—The trail follows Red creek down to Goat creek, a distance of four miles, and crosses the latter by a ford below the junction of Red creek. There is also a log foot-bridge across the creek. From this ford there is a trail leading over to and up the Telkwa to the coal locations of the Kitimat Coal Company, which were then visited and which have already been described.

After crossing the ford the trail mounts the gravel benches of the Telkwa, and in about two miles joins the Goat creek trail, already described, some four miles out from the Bulkley river. The camp outfit was taken across the Bulkley in a canoe, the horses being left on the south side, and camp was again made on the previous camp ground on the north-east side of the Bulkley, opposite the mouth of the Telkwa.

September 15th was spent in camp. The horses were swum over at the lower crossing, a very awkward place with a precipitous "take-off" into very deep, swift water, but with an eddy and gravel beach on the north bank affording a good landing.

Supplies for the remainder of the trip were obtained from the Aldermere store. The guide and the packer were here paid off, and a pack-horse sold to a party going through to Bella Coola.

September 16th—Camp was moved down the valley of the Bulkley, a distance of 12 miles, to the Hudson Bay Company's ranche near Driftwood creek.

From the mouth of the Telkwa the trail at once mounts the bench land, which, near the river, is very dry and inclined to be sandy, with scant vegetation; but as the rolling foot-hills near Tyee lake are reached, the soil becomes a fine loam, well suited for cultivation. The telegraph trail was again picked up at the south end of Tyee lake, at which point there is an office and an operator.

To the north of Tyee lake the ground slopes gradually to the higher hills, and along this side-hill there are a number of ranches, some of them fenced, on which comfortable cabins have been built and large stacks of hay put up, cut from the wild hay growing on the yet uncultivated hillside. These ranchers, besides wintering their own stock, are wintering a number of horses for prospectors and surveyors, at from $12 to $15 a head. They expect to have to feed hay for from three to four months, but provide no shelter for the stock. The land is well watered, and such small areas as were under cultivation yielded good crops of potatoes and other vegetables.

The country passed over between Tyee lake and Hudson Bay ranche is of a similar nature, a large proportion of it open country, while some of it is covered with poplar and willow, with occasional spruce. The wild grasses, pea-vine and fire-weed cover the open portions, producing a crop well worth cutting for hay.

The Hudson Bay ranche is provided with extensive sheds and stables for stock, with two or three houses for employees. The property is at present leased to a Frenchman, who purports to keep a "hotel," at which the guests cook their own meals and provide their own blankets and bedding.

About three miles east of the Hudson Bay ranche, on Canyon creek, there was noted, in the bed of the creek, a very nice exposure of the local coal measures, consisting of shales and sandstones, the latter well ripple-marked, with small seams of coal. No workable coal is exposed here, and the occurrence of the measures is noted only to show the possibility of coal being found underlying a considerable portion of the valley of the Bulkley.

September 17th—All baggage and supplies, except enough for a trip of one week, were stored in one of the ranche buildings, and P. McPhee, a local prospector, was engaged as a guide for a trip into the Babine range, where a number of prospects had recently been staked, between the headwaters of Canyon and Driftwood creeks.

Babine Range.

The trail up to these claims leaves the telegraph trail about half a mile west of Driftwood creek, and cutting across the rolling hills through pea-vine and fire-weed higher than the horses' backs, crosses Driftwood creek about two miles up from the trail. At this point the coal measures, similar to those on Canyon creek, are exposed in the bank of the creek. The trail follows the east bank of Driftwood up for a couple of miles farther, through heavy spruce woods, when it begins to climb the main mountain side by a steep and poorly cut-out trail, through the small jack-pine and balsam timber.

After travelling for about eight miles and climbing to an altitude of about 5,500 feet, which occupied some five hours' time, camp was pitched above timber line, with only a few stunted balsams in sight, on the open hillside, on which grew in patches sufficient bunch-grass for the horses. It snowed all afternoon and most of the night, and blew so hard it was next to impossible to keep a tent up—a night long to be remembered.

September 18th—It blew so hard all day that it was with difficulty the wind could be faced, and when it did not snow it rained.

Eldorado

Within a short distance of camp was seen the *Eldorado* mineral claim, owned by P. A. McPhee. The claim lies at an altitude of 5,500 feet on the open face of the hill, in which a number of open cuts and trenches have exposed a number of somewhat ill-defined quartz veins, having a general strike S. 15° E. and a dip apparently to the north. The veins are from 2 to 6 feet in width, though often including a portion of the country rock, which appears to be a chloritic schist. A sample was taken of the vein where best exposed, which assayed about an ounce in silver with but a trace of gold and no appreciable amount of copper.

To the south of the *Eldorado*, Henry Finch has a claim staked, the ——*kill* mineral claim (name illegible).

To the north, Lem. Broughton has staked an extension, the *Silvertip*.

Pack-Train Group.

About a mile to the N.W. from the *Eldorado*, on a canyon leading down to the upper part of Driftwood creek, C. G. Harvey has staked for himself, Chas. Barrett and Jno. Charleston, a group of three claims known as the *Pack-train Group*. The country rock appears to be similar to that of the upper Telkwa country, but very much broken and disturbed, pitching at high angles, with numerous small quartz veins. In an open cut about 5 feet deep there is a showing of mineral about 27 inches wide, from which a selected sample assayed 19% copper, 106 oz. silver, and 0.03 oz. gold.

A little farther up the canyon there is another open cut about 5 feet long, in which about 24 inches of mineralised quartz appears. At this point the containing measures dip to the N.E. and are overlain by a flow of amygdaloidal trap, dipping to the south.

Last Chance.

About half a mile to the N.W. of the last claims, on the brow of a steep bluff overlooking the Driftwood, was found the *Last Chance* mineral claim, staked by Thos. Gagne and Thomas Joseph Roberts, as agents for J. D. McIntosh and Geo. Duhamel. After considerable search a side-hill cut was found in which was showing a vein some 15 inches, filled with quartz and barytes carrying iron sulphides.

The fissure seemed to be of irregular width, sometimes pinching up and again widening out into lenses of quartz, which, wherever seen, was "frozen" to the country rock. A sample of the clean ore taken for assay gave 17% copper, 63 oz. silver and 0.12 oz. gold.

September 19th—Further exploration into the range was found to be impossible, on account of snowstorms, so a return was made to the Hudson Bay ranche. It was learned that there had been some prospecting done on the head of the north fork of Canyon creek, and some claims staked there during the summer and fall of 1905. These, however, could not be visited, on account of the early snowfall.

Pat McPhee reports that he staked there the *Commodore*, in an igneous country rock in which there is exposed a good streak of ore for a length of 5 feet. From a sample provided by him, an assay of 30% copper, 3 oz. silver and trace of gold was obtained at Government Laboratory.

On the same hill McPhee staked the *Blue Bell*, on which he reports from 1 inch to 5 inches of solid ore, which from the sample also provided by McPhee assayed 27% copper, 30 oz. silver and trace of gold.

The *Melvinia* mineral claim, an extension of the *Commodore*, was staked by Lem. Broughton, and is said to have an 18-inch lead, from which a selected sample of copper carbonates was obtained which assayed 9.5 % copper, 2.4 oz. silver, with a trace of gold.

September 20th—Camp was moved from the Hudson Bay ranche westward down the valley of the Bulkley for a distance of about 14 miles, to the bank of a large creek flowing from the north, across the trail into the Bulkley. Other creeks of fair size flowing in the same way were crossed at 6 miles, 7 miles and 11½ miles from the ranche. The creek at 7 miles out is a very rapid stream, spanned by a log bridge which is quite unsafe for horses, so a crossing had to be made which at high water would be exceedingly dangerous.

The first half of the day's travel was through open country with few trees, and hillsides covered with upland hay. The soil is light, but very fertile and free from stones. A sample of this lighter soil was taken for analysis, the Government Assayer's report upon which will be found in the Addenda as sample No. 6. This is the lighter soil of the uplands, that of the lower lands containing more clay and decomposing vegetable matter.

The last half of the day's travel was through country much more covered with poplar woods, the soil more clayey and darker, really a much stronger and better soil, but requiring some draining and clearing of timber. The trail all the day was excellent, although a little muddy in places.

September 21st—Horses astray delayed departure until about 10 a. m., when travel was continued along the old telegraph trail for about three miles, when a branch trail was taken leading to the bridge across the Bulkley at Moricetown, distant one mile.

The telegraph line and trail follows the north side of the Bulkley from here to Hazelton, not crossing the river. This trail is, however, some 10 miles longer than that which crosses the Bulkley at Moricetown and keeps to the south side of the river as far as Ahwillgate, an Indian village some four miles from Hazelton, where it crosses the Bulkley again. This latter trail is the one universally used, despite the fact that the two bridges of Indian construction are considered unsafe. This latter objection has, however, now been removed, as the Provincial Government has this fall put in two substantial pack-trail bridges over the river at these points.

After crossing the Bulkley at Moricetown, the main trail was left and a trail taken leading eastward up the south bank of the river. This trail, an old Indian hunting trail, leads in through a pass to the south of Hudson Bay mountain, a large bold mountain peak on the south side of the Bulkley directly opposite the Hudson Bay Co. ranche, already mentioned, and from which it derives its name.

The drainage of the south slope of this mountain is into the Zymoetz or Copper river, which flows into the Skeena below the canyon—practically into the Pacific ocean. This mountain is an outlying peak of the main Coast range, in which respect it differs from the mountains heretofore met with.

On the south slope of this mountain, and the range of which it forms a part, a number of claims had been staked, from which very fine samples of ore, both copper and lead, have been brought out, and it was to inspect these claims on the headwaters of the Copper river that the excursion was taken south from Moricetown.

After leaving Moricetown the trail follows up the south bank of the river for about three miles, when it turns south, mounting to an open plateau of easily rolling hills, similar to that on the north side of the Bulkley, which forms a wide draw to the west of Hudson Bay mountain, extending southward for about five miles from the river. This plateau is about the same elevation as that to the north of the Bulkley, and the soil and vegetation are similar; in fact, they were in all probability a part of the same lake-bed before it was cut in two by the present Bulkley river.

Camp was made at the head of this draw, at the foot of the hill over which the trail leads on to the headwaters of the Copper river, and about 10 miles out from Moricetown.

September 22nd—The previous day had been mild and clear, as had been the evening, yet in the morning we woke up to find about four inches of snow all over the plateau at the camp, and we afterwards found that this represented over 24 inches on the summit over which the trail passed. The day was spent in camp. In the afternoon the sun melted the snow completely away on the plateau, and it was thought it would have melted it on the hills also.

September 23rd—One of the Hankin brothers, whose claims were to be inspected, having come into camp with us the day before, an attempt was made to get over the summit, with Mr. Hankin for guide, in the hope that the snow would by that time be off the Copper river valley. We left camp at 9:30, taking only a tent, blankets, and a few provisions, with a few of the strongest horses, leaving the rest in camp in charge of a man. In about two miles distance began the ascent, and as soon as we left the level of the plateau we were in snow which rapidly increased until it was over two feet deep on the summit of the pass, at an altitude of 5,000 feet, so that it was necessary for two men to precede the horses to break trail. After crossing the summit the trail zig-zags down the steep hillside through dense spruce woods for about two miles, where the valley of a small tributary of Copper river was reached, at an altitude of about 3,000 feet.

In this valley bottom the trail branches, the fork to the left proceeding up the creek to what are known as the "Hankins' claims," while the main trail continues down the valley to what is known as the "galena property," owned by Fleming *et al.*, from which a small sample shipment of ore was made during the summer, and which is reported to be about 10 miles down the valley.

The trail was taken up the creek towards the Hankin claims, which were supposed to be about five to seven miles away. Even in the low valley bottom on this side of the divide the snow lay on the ground to such a depth as to prevent horses getting any feed, but it was reported that within a mile of the Hankin claims there was a lake with marsh grass, so an attempt was made to reach this point. The party pushed on up the creek through the snow until 5 p. m. when darkness came on at timber line, at an altitude of 5,500 feet, while ahead it was seen that there was a bald summit to cross some 1,000 feet higher, on which the snow, driven by a fierce gale, lay in drifts four and five feet deep, rendering further progress impossible.

The tent was consequently pitched among the last of the scrub balsam trees on two feet of snow, and the horses tied up to the trees without food and about played out, until morning, when it became evident that if they were to be got out alive a prompt start would have to be made to return to the Bulkley, and any further attempt to see the claims abandoned.

September 24th—Consequently, at 8 a. m. the party was on the return trail, leading the horses, and arrived at the camp on the plateau of the Bulkley at 2 p. m., with horses about exhausted. Very indifferent feed awaited them even here, as pea-vine, once the snow comes, goes to the ground a wet soggy mass, leaving only the fire-weed and scanty wild grass for feed.

Although, as will have been seen, the writer was not able personally to inspect the various claims on the Copper river slope, the following is a description of the location of the claims:—

On a fork of Copper river just over the divide and about two miles from the camp of September 23rd-24th, at an altitude of about 6,000 feet, between what have been called Silver and Red creeks, which flow into the Copper river fork from the east, there have been located, in a general northerly direction from Silver creek, the following adjoining claims:—

Reliance, *Tower Hill*, *Silver Top*, *Highland Chief*, *Mayflower*, and *Blue Bell*, with, to the east of the *Highland Chief*, the *Enterprise* and to the west the *Bonanza*. These claims have all been staked by Loring and Hankin Bros., of Hazelton.

September 25th—The snow on the hills showing no indications of melting, the back-trail was taken to Moricetown, and from Moricetown the main trail down the Bulkley was followed for some two miles, when camp was made on a large open prairie just to the west of a large creek flowing into the Bulkley, the prairie being reported as within the Indian reserve.

September 26th—Starting at 9 a. m., a farther distance of 12 miles was travelled westward down the river valley, and camp was made on the upper end of "Mosquito flat."

From Moricetown westward the main valley of the Bulkley becomes narrower by the gradual approaching of the Babine mountains to those of the Coast range, until at "Mosquito flat" it is not over a mile wide, including the foothills.

West of Moricetown, while there are a number of small patches of exceedingly good and rich land, there is no considerable area of land fitted for agriculture until the main valley of the Skeena is reached.

About 12 miles west of Moricetown cedars, soft maples, and firs were noted for the first time on the trip, indicating an approach to the coast vegetation and climate.

The trail on the south side of the Bulkley, between the two crossings of that river, is best described as one continuous mud-hole, with mud from six to twelve inches deep, but with a good, firm, stony bottom. The trail on the north side of the river is reported to be equally muddy, but with no bottom, and horses are apt to be mired.

September 27th—The pack-train left "Mosquito flats" at 10:45, reaching Ahwillgate, the lower crossing of the Bulkley, at 4 p. m., a distance of, say, ten miles, and Hazelton, some three or four miles farther, at 5:45 p. m.

About three miles from "Mosquito flats" the trail crosses Mud creek, where it mounts a high gravel bank, which it follows for some five or six miles, when it enters a wet, dense forest of fine cedar timber, through which it passes for a couple of miles. About a mile out from Ahwillgate the trail leads for half a mile over a muskeg, over which a round pole corduroy had at one time been laid, and where horses getting off the sticks and brush will sink to their bellies.

Ahwillgate is an Indian village, located at a deep gorge of the Bulkley, where the river has cut its way through a ridge of basaltic rocks, forming a canyon some 200 feet deep with perpendicular sides, across which a bridge has been built by the Indians. This bridge, of

which a cut accompanies this Report, is a wonderfully daring piece of bridge construction to be attempted by Indians with the material they had at command, and is worthy of special notice. The bridge is 200 feet above a roaring torrent; the span is 150 feet in the clear; the two shore members are each 63-foot trusses supported by inclined struts from below, and acting as cantilevers, which are joined by a connecting truss 24 feet long, the whole being supplemented by a double system of suspension cables, made of telegraph wire, anchored to either bank.

The timbers are all round poles tied together with telegraph wire, which is twisted round them. The wire is a remnant of the "Collins Overland Telegraph Line," abandoned in 1866, and already referred to in this Report. The structure is a "fearsome" one to cross, and the writer's party led one horse at a time across in fear and trembling; but it was afterwards learned that a "tenderfoot" from Washington had, the previous day, run four loaded horses across at the same time, and lives to tell the tale.

September 28th, 29th and 30th were spent in Hazelton, the head of navigation on the Skeena. The town is situated on the east bank of the river, just above the mouth of the Bulkley, and is an old Hudson's Bay Co.'s post of some importance, from which the interior posts of Omineca, Stuart lake and elsewhere are supplied. Besides the Hudson's Bay Co.'s store, there are three or four other good stores, two hotels, post office, telegraph station, and an Episcopal church and school.

The town occupies a limited area of a few acres, surrounded by an Indian reserve on the river bank, but a new townsite, or an addition, has been plotted on a higher level bench about a mile from the steamer landing, and on this addition there is a well equipped hospital with a full staff of nurses, presided over by a most efficient suregeon and doctor, Dr. Wrinch. This institution has proved a great boon to the district.

October 1st—The Hudson's Bay Co.'s steamer "Mount Royal" on its last trip of the season was taken for Port Essington, at the mouth of the Skeena, a distance of 180 miles, at which point the party arrived on the following day. At Port Essington the party was obliged to wait until October 6th for a steamer southward bound, when the Union Steamship Co.'s steamer "Camosun" arrived, the party reaching Vancouver on the morning of October 9th, and Victoria the same evening.

Summary.

The following is a brief summary of the information gathered respecting the district traversed during the trip:—

Agricultural Possibilities.

Area available. The country from Quesnel to the headwaters of the Bulkley is a gradually rising plateau, having an altitude above the sea-level of from 2,500 to 3,500 feet, and lying between 53° to 54° 30′ north latitude. This plateau has been at one time covered, except in a few places where the solid rock formation rose above it, by a deposit of the glacial age, composed of clay and of sand and gravel mixed with clay. The erosive action of water and ice has cut into this general plateau depressions now occupied by lake and river beds. Some of these lakes and rivers were primarily of very considerable size, and as only a portion of their original area is occupied by the beds of the modern lakes and rivers, there are to-day along these later water-courses benches and terraces representing the unoccupied portion of those ancient lake and river beds. It may be said, therefore, that the area of arable land consists of strips along the present water-courses, and represents the old river or lake beds. This area, while but a very small proportion of the whole, includes an acreage capable of supporting a large, though scattered, population.

Very soon after the passing from the interior drainage area to that of the Skeena river and Coast, the rolling hills and plateaux give way to more sharply defined mountain ranges; the smaller streams become mountain torrents, and only in the main valleys, along the larger streams, is there any land available.

The valley of the Bulkley—that is, of the old stream—is 4 to 6 miles wide, much of which, for a distance of 50 miles, is suited for farming. This valley is also lower than the level of the interior plateau, lying between 1,800 and 2,500 feet above sea-level, while that of the Skeena, even above Hazelton, is still lower, and contains a large amount of good land, although it is but a small percentage of the area of the district.

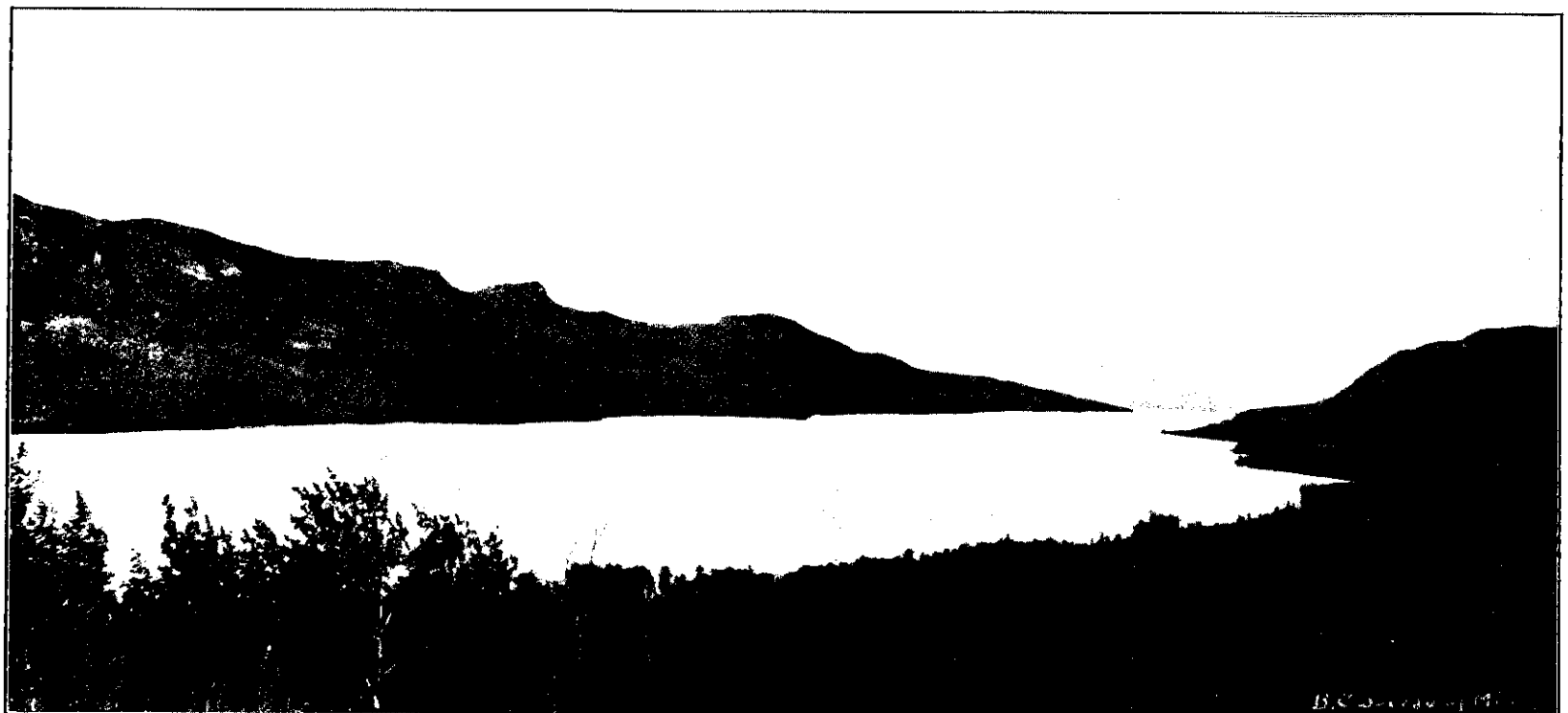
Soil. The soil found on the plateau proper is poor and usually gravelly, save in small recent depressions which have been filled by local washings from the surrounding ground. The benches and terraces which flank the water-courses, and which formed the beds of the ancient lakes and streams, are covered with a silt deposited by these old bodies of water, assisted, no doubt, by washings from the higher land, and this soil, while light, is remarkably free from boulders or stones and is very fertile, being formed from what were originally volcanic rocks, very easily disintegrated by atmospheric action. The amount of humus or leaf-mould is very slight, probably due to the evidently dry climate and to forest fires, which have repeatedly swept over the district and burned up all surface carbonaceous soil.

As far as the quality of the soil can be gauged by chemical analyses, the bench-land and terrace soils appear to be unusually good, and are so classed by Dr. Frank Shutt, Chief Chemist of the Dominion Experimental Farms, whose letter on the subject, together with the analyses of the soils, is included in the Addenda to this Report.

The quality of the soil may be judged also by the growth which it did, or does, support This criterion would, of course, be influenced adversely by the climate in an unfavourable year and, consequently, to use the plant-life as an indicator of the soil, a favourable year, climatically, must be taken. In such years we find the growth of almost anything planted to be unusually prolific. All the grains and all the vegetables found in the most favoured Provinces of the Dominion grow well, as do such of the small fruits that have as yet been tried. As to the grasses, the writer, who is familiar with all the southern portion of the Province and with much of the Dominion, has never before seen such prolific growth.

Most of the luxuriant summer growth met with in the district, such as pea-vine, etc., provides splendid green feed for stock, and makes good hay if properly cured; but most of such feed grows annually from seed, and if cut or eaten off before the seed is dropped will not come up again. This fact, taken in conjunction with the climatic conditions, warrants the assertion that the district is not a cattle-ranging district; that it is splendid for summer grazing, but that feed for winter feeding of stock must be put up, and that such winter feeding will have to be kept up for from three to four months.

Climate. The summer growth, in a latitude as far north as 53°, is such as would astonish one not familiar with the length of the summer days and the number of hours of absolute sunlight that a day in this northern latitude contains, sometimes about 20 hours out of the 24, at least three hours more than farther south. As vegetation grows only in the sunlit hours, this additional sunlight means just so much more growing time, and the crops grow and ripen in just a proportionately fewer number of days. In considering the season here available for agriculture, the southern agriculturist must take this fact into serious consideration.



CHESLATTA LAKE—LOOKING WEST.

The climate of the interior is dry, though there appears to be usually a sufficient rainfall, and the summers are not very warm, while the winters are sometimes very cold, the thermometer dropping to from 30° to 40° below zero. The only absolute statistics available are those of the meteorological observer at Stuart lake given on pages 102-104 of this Report.

Summer frosts are unquestionably at present prevalent, but that these will disappear as soon as any appreciable area of the soil is cultivated, there is every reason to expect, from the experience of the northern part of Washington State and the Canadian North-West.

The climate of the valley of the Bulkley is undoubtedly much moderated by the influence of the warm winds from the Pacific Coast in spring and summer, although the coast vegetation does not show itself until within a few miles of Hazelton, the air being robbed of its moisture at this distance from the coast, although it still carries its warmth. The lower altitude of this valley has a marked influence on its climate, as compared with that of the rest of the interior, although summer frosts are even here prevalent at present.

Forest Growth.

There are evidences scattered over the district indicating that at one time this whole district was covered with a heavy growth of very large fir. In many places an occasional charred stump, or a large root imbedded in a muddy bank, proves this conclusively. This heavy growth was removed by fire, presumably in prehistoric times, and was replaced by a second growth of inferior timber, such as jack-pine and small spruce on the higher and drier levels, with poplar on the benches, and cottonwood and willow on the low lands. The low lands and terraces are easily cleared and can soon be brought under cultivation. The uplands will supply an amount of rather inferior timber sufficient for home consumption if the country was all settled up, but with little suitable for export out of the district.

Transportation.

At present the district is absolutely devoid of transportation of any kind, and there is neither waggon nor waggon road between Hazelton and Quesnel. A trail there is, of a kind, which served in the past, but which cannot be accounted as a factor in the future economic development of the district. This lack of transportation (indeed of ordinary means of travel), renders the land in this part of the Province practically valueless, notwithstanding its undoubted possibilities. The farmer has no market, and no means of getting his produce there, if he had one, and if he drives his stock over the trail to Hazelton or Quesnel, he is met at the former place with a prohibitory steamer freight and at the latter by a further "drive" of 200 miles, through a competitive stock country, to the nearest railway.

Before, therefore, any attempt can be made at development, waggon roads are an absolute necessity, and must connect the agricultural sections with the distributing points of the district, and should, furthermore be used to connect the system of natural waterways. This only by way of beginning, however, for the country will not begin its real growth until the advent of a railway.

Mineral Probabilities.

It is much more difficult to summarise the mineral probabilities of the district than the agricultural, since the mineral-bearing formation is usually covered, and even where it is exposed and is of such character as elsewhere carries valuable mineral, there is no guarantee that such formation is here similarly mineralised; while, on the other hand, a formation which in one district may be barren may in a second district carry valuable mineral. The most that can be done is to judge the rock formation seen by the experience gained elsewhere with similar formations, aided by the few slight developments which have been made on such claims as have been located.

From Quesnel westward to the Bulkley at the Telkwa, as has been already described, the country is, as a rule, so covered with glacial wash as to hide whatever solid formation may lie underneath, effectively blocking all prospecting for lode deposits. Such peaks of the formation as appear above the glacial drift are practically all of comparatively recent geological age, and are of volcanic origin, belonging to the Tertiary age, and were so classed by Dawson in 1875.

Aside from the theoretical consideration that such recent volcanic rocks are very unlikely to contain fissure veins of any importance, the actual experience of mining does not indicate that such formations elsewhere have been found to contain valuable mineral deposits. These rocks undoubtedly do contain small percentages of various economic minerals, disseminated throughout them, which through the solvent action of water have in places been leached out and re-deposited in small fissures, but such action requires much time and pressure to produce deposits of commercial importance. These conditions are here lacking, as the rocks are younger than even the lignite formations. With the older rocks effectively covered, as far as could be observed, and only the recent rocks exposed in a few places, the chances of successful lode prospecting in the section under consideration seems slight.

At various points coal or lignite formation was noted, and although no seams of commercial size or quality have as yet been found, there is always the possibility of such being discovered at one of many points in this district.

As the interior plateau approaches, on its western boundary, the Coast range of mountains the conditions change; the upheaval which formed this range carried up with it on its eastern flank the adjoining rocks of older formations and sent off into these older rocks spurs and tongues as dykes or larger intrusions. Along the contacts thus formed there appears to be every likelihood of mineral deposits being discovered.

The rocks of the Vancouver Island series are supposed to have been formed at the same time as were those of the Coast range, and these have been shown to be mineral-bearing along their contact with the older rocks.

Speaking generally and from a geological standpoint, it is considered that the Coast range and its eastern foothills is the only portion of the district which offers any very hopeful field for lode-mine prospecting, but this section is well worth such investigation. The headwaters of the Telkwa is about the eastern boundary of the area probably influenced by the Coast range. Here it will doubtless be found that the deposits will be smaller, though probably higher grade than nearer the main range.

The present mineral development is too recent and too slight to permit of even an approximate estimate being formed of the district; the claims seen have been described, and they seem to indicate possibilities of very considerable mineral being eventually discovered in this vicinity.

Until adequate transportation facilities are provided, even the best of the claims seen are of little value, as none of the ores are free milling, nor are they of a grade sufficiently high to stand pack-train transportation to Hazelton.

The Coast range is exceedingly rugged, and the ultimate location of the railway to the Coast, whether by one pass or another, will have a material influence on the respective camps; and whichever route may be ultimately selected, it will be necessary to build from it branch lines to tap one or other of the new mining camps.

ADDENDA.

Analyses of Soils from Northern Interior of B. C.

SAMPLE NO.	1	2	3	4	5	6
Moisture	5.5	2.1	6.2	3.7	4.1	6.1
Organic and Volatile	23.0	4.4	13.4	11.5	10.9	20.5
Insoluble	61.0	83.8	59.7	72.8	75.9	60.2
Oxide of Iron	4.2	4.5	8.7	4.7	3.5	5.5
Alumina	4.3	4.3	10.7	4.5	4.2	4.2
Lime	1.1	0.6	0.3	1.2	0.4	1.7
Magnesia						
Potash	0.31	0.23	0.76	0.52	0.35	1.20
Phosphoric Acid	0.25	0.22	0.12	0.87	0.12	0.60
Nitrogen	0.96	0.15	0.33	0.59	0.50	1.0
Alkali	None	None	None	None	None	None

No. 1.—Soil from prairie near Noolki lake; a rather fine, dark gray soil; no stones.
No. 2.—Soil from Section 24, Township 4, Range 5, Nechaco District; a fine, light brown soil, inclined to clay.
No. 3.—Soil from plateau south of east end Stuart lake; a light brown soil, inclined to clay; no stones.
No. 4.—Soil from barley field, H. B. Co., Fort Fraser; a light brown soil, inclined to clay; no stones.
No. 5.—Soil from six miles south of Francais lake; a dark brown soil containing gravel; no clay.
No. 6.—Soil from Hudson Bay Co.'s ranche, Bulkley valley; a fine dark soil, with little gravel.

A copy of the preceding analyses was sent to Frank T. Shutt, Chief Chemist of the Dominion Experimental Farms, at Ottawa, with a request for his opinion as to value of such soils for agricultural purposes. The following is Mr. Shutt's reply:—

"Reporting upon a soil merely from the analytical data can only be regarded as partially satisfactory, and especially is this the case when the results are in a sense incomplete. In the present instance the chief difficulty, however, lies in the fact that the writer has no personal knowledge of the physical condition of the soils, a matter of the greatest importance when considering a soil's probable productiveness. The case is somewhat similar to that of a physician who endeavors to correctly diagnose a complicated case from a statement of certain symptoms. It will be possible for me only, therefore, to consider the submitted data in the light of certain provisional standards, and to ask that my judgment be regarded as in a measure tentative and open to revision, should I deem such necessary when in possession of further information relating to the soils.

"Nos. 1 and 6 are probably the two most fertile soils of the series. Their nitrogen-content is considerably above the average, and in this respect, and in the proportion of vegetable matter they possess, they are very similar to much of the rich prairie soil of the North-Western Provinces. In both potash and phosphoric acid, No. 6 is very well supplied, making it, from the standpoint of plant food, an exceptionally good soil. No. 1, though not so rich in these mineral constituents, might be considered as quite equal to many Canadian soils that we have classified as of excellent quality, and which are to-day producing remunerative yields. The percentage of lime, a matter of considerable importance, would appear to be highly satisfactory in both these soils.

"Nos. 4 and 5, with No. 4 as the better of the two, constitute the second class of the series. Everything considered, I judge them to be soils of sterling worth, highly productive under favourable climatic conditions and probably suitable to the growth of most farm crops. From the data of No. 4, one might predict great possibilities as to productiveness.

"No. 3 is probably a fair soil, though somewhat low in lime and phosphoric acid. It is by no means deficient, however, in humus and nitrogen, and its percentage of potash is considerably above the average.

"No. 2.—From the analytical data I should suppose this to be the poorest of the series, and I should hesitate to state definitely how it would prove on cultivation. I should add, however, that there are ample data to show that many soils in Canada of apparently similar character are being worked to-day and giving profitable returns."

SOUTH-EAST KOOTENAY DISTRICT.

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FORT STEELE MINING DIVISION.

REPORT OF J. F. ARMSTRONG, GOLD COMMISSIONER.

SIR,—I have the honour to submit a report on the progress of mining in the Fort Steele Mining Division for the year 1905.

The following table shows approximately the number of mineral claims held during each year since 1899:—

	Held under Crown Grant or Certificate of Improv't.	Certificate of Work.	New Locations.
1899	37	718	729
1900	71	704	470
1901	104	642	455
1902	117	451	253
1903	142	335	200
1904	167	260	169
1905	189	193	181

The assessment work done on mineral claims shows a continual decrease, but for the first time in eight years the number of new locations is larger than in the previous year.

The shipping mines have been the *St. Eugene Group*, the *Sullivan Group* and the *North Star Group*. The *St. Eugene* mine was shipping during the whole year, with the exception of a couple of months, during which it was closed on account of damage done to the machinery by a fire. The *Sullivan Group* has been shipping for six months and is smelting its product at Marysville, where the company has erected a smelter which is expected soon to be in a position to treat the ore of other mines in the St. Mary's District. The *North Star* ceased shipping early in the year, but development has been continued on a neighbouring claim, the *Stemwinder*, where good ore has been struck at a depth of a thousand feet or more below the level of the *North Star* workings, with the best of indications.

The *Aurora Group*, on the west side of Moyie lake, has been developing, and a lead has been struck which is considered to be a continuation of the *St. Eugene* lead on the east side of the lake. It is expected that some shipping will be done during 1906.

A syndicate has secured rights to prospect under Moyie lake, between the *St. Eugene* and *Aurora Groups*, with the object of locating the lead on which these two groups are working. They propose commencing work early in 1906.

Some development work has been done on claims on White Fish and Alki creeks. Ore from these localities could be transported to the smelter at Marysville, at rates which would not be prohibitive.

The situation at the end of the year shows a large increase in shipments. Development work on a large scale would be justified on many properties, even with the present means of transportation. Capital is wanted everywhere, and better means of transportation are necessary in some sections.

Placer Mining.

On Wild Horse creek, the usual output has been made by Chinamen. One white company is installing a plant on a lease and work is being continued during the winter, with the expectation of being ready for sluicing as soon as the frost leaves the ground.

On Perry creek, one hydraulic company has been working all summer, with a large plant, the leases covering two and a half miles of the creek-bed and the adjoining benches. The output has been satisfactory. The company operating on the same creek with a steam shovel has not done any work during the year. A mining lease below the hydraulic company is being worked by sinking and drifting below the bed of the creek; the work is being carried on on a small scale, but with remunerative results.

The company operating on Bull river has not done any work during the past summer.

Coal Mining.

The Provincial Mineralogist will probably report on the work done by the Crow's Nest Pass Coal Company. I cannot do so, as no returns are made through my office.

The Imperial Coal Company holds 89 coal licences on Fording river. During the year trails have been built, surveys made and prospecting has been carried on. Several valuable seams of coal have been uncovered.

A syndicate which has been holding 45 coal licences on Elk river, north of and adjoining Block 4,588, having discovered coal thereon, has applied for coal leases over 41 of the claims. During this year they have had their claims surveyed.

The Elk River Coal and Oil Company has renewed 22 coal licences, having prospected these, built trails and surveyed certain of the claims. They have applied for 16 additional licences.

The Western Coal and Oil Company, which held petroleum claims on the west side of Elk river, near Morrissey and Fernie, has allowed them to lapse. The lands have since been staked in other names.

A syndicate holding 16 coal licences at the northern end of Block 4,593 has successfully prospected its claims and having had them surveyed, obtained coal leases of the same ground.

Of the coal and petroleum licences issued over land in Block 4,593, 23 have been renewed through my office, proof of prospecting having been filed. Nineteen of these claims have been surveyed. The surveys show many cases of overlapping.

During the year there have been published in the British Columbia Gazette notices of application for 219 coal and petroleum licences over ground in South-East Kootenay, and 64 applications have been filed in my office.

OFFICE STATISTICS—FORT STEELE MINING DIVISION.

Mineral claims recorded	181
Placer claims recorded or re-recorded	5
Partnership placer claims recorded or re-recorded	0
Certificates of work	193
Payments in lieu of assessment work	1
Certificates of improvement recorded	29
Conveyances or other documents of title recorded	42
Partnership agreements	4
Gold Commissioner's permits recorded	15
Documents filed	27
Affidavits filed	325
Records of water grants and permits	0
Mining leases issued	4
Mining leases in force	33
Free miners' certificates, ordinary, issued	383
" companies "	6
" special, individual	6
Crown grants issued	22
Records of abandonment	4
Coal and oil licence applications	64
" renewals and leases	203

Revenue.

Free miners' certificates	$2,246 25
Mining receipts	3,703 25

NORTH-EAST KOOTENAY DISTRICT.

—:o:—

GOLDEN MINING DIVISION.

Report of J. E. Griffiths, Gold Commissioner.

I have the honour to submit my annual mining report for the District of North-East Kootenay for the year 1905:—While the tonnage of ore mined has not been as great as in 1904, more development has been done on different claims and small quantities of very rich ore shipped, the main reason for the shortage in tonnage being the closing down of the *Ptarmigan* and the reduction of the force on the *Paradise*. Surveys for the Kootenay Central railway have been completed and work, in a small way, commenced, to be under way all winter. What with the mineral showings, and the possibilities of agriculture and fruit-growing, there should be sufficient encouragement to build the road without delay, and the fact that all available land is being taken up so rapidly should be conclusive proof that outsiders have faith in the ultimate outcome.

Total Revenue of the District from Mineral Resources during 1905.

Free miners' certificates	$1,262 50
Rent of placer leases	155 00
Rent of water leases	19 00
Mining receipts, general	1,040 70
Royalty on mines	105 00
Acreage tax on Crown grants	573 00
	$3,155 20

GOLDEN MINING DIVISION.

Giant.

The *Giant* mineral claim is situated on Spillimacheen mountain, about six and a half miles from the steamboat landing near Spillimacheen, on the Columbia river. Although this claim was located several years ago, but little work had been done on it until late this fall, which development work has shown up a much larger body of ore than could be expected from the surface showing, the main feature being an unexpected body of zinc ore, which occurs in a soft black slate, forming the hanging wall of a galena ledge, about 25 feet wide, and well mineralised for about 400 feet on the surface. The upper tunnel was driven about 50 feet, and the lower tunnel, about 70 feet lower, is in 400 feet. A winze is now being sunk to connect the two, and at a depth of 12 feet had 30 inches of zinc ore. The face of the lower tunnel did not show much sign of zinc, although at the part which is under the winze there is a considerable showing, but as it had not been cross-cut no definite estimate of the width at that point can be given.

The Labourers' Co-operative Mining Company.

This company is still working on some of its numerous claims. A full acccount of the smelter was given in last year's Report. It was built mainly to treat the *Good Luck* ore, but work has been stopped on this group for the winter, the intention being, according to the report of their engineer, to start work next spring at another point which would be more advantageous.

The *Shining Beauty Group*, upon which the company has about a dozen men working this winter, is situated on Ice river, a distance of about 16 miles from Leanchoil station, on the Canadian Pacific railway. About 10½ miles of waggon road has been built, with a good pack-trail from there on. There is a very strong vein traceable for many thousand feet, showing signs of mineral all along, and, from the last reports, the ore in the tunnel was coming in much better than anticipated.

With the exception of the above, the season has been a quiet one.

OFFICE STATISTICS—GOLDEN MINING DIVISION.

Free miners' certificates	90
Company certificates	4
Mineral claims recorded	35
Placer claims recorded	1
Certificates of work	32
Certificates of improvement	14
Conveyances	14
Powers of attorney	3
Crown-granted claims in the district	90
Mining leases	3

Revenue.

Free miners' certificates	$ 828 25
Rent of placer leases	155 00
Rent of water leases	19 00
Mining receipts, general	461 10
Royalty on claims	105 00
Acreage tax	573 00
	$2,141 35

WINDERMERE MINING DIVISION.

REPORT OF E. J. SCOVIL, MINING RECORDER.

Paradise Group.

This well-known group, situated on Spring creek, a tributary of Toby, is too well known, through being the heaviest shipper from the district, to require any description, having been described in previous reports. The force was considerably reduced this season, the management having decided to wait until railway transportation is forthcoming. Development work has shown up a very large body of ore, the total amount of underground workings amounting to 5,242 feet, of which the following was done this season:—

No. 2 level, drift, 68 feet; No. 3 level, drift, 59 feet; No. 4 level, drift, 277 feet; No. 4 level, upraise, 12 feet; No. 4 level, cross-cut, 93 feet. Total, 509 feet.

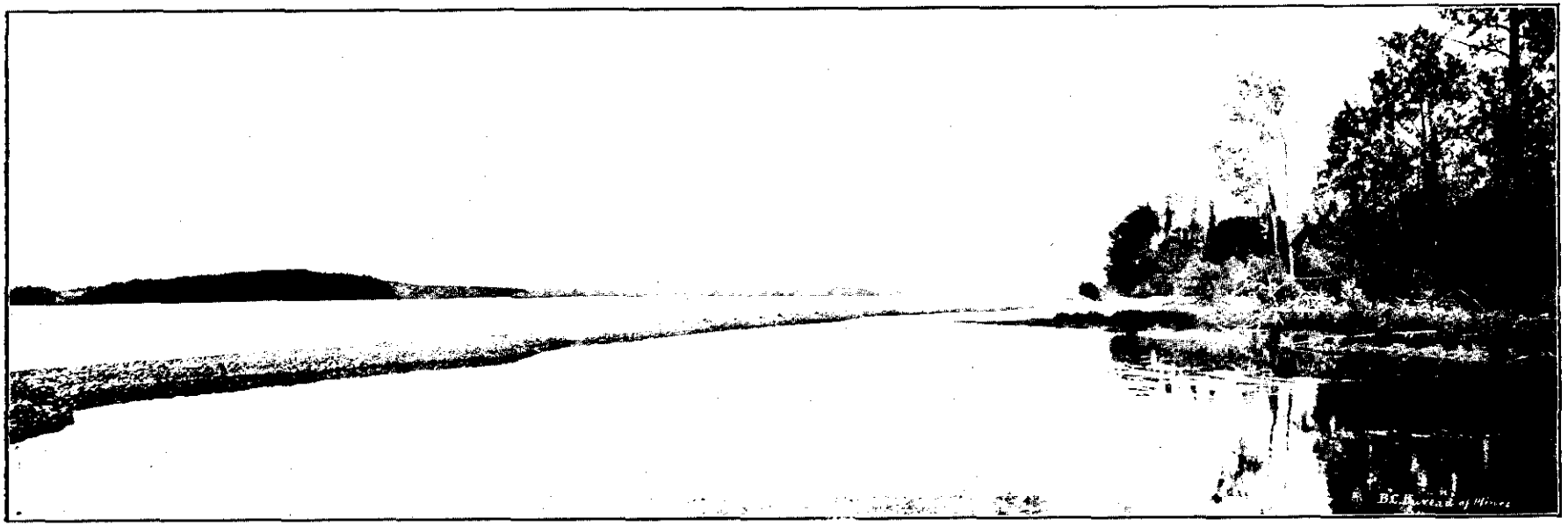
Silver Belt Group.

Development work on this group consists of several shafts and open work. The last shipment went 218 ounces in silver, and it is fully expected that work will be carried on again next season.

The *Potlach*, adjoining the *Royal Stag*, has a fair showing of ore uncovered by a series of open cuts, running well in silver and lead.

The *Shamrock*, adjoining the *Paradise*, has made application for a Crown grant. Development work consists of open cuts and general surface work.

The *Outcrop Group* is situated on the north fork of Toby creek, and is in a formation of lime and slate. Two veins, about 1,400 feet apart, have been discovered on the property which



OOTSA LAKE—LOOKING WEST—SHOWING SPIT FORMED BY WAVES FROM OUTCROP OF SILICIOUS BEDS.

parallel each other in a northerly and southerly direction, pitching easterly. The ore consists of galena, iron and a little copper, and some very high assays have been obtained. Development work consists of open cuts and tunnels. The open cuts indicate ore for a distance of 400 feet. On the *Outcrop* claim a tunnel has been started 300 feet below the surface showing, and after driving through 8 feet of solid blue lime, a lead 5 feet wide of oxidised iron was struck. It is the intention to drive this tunnel under the surface showing.

The *B. C.* and *Tilbury* are in a formation of lime schist, and carry from 4 to 15 inches of clean ore. A shipment of 22 tons averaged $65 per ton, 22 tons being in transit. This property is being worked under a lease.

On the *Blackfoot* mineral claim the ledge is two feet wide, carrying a paystreak traceable for over 400 feet, averaging well in lead and silver.

Development work on the *Hot Punch Group*, during the past season, consisted of general surface work and 10 open cuts, showing from 6 to 9 inches of ore.

The *Delphine* has been worked under a lease for the past two years, about 63 tons being shipped, averaging 85 oz. silver, 30 per cent. lead, and from 2 to 3 per cent. copper.

Regarding the *Hope*, no details of development work are known, but it is said to assay well in galena and copper.

The *Sultana Group* is situated on Michelson creek, a tributary of Toby creek, in a limestone formation. The ledge is 3 feet wide, carrying a paystreak which averages 10 inches wide, assaying well in silver, copper and lead. Development work consists of a 70-foot tunnel showing 1 foot of carbonate, an open cut with 15 inches of ore, and a shaft in ore.

On the *Sylina Group*, in a formation of limestone, the paystreak averages 2 feet, carrying silver, lead and copper.

On the *Lucky Seventh Group*, a fissure lead in a quartzite formation is four feet wide, carrying a paystreak of 6 inches, assaying well in silver, lead and gold.

The *Mineral King*, situated on Toby creek, has a very good surface showing of argentiferous galena, upon which considerable work has been done.

The *Samson* is on the *Mineral King* lead and carries about the same values.

The *Bullion* and *Diamond R.*, in a schist formation, carry a paystreak of 3 feet. Development work consists of shafts and open cuts, showing ore assaying well in silver, lead and gold.

On the *Black Diamond Group*, in a formation of quartzite and slate, is a ledge 4 feet wide, carrying a paystreak of 12 inches, assaying in silver, lead and some zinc. Development consists of No. 1 tunnel 107 feet, tapping the lead, carring 10 inches of galena, at a depth of 80 feet; No. 2 tunnel is in 148 feet, with a cross-cut 12 feet, and by continuing another 300 feet it is expected to tap the main body at a depth of 500 feet; No. 3 tunnel is in 70 feet and shows 15 inches of ore.

The *Lottie M. Group*, in a formation of slate and alternate lime, was located this year. Work commenced at once and is still being continued, the ledge averaging 3 feet in width, carrying a paystreak of 11 inches of ore. Development work consists of tracing the lead for 800 feet by numerous open cuts, No. 1 tunnel, 120 feet, tapping the ledge at a depth of about 75 feet. A trial lot assayed 150 oz. silver, 40 per cent. lead, 4 per cent. copper and $8.65 in gold.

The *Lucky Boy Group* is situated on Monroe creek, a tributary of Toby, in a formation of limestone and slate; ledge about 16 feet wide and about a foot of ore, assaying well in silver and lead. Development work consists of cross-cut tunnel 120 feet, with a drift south 14 feet, and numerous open cuts. Work is to be continued throughout the winter.

The *High Grade Group*, in a formation of limestone and slate, carries several ledges with paystreak assaying well in gray copper and galena. Development work consists of No. 1 tunnel, 30 feet; No. 2 tunnel, 40 feet, and open cuts.

The *Charlemont Group* is in a formation of lime-schist, slate and quartzite. The ledge is 8 feet wide, carrying a paystreak of about 30 inches. Development work: No. 1 tunnel, 130 feet; No. 2 tunnel, 60 feet, and open cuts.

On the *Silver Tip*, in a formation of limestone and slate, the ledge is 25 feet wide and the paystreak about 30 inches, uncovered on surface for 300 feet, the ore being gray copper and argentiferous galena. Development work: No. 1 cross-cut tunnel, 140 feet; drift east, 50 feet; drift west, 65 feet; No. 2 cross-cut tunnel, 200 feet, which ran into about 30 inches of carbonates when in 70 feet, and at 190 feet ran into a layer of quartz, averaging six inches of clean ore.

The *Tecumseh Group*, situated on Iron Cap and Horse Thief creeks, has a ledge about 7 feet wide, carrying a paystreak 18 inches wide. Development work on the *Tecumseh*: No. 1 tunnel on lead 95 feet, which gives a depth of 75 feet, showing 18 inches of clean ore all the way; four carloads of ore have been shipped from this tunnel. No. 2 tunnel, 10 feet, showing 18 inches of ore. No. 3 tunnel, 30 feet, showing 18 inches of ore. A shipment of 53,675 pounds sent to the Trail smelter this fall averaged 83 oz. silver and 56.60 per cent. lead.

The *Ptarmigan* mines, a well-known property, situated on McDonald creek, has been closed down, pending railroad construction.

On the *Lead Queen Group*, situated on No. 3 creek, in a quartzite, slate and schist formation, the ledge averages 10 feet in width, carrying a paystreak of 3 feet, which assays in silver and lead. Development work on the *Lead Queen*: Cross-cut tunnel 264 feet, which tapped the lead at a depth of 150 feet; south drift on lead 100 feet, showing 30 inches of clean ore and 6 inches of carbonates. *Big Chief:* Considerable surface work was done this summer with encouraging results; cross-cut tunnel 25 feet, to be continued 175 feet more this winter, to tap the lead at a depth of over 200 feet. *First Effort:* Tunnel 150 feet, driven on lead showing ore all the way. This claim assays higher in silver and lower in lead than the *Lead Queen* claim, besides carrying considerable zinc. Development work will continue all winter by the owners.

The *Steele Group* is situated on Williamson creek, on the same lead as the *Lead Queen Group*, and carries ore of practically the same values. Development work: One cross-cut tunnel 50 feet, which tapped the lead at a depth of 50 feet; drift 25 feet, showing 30 inches of ore and 6 inches of carbonates all the way.

The *McLean Group* is situated on McLean creek, in a formation of quartzite, slate and schist from 1 to 3 feet wide, and carrying a paystreak of from 6 to 12 inches of clean ore. Development work on *Evelyn* is a tunnel 30 feet in ore, assaying well in silver and lead.

The *Queen Esther Group* is situated on No. 2 creek, in a formation of quartzite and slate, with a ledge about 3 feet wide, assaying in copper and gold.

On Boulder creek there are many promising claims, but nothing but assessment work was done this year.

On the south fork of Horse Thief creek five new locations were recorded this year, which are said to be very promising.

The *Bunyon Group* consists of four claims on the west side of Windermere lake, carrying a paystreak of 3½ feet in width. Development work consists of a series of tunnels and cross-cuts.

The *Duchess Group* is situated on Copper creek, a tributary of Dutch creek, in a shale formation. The ledge averages 4 feet, carrying a paystreak. Development work: Cross-cut tunnel 35 feet, tapping the lead at a depth of 30 feet.

Office Statistics—Windermere Mining Division.

Free miners' certificates	80
Mineral claims recorded	35
Certificates of work	149
Conveyances	29
Certificates of improvement	1

Revenue.

Free miners' certificates	$ 434 25
Mining receipts, general	579 60
	$1,013 85

NORTH-WEST KOOTENAY DISTRICT.

REPORT BY FRED. FRASER, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report of the progress made in mining during the year ending December 31st, 1905, within the Revelstoke, Illecillewaet, Lardeau and Trout Lake Mining Divisions of West Kootenay District; and while the year has not recorded any discoveries of importance, nevertheless development has been going steadily onward.

The Prince Mining and Development Company has continued work on its properties throughout the year, employing 12 to 14 men. These properties are situate in Standard Basin, Big Bend, and were visited by Mr. Carmichael during the summer.

Placer mining during the year has been carried on principally by the Revelstoke and McCulloch Creek Company, American and Buffalo Mining Companies on French creek, the Camp Creek Mining Company on Camp creek, and the Dusquene Mining Company on Smith creek. All are satisfied with the season's work.

REVELSTOKE DIVISION.

REPORT OF W. E. MCLAUCHLIN, MINING RECORDER.

I have the honour to submit my annual report of mining operations in the Revelstoke Mining Division for the year ending December 31st, 1905.

During the past year but little development work has been done on the mines in this division, other than the necessary annual assessment work, except by the Prince Mining and Development Company, Limited, of Revelstoke, B.C., at the headwaters of Downie creek, who have kept a force of men on all season.

The *J. & L. Group*, owned by E. McBean, J. P. Kelley and L. T. George, and the *Keystone* group of claims, A. W. McIntosh, manager, and a number of others, have had some work done on them. Some new discoveries have been made, one group which was staked on the west side of the Columbia river, about 10 miles below Revelstoke, giving good assays.

OFFICE STATISTICS, REVELSTOKE MINING DIVISION.

Bills of sale recorded, mineral	17
" " placer	8
Powers of attorney recorded	1
Mineral claims recorded	67
Certificates of work issued	87
Money paid in lieu of assessment work	8
Placer leases issued	10
Free miners' certificates issued, individual	215
" " companies	5
" " special	2

BIG BEND DISTRICT.

Report by H. Carmichael, Provincial Assayer.

Big Bend District is that portion of British Columbia north of the Canadian Pacific Railway and enclosed by the Big Bend of the Columbia river, having an area of approximately 2,300 square miles. Crossing the C. P. R. at Beaver Mouth, the Columbia river flows in a north-westerly direction for 60 miles, when it makes a sharp turn to the left and flows south, again crossing the railway at Revelstoke, 76 miles south of the Bend. With the exception of a few rapids, the river is navigable for boats or canoes for the entire distance, and the only bar to steamer navigation is at La Porte, 40 miles above Revelstoke, to which point a stern-wheel steamer now ascends twice a week from Revelstoke, the return journey being made in one day.

Historical. In the spring of 1865 four boat-loads of prospectors left Marcus, in Washington Territory, to prospect the Columbia river. They were headed by five men who, in some form or other, have left their mark upon the country, a creek, a basin, or a mountain peak being named after them. These men were Wm. Downie, Hy. Cairns, Nelson De Mars, Louis Lee and Steve Liberty.

Ascending the Columbia through the Arrow lakes, prospecting as they went, they first struck gold on Cairns creek, 20 miles above the present town of Revelstoke. Washing here proved so successful that the party decided to send some of their number back to Marcus for more supplies, while the remainder whip-sawed lumber and put in sluice-boxes. While the return party was at Marcus some of the others prospected the creeks further up the Columbia, striking gold on a number of them, the best, however, being McCulloch and French creeks.

The news of the discovery of gold in this region travelled down to Marcus and through the west, with the result that in the following year (1866) there was a rush to this section, the population becoming between 8,000 and 10,000 people. A steamer was built at Marcus, called "The 49," and during the one season (1866) made 37 trips from Marcus to La Porte, where a rapid blocks further continuous navigation. In the same year the Government appointed the late Hon. Peter O'Reilly as Gold Commissioner at French creek.

Quite recently a pair of old English handcuffs and part of a billiard table were unearthed, reminders of these early days. It has been estimated that some $3,000,000 of gold were taken out in 1865-6, a $375 nugget being found on French creek.

Travel was not entirely confined to the Columbia river, as parties came in from Kamloops with pack-trains, following down Smith creek to the Columbia opposite Gold creek. This placer excitement died down, many of the miners going to Perry creek, in East Kootenay, others pushing northward until they struck the Peace and Finlay rivers, bringing the placer camp of Omineca into existence.

From this time the Big Bend district took a long rest, comparatively little mining being done, and that confined to placer and hydraulic claims, no lode mining being prosecuted. In 1896 prospecting for quartz was commenced in this region, but, unfortunately, had barely begun before the wave of mining development over the whole of the North-West showed signs of slackening; the prospector, not seeing a buyer for his claims, turned his attention elsewhere, and Big Bend district continued to slumber a little longer.

Formation. The entire region is rugged, the mountains rising rapidly from the Columbia river. The lower hills and benches are covered with a heavy growth of timber, consisting of Douglas fir, cedar and white pine; timber line being reached at an altitude of 6,000 feet above the river or 7,500 feet above sea level.

On the divides between the creeks, at an elevation of 7,500 feet, there is a considerable area of what might be called a rolling plateau or parkland, from which peaks rise from 1,000 to 2,000 feet still higher. In summer these grassy slopes furnish excellent food for pack animals; the rocky portions are easily seen, and prospecting does not present the difficulties encountered in the thick underbrush of the lower altitudes. An easy grade to these plateau regions is obtained by following up the numerous creeks flowing into the Columbia river. For instance, the divide above Standard basin is reached by following up Five-Mile creek on a gradual grade of about 600 feet to the mile. Some of the creeks, however, are much steeper.

From personal observation and information obtained, the country rock of the Big Bend district seems to be schist, a typical sample of which was sent to Dr. Dresser, who gives the following report:—

"BIG BEND DISTRICT, COUNTRY ROCK.

"*Hand Specimen.*—A greenish grey rock, apparently consisting of dark, schistose serpentine and containing small layers of calcite along the cleavage lines. The latter mineral is so pure as to effervesce readily with cold hydrochloric acid.

"*Thin Microscopic Section.*—The rock is found to be composed of serpentine, quartz, feldspar, and remnants, or alteration products, of some ferro-magnesian mineral. The feldspar is by far the most abundant mineral, and, with the calcite and quartz, makes up the essential part of the rock.

"The alteration of the original rock is so complete that few, if any, parts of the primary minerals remain. It is an impure serpentine, evidently derived by alteration from a rock whose original composition was between that of a gabbro, or diabase, and a peridotite."

The country rock, where seen, did not show much local contortion, and the open ground on the divides makes it easy to see the strata and to prospect. So far as examined, mineralization seems to have taken place along zones of movement in the schist and parallel with the strike. No veins were observed crossing the formation. The vein filling differs in different properties and in different parts of the same vein. In places it is quartz showing a remarkably banded structure; in others, copper and iron pyrites or zinc blend have been deposited in the original schist and are minutely interbanded.

Prospecting in the region above timber line is easy, compared with the densely wooded portions of the Province. Communication will undoubtedly be better in the future, so that this section appears to offer a favourable field for the prospector and, after him, the mining engineer.

J. and L. Group.

The *J. and L. Group* is situated on Goat mountain, at the head of the east fork of Cairns creek. The group consists of five claims—the *Eli* and *J. and L.*, owned by L. T. George and J. P. Kelly; the *Badger*, owned by J. P. Kelly, and the *Annie M.*, owned by E. McBean and J. P. Kelly. The foot of Goat mountain is reached by a trail from Cairns creek to the forks; thence following up the east fork to the mine cabin at the base of the mountain, where it is 1,050 feet above the Columbia river, the length of the trail being nine miles. The exposures of country rock on the trail were all schist, interbedded here and there with limestone. Goat mountain consists entirely of schist, and cutting diagonally across a shoulder is a mineralised zone in the schist, having the same strike as the schist and dipping with it into the hill at an angle of about 30°.

The southern slope of Goat mountain is very steep, rising at an angle of 40°. The vein or mineralised zone was first struck in the creek at the base of the mountain, but little work was done at this point. The highest workings are 1,200 feet above the mine cabin, and an examination was commenced at that point, gradually descending and at the same time going around the mountain to the east.

At 1,200 feet altitude a tunnel was driven in through a schist formation a little below the outcrop of the vein, and when 90 feet in it cuts the vein diagonally where it is about 8 feet wide, dipping with the schist into the hill at an angle of 30°, and having a strike of N. 65 W.

From the end of the cross-cut a drift was run to the right 60 feet on the vein, which is soft and entirely decomposed, no doubt largely due to the decomposition of arsenical iron in vein matter so close to the surface, this mineral being noted at other points in the deposit. The hanging-wall is schist and the foot-wall limestone, and both are well marked with several inches of red gouge on each.

Some 50 feet below this upper tunnel and about 750 feet horizontally round the hill is an open cut, which shows the ore-body to have the same characteristics as noted above, and to be about 3 feet wide. At 275 feet below the upper tunnel, and still further round the hill, an incline was sunk on the vein to a depth of 50 feet. On the surface the characteristics were much the same as noted above, the ore-body being 4 feet wide, with schist hanging-wall and lime foot-wall, with 10 inches of red gouge on the latter.

On descending the incline and a few feet from the surface the vein loses its decomposed nature and becomes very distinctly banded in character, quartz and schist being interbanded with arsenical pyrites, the latter being in bands of one to two inches wide. Assays from the incline gave the following results:—Gold, .6 oz.; silver, 4.4 oz.; copper, none.

Still further round the mountain and 600 feet under the upper tunnel a cross-cut through the schist was made below an outcrop of the vein, and at 90 feet in the ore-body was cross-cut diagonally, having a slightly steeper dip than noted above, being here 45°. A drift on the vein was then run to the right, a distance of 117 feet, a bend here causing the tunnel to slightly change its direction.

The ore-body is here from 1 to 4 feet wide, zinc blend showing however more largely, in one place being 2 feet 9 inches wide. Assays from the long tunnel gave gold, .28 ozs.; silver, 4.2 oz.; copper, trace; lead, none; zinc, 30.75 %.

A small open cut, midway between this tunnel and the incline above, clearly shows the ore-body some 2 feet 6 inches wide, with a dip of 49°, the mineralisation being zinc blend, arsenical iron and galena. The values of a sample taken from this open cut gave as follows:—Gold, .62 oz.; silver, .4 oz.; copper, trace; zinc, 5.25 %.

The work done on this property shows that there is a vein or impregnated zone in the schist country rock and along a contact with limestone extending from high up the mountain to the creek below, varying in width and mineralisation, but showing great permanence. In places the ore is solid, carrying good values; in others, concentration would be required. The work which has been already done amply justifies further development.

Assays obtained by the owners from different parts of the vein gave the following results:—

Gold.	Silver.	Copper.	Lead.
.33	16.4	.6	27.2
.63	2.6	.2	3.5
.11	13.8	3.8	
.24	26.52	1.9	

Standard Group.

The *Standard Group* embraces eleven claims, and is owned by the Prince Mining and Development Co., of Revelstoke, B. C. The property is situated on a small divide between two forks at the head-waters of one of the south-east branches of Downie creek, flowing into the Columbia river. The claims are reached from the Columbia river by a trail 12 miles long, following up Five-Mile creek and

crossing over the divide into Downie creek. The altitude of the divide is 6,000 feet above the Columbia, about 7,500 feet above sea level and is just above timber line. The summit is practically clear of timber, although a few hundred feet lower there is a large extent of fine park-like country, with clumps of trees and the best of feed for cattle or horses during the summer months.

The country rock over this whole neighbourhood is a well-marked schist, interbanded with limestone and outcrops of quartz, often carrying minerals, are numerous. Nearly on the crest of the divide a mineralised zone in the schist occurs, which has been traced for over a mile along the ridge by outcrops and open cuts in the direction of the approximate strike of the schist country rock.

To prove the value of this deposit, a series of tunnels was run in to the hillside, cross-cutting the formation, at the point where the mineralisation showed strongest. These tunnels are three in number, and have been run as follows :—

The lowest tunnel cross-cuts the formation and was run 315 feet. At 275 feet a mineralised zone was struck and was estimated to be about 45 feet thick. Drifts were run on this zone N. 40° W. and S. 40° E., a total distance of 140 feet. This zone was found to have a dip of 24° N.E. and a strike of S. 40° E., in conformity with the schist country rock on the hillside.

A second tunnel, run at an elevation of 184 feet above the lower tunnel, struck the zone referred to at 140 feet, when drifts were run, parallel with those below, a total distance of 166 feet.

At a further elevation of 120 feet above this a third tunnel was driven, cutting this zone at 150 feet, when drifts of 70 feet were run north and south. The last two levels have been connected by an upraise driven on the zone, drifts 70 feet long being run from the upraise midway between the two levels.

Besides this main work, there are other tunnels and open-cuts on other portions of the property. The work done goes to prove that there exists in the very dark talcose schist a mineralised zone, having a width of about 40 feet in the tunnels and traceable for a very considerable distance. A close examination of the vein-matter would indicate that there has been considerable movement, the black schist being slicken-sided to a marked degree, but it would appear that the mineral-bearing solution had not penetrated the zone until after this movement had ceased, as the mineral is found to be between the foliation of the schist and not in any solid masses of the schist itself. Payable mineralisation does not extend across the entire zone, as in places the black schist occurs without any mineralisation whatever, but there are cavities in the schist which have been entirely filled with ore-bearing solutions, and represent solid lenses of ore 4 to 8 feet thick.

The mineralisation consists largely of arsenical iron and copper pyrites, with a little bornite. Assays of selected samples gave gold, .32 oz.; silver, 1.4 oz., and copper, 15 %. While quartz was noted as a portion of the vein filling, it is not nearly so prominent as might be expected from the number of quartz outcrops seen at different points on the surface.

Difficulties of transportation at present militate against the claims, but there is good ground for hoping that further work will prove up a property which, by offering a large tonnage of ore, will overcome this difficulty.

An effort was made to find the *Keystone Group* of claims, on which a considerable amount of work has been done, but this property was missed, owing to the entire obliteration of the trail on the Keystone divide.

ON SUMMIT ABOVE STANDARD BASIN--REVELSTOKE M. D.

DOWNIE CREEK--REVELSTOKE M. D.

TROUT LAKE MINING DIVISION.

Report of F. C. Campbell, Mining Recorder.

I have the honour to submit herewith my report of the progress of the mining industry in the Trout Lake Division for the year 1905:—

While the statistics show a considerable decrease in the volume of business done in the office, this is accounted for by the fact that during the year there has been considerably more development work done than prospecting. This, I am pleased to say, has in many cases been productive of good results, and will, in the near future, materially increase the output of the Division.

The *Silver Cup* and *Nettie L.* mines and the Five-Mile Reduction Works, which are connected by aerial tramways, are the property of the Ferguson Mines, Ltd. During the first part of the year, with the exception of March and April, about 30 men were employed on the *Silver Cup*, which, in conjunction with the *Nettie L.*, supplied milling ore to the Five-Mile Reduction Works. Since June only development work has been done, 20 men having been steadily employed. Eight hundred and forty-five feet of drifts and cross-cuts were run and 230 feet of raises made. One hundred and twenty tons of crude ore have been shipped since June, which represents only ore encountered during development. The *Nettie L.* employed about 25 men up to the latter part of April; since that time a small amount of development work only has been done. The Five-Mile Reduction Works were in operation from 1st January to 10th June, employing about 40 men and handling 10,000 tons of *Silver Cup* and *Nettie L.* ore, making 615 tons of concentrates and 37,120 ounces of silver bullion.

On the *Triune*, situated on the Triune mountain, and owned by the Metropolitan Gold and Silver Mining Co., Ltd., chiefly work of a developing nature was proceeded with during the year, 920 feet of drifts and cross-cuts having been run and 180 feet of raises made. One hundred and fourteen tons of ore, of an average value of $135, was shipped. Twenty men were employed from January to October.

Adjoining the *Silver Cup* on the south-east is the *Free Coinage*, on which considerable work has been done in former years. This property is now under lease to local people, who have done considerable work of a prospecting nature during the year.

On the *Alice No. 2*, situated near the head of Brown creek, a moderate amount of surface work was done, exposing a fissure vein carrying values of about $165 in gold and silver.

The *I. X. L.*, situated in the vicinity, was worked under lease during the latter part of the summer, and a trial shipment of about eight tons made, which gave, I understand, very satisfactory returns.

On the *Noble Four*, a new location adjoining the last-mentioned property, considerable surface work was done and about eight tons of ore shipped.

On the *Mohecan*, situated near the head of Gainer creek, the cross-cut tunnel was continued about 200 feet. It is estimated that this tunnel, when continued 200 feet farther, will cut the lead at a depth of 500 feet.

The Reward Mining Co. Ltd., has acquired 21 claims near Seven-Mile creek, and has commenced driving a tunnel which is to be about 3,200 feet long, and will cut at great depth the porphyry dyke, in which the *Silver Cup* and *Nettie L.* mines lie. The company has installed a 5-drill compressor and run about 550 feet of tunnel during the year. Thirteen men have been employed since operations commenced.

On the *Rambler*, a promising prospect near Seven-Mile creek, about 50 feet of tunnel was driven with good results.

A large amount of surface work was done during the year on the *Surprise*, situated on the north fork of Lardeau creek, exposing large bodies of medium-grade ore.

About the end of October the *Broadview*, situated on Great Northern mountain, on which a large amount of work was done in former years, was bonded by a local syndicate. Up to the end of December the new owners had done about 150 feet of work and shipped 80 tons of ore. Seven men were employed on the property during this period.

On the *St. Elmo*, also situated on Great Northern mountain, considerable work of a prospecting nature was done, disclosing a good body of medium-grade ore.

The *Lucky Boy*, situated on Trout creek, and owned by the Chestnut Hill Mining Co., was in operation from the 1st of January to the 30th April. During this time work of a developing nature principally was done, which consisted of the following:—Sinking the main shaft 40 feet farther; extending the second level to the right about 60 feet, and to the left about 75 feet; extending the third level to the right 100 feet and connecting it by a winze with the second level. The ore chutes continue about as before reported, running from three inches to one foot of solid ore, carrying about 250 ounces silver and 30 % lead. Fifty-six tons of ore was shipped and 10 to 16 men employed.

Adjoining the last-mentioned property is the *Horseshoe*, on which considerable work of a prospecting nature was done during the year. Ten tons of ore were shipped, which gave very satisfactory returns.

On the *Copper Chief*, situated on Trout creek, the tunnel was continued along the No. 1 lead for a distance of about 60 feet, through which distance the lead maintains its uniform size and values. Sixty feet west of No. 1 lead about 40 feet of open cut was made, exposing a second lead, on which a tunnel was driven for a distance of 30 feet. This second vein proved very similar to the No. 1, and consisted of two and a half feet of quartz with an eight-inch paystreak. A sample shipment of three tons made to the Hall Mines' Smelter gave values of 255 ounces silver, 16 % lead, 1.71 % copper, and 17 % zinc.

Considerable surface work was done on the *Willow Grouse*, also on Trout creek, and about two tons of ore shipped.

On the *Silver Plate*, situated on American mountain, a cross-cut tunnel was run 200 feet, cutting the vein at a depth of 80 feet, and a drift made for a distance of 15 feet. At this point the vein is eight feet wide and carries good gold values.

The tunnel on the *Bonanza*, situated in this vicinity, was extended 35 feet. This opens up the vein for a distance of 125 feet. Vein consists of about eight feet of quartz, carrying values of $44 in gold and silver.

About 80 feet of tunnel was run on the *Lanax*, a promising prospect situated on the north side of Trout lake, near Gerrard.

On the *Blue Grouse*, also situated in this vicinity, a tunnel was run on the lead for a distance of 100 feet.

Considerable work of a prospecting nature was done on the *Homestake*, situated on the south side of Trout lake, near Gerrard.

On the *Linson View*, situated on Canyon creek, at the intersection of the cross-cut tunnel with the vein, a shaft was sunk 20 feet, thus giving a depth of 70 feet. At this point the lead is about four feet wide with a nine-inch pay streak. A sample of 1,000 pounds shipped to the Trail Smelter gave values of 201 ounces silver, 12 % lead, 4 % copper and 9 % zinc.

Considerable prospecting work was done on the *Red Hill*, on Canyon creek, exposing a good vein, which carries about 70 ounces silver, as well as a large percentage of zinc.

Situated also in this vicinity is the *Ruby Silver*, on which a tunnel was run for a distance of 94 feet on a quartz vein from two to four feet wide, impregnated with gray copper and galena, giving values of $65 per ton.

On the *Grand Solo*, situated on Canyon creek, 70 feet of tunnel was run. This is a quartz lead impregnated with gray copper and galena.

Considerable work of a prospecting nature was done on the *Fear Not*, also situated on Canyon creek, with very good results.

Situated near Gerrard is the *Poplar*, on which a large amount of surface work was done, exposing several seams of asbestos; but, so far as I can learn, not of a marketable quality at present.

On the *Calumet and Hecla*, situated near Rapid creek, a shaft was sunk 40 feet and the ledge then cross-cut for a distance of 20 feet. This is a quartz vein heavily impregnated with pyrites and arsenical iron carrying gold values of from $2 up per ton.

Considerable work has been done on the *Golden Chest No. 2*, a gold proposition near Poplar, with very satisfactory results. I am informed it is the intention of the owners to install a small stamp-mill in the future.

On the *Gold Park*, situated near Poplar, 140 feet of tunnel was driven, exposing a large body of arsenical iron carrying gold values.

On the *Mother Lode*, operated by the Laclede Mining Co., Ltd., and also situated near Poplar, 400 feet of drifts, cross-cuts and raises have been made during the year. This is a silver, lead and zinc property. The owners express themselves well satisfied with the year's development.

Owing to high water continuing on Lardeau creek until late in the season, work on the placer lease of the Spokane Falls Placer Mining Co., Ltd., was somewhat retarded. The company, however, extended its flume 500 feet, besides making all necessary repairs in the old flume and dam. During the short time in the fall that sluicing was proceeded with, the clean-up was, I am informed, very satisfactory.

Office Statistics—Trout Lake Mining Division.

Free miners' certificates issued to individuals	274
" " " companies	5
" " " individuals (special)	2
Mineral claims recorded	182
Certificates of work issued	587
Cash paid in lieu of assessment work	3
Certificates of improvements recorded	33
Bills of sale, agreements, etc., recorded	109
Abandonments of mineral claims recorded	2

LARDEAU MINING DIVISION.

Report of Geo. Sumner, Mining Recorder.

I have the honour to submit herewith a short report of the progress made by the Lardeau Mining Division during the year 1905.

The locating of new mineral claims has fallen off, and only the locations having merit are now kept alive, and the assessments compare favourably with former years. There are now at least seven mining properties being operated by companies.

We are still suffering from the lack of transportation facilities, although the Provincial Government is improving the roads, but at best waggon roads are a poor means of transporting heavy minerals.

The Beatrice. This property has a large surface-showing of galena ore, and the company is at present driving two tunnels—the lower and the intermediate. Several hundred feet have been driven, but the ore has not yet been encountered.

On the *Del Rey* a long tunnel has been driven and a vein of free gold quartz encountered about 20 feet wide.

Silver Dollar. This claim is situated on Mohawk creek, about half a mile from the *Del Rey*. Character of ore the same; vein large, and considerable work done. I have been unable to ascertain the assay value of the ore, but as the company is doing a considerable amount of work, installing compressor, saw-mill, stamp-mill, etc., I take it that they must see values in the ore sufficient to justify all this expenditure. An aerial wire tram is contemplated from the mine to the mill.

Oyster-Criterion. This mine is situated in the immediate vicinity of the town of Camborne. It was worked for some years and is fully equipped with stamp-mill, compressor plant, power drills and aerial wire tramway, but owing to financial difficulties was shut down last autumn. The property is of considerable merit, and if allowed to stand on its own legs would work out its own salvation in a short time; but has been tied up to distant properties which were constantly in liquidation, hence the financial difficulties. Head office, Nelson, B. C.

Eva Gold Mines, Ltd. The claims of this company are adjoining the *Oyster-Criterion* and the character of ore is the same, the same veins being said to run through both. The *Eva* is fully equipped with everything necessary for turning the raw ore into bullion. Large ore reserves are kept ahead of the milling capacity. Manager, A. H. Gracey, Nelson, B. C.

Gold Finch Mines, Ltd. These properties are situated on Menhinnick creek, opposite the *Eva* mines. This company, after having met disaster a few years ago, partly through mismanagement, partly through forest fires, is about to resume operations next spring. Samples of free gold ore taken from the *Gold Finch* were very rich, but what the average assay value was, I was never able to ascertain, as conditions in regard to the company were always very much mixed. The financial condition of the company is now completely rehabilitated, and with proper management there is no apparent reason why an era of prosperity should not set in for the company.

Mammoth. This is a silver-lead proposition high up on Goat mountain and about ten miles distant from the town of Camborne. The property is owned and operated by the Edward Baillie Syndicate, Ltd., of Nelson, B. C. The ore is sorted at the mine; hand-picked samples are sacked and then "raw-hided" down the mountain over a very steep trail; thence taken by waggon to deep water at Beaton, from which point it is shipped to the smelter. The mining is done under great disadvantages, the location is above timber line, and the fuel, as well as all supplies, has to be packed on horseback, the wood for cooking and heating costing about $40 per cord. The ore is very high grade

OFFICE STATISTICS—LARDEAU MINING DIVISION.

Locations recorded	33
Certificates of work issued	170
Transfers, etc	36
Free miners' certificates	109
Certificates of improvement recorded	15

SLOCAN DISTRICT.

AINSWORTH, SLOCAN AND SLOCAN CITY MINING DIVISIONS.

Report of E. E. Chipman, Gold Commissioner.

I have the honour to submit my report for the Slocan District for the year 1905.

The improvement in the mining industry in the Slocan, Slocan City and Ainsworth Divisions for the year 1905, although not as marked as was hoped for at the beginning of the year, has still been sufficient to warrant the feeling of increased confidence that prevails everywhere throughout the district. During the year a material difference in the methods of mining has obtained. There is a decrease in the number of mines worked by large companies, and an increase in the number of properties worked under lease. Over fifty different mines were operated during the year under the last-named system. Almost invariably the lease-holders have been well remunerated for their labour, and some of them have been rewarded with handsome profits. Notably among the latter are the leases held on the *Lone Bachelor*, *Payne*, *Whitewater* and *Hewitt*. The success which has attended the efforts put forth in this direction has increased the activity in mining in the district, and properties which have been idle for years, but which have a favourable surface-showing of ore, are being sought for eagerly. A large increase in the number of leases is confidently looked for in the coming year. Substantial dividends have been paid by the Slocan Star Mining Company, the Reco Mining Company, and the *Lucky Jim*. The last-named mine, practically abandoned some years ago on account of excess of zinc, enabled its management to pay the owners a dividend of $80,000 during the year. The increased price of silver, lead and zinc has stimulated operations, and the added facilities for the magnetic separation and enriching of zinc ores by the Kootenay Ore Company's plant at Kaslo, which is in successful operation, with the proposed plant of a like nature now being installed by the Canada Metal Company at Pilot Bay, encourages the belief that the year 1906 will be the most successful in the history of the Slocan District.

While the tonnage of silver-lead has slightly decreased in the district, the shipments of zinc have more than made up the shortage. The figures, as accurately as can be obtained in tons, are as follows:—

Ore shipped from Slocan points (C.P.R.)	Silver-lead,	7,835;	zinc (est.),	2,500
" " Kaslo (K. & S. Railway)	"	3,618;	"	8,895
" " Kootenay lake points	"	1,817;	"	
Totals		13,270		11,395

AINSWORTH MINING DIVISION.

In this division the greatest improvement in the mining industry has occurred in the mines on the Kootenay lake. At Ainsworth, many of the older mines, which had been unworked for a number of years, resumed operation. This condition has been brought about by the demand and high price for the zinc ores which predominate in nearly all the properties, and in the facilities which are being provided by the Canada Metal Company for the treatment of the product. This company has secured the old Pilot Bay smelter, which has been

shut down for over ten years. They are employing a large force of men in renovating it, and putting in modern and up-to-date machinery, which will enable them to treat not only lead ores, but to separate magnetically the zinc and prepare it for smelting at the company's works at Frank, Alberta. The company has also purchased the old *Blue Bell* mine, on the east shore of Kootenay lake, which is believed to contain sufficient zinc ore to keep their separating and enriching plant at Pilot Bay almost continually at work. Thirty men are employed at the mine, and the same number at Pilot Bay.

Krao. This property has been continuously worked since June 1st, 1905; 600 feet of waggon road and 600 feet of rawhide trail have been built, and a substantial bunk-house, cook-house, blacksmith shop and ore-sorting sheds have been erected. The mining done during the year consisted of working out two "glory holes" 20 by 25 by 20 feet deep, and chambering out ore in the shaft at 30 feet in depth, 30 by 13 feet, and 15 feet high. An average of four men has been employed, and 600 tons of ore have been shipped. A. D. Wheeler is the owner and manager.

The *Highland* mine is situated on Cedar creek north of Ainsworth, and is the property of the Highland (B. C.) Mining Company, but is at present under bond and lease to P. Burns & Co. Development has been prosecuted throughout the year. Amount of work done in drifts, upraises and shafts, 1,130 feet. A fine showing of ore has been uncovered. An average of 12 men have been employed.

No. 1 mine employed a few men and shipped about 140 tons of ore.

United. This property has been taken over by the Canada Metal Company, of Frank, Alberta, which has erected shaft houses, ore-bins, cook and bunk-houses, and has contracted with the "Coffee Creek, Kootenay Air Supply," for power. It has also put in a steam plant in case the air supply power should be insufficient at any time. The mine has been pumped out to the 150-foot level, and from this point the company is drifting, cross-cutting, putting in chutes, blocking out ore, and getting ready to ship early in the coming year. Thus far no ore has been moved from the mine. About 20 men are employed.

From the *Highlander* about 250 tons of ore have been shipped and considerable development has been done, but no further particulars have been obtained.

Woodbury Creek.

On Woodbury creek the *Baltimore* has worked continuously during the year. An average of three men has been employed. A considerable amount of development has been done, and over 50 tons of high-grade silver ore have been shipped. The *Pontiac* also has been working steadily on development work during the year. No ore has been shipped.

The King Solomon Mines Co. has also prosecuted development work on its many properties during the year but has shipped no ore.

South Fork of Kaslo Creek.

On the south fork of Kaslo creek the *Cork* mine has worked steadily during the year in development and in taking out ore. An average of 20 men has been employed in the mine and mill, which latter is now working successfully. Over 200 tons of concentrates have been shipped. At the present time 52 men are on the pay-roll.

On the *Province*, adjoining the *Cork*, a small amount of development work was accomplished. A winze was sunk 25 feet, and 65 feet of cross-cutting and drifting was done, all in ore. The management contemplates driving a 1,200-foot cross-cut tunnel to strike their vein at a greater depth, and the erecting of a concentrator in the coming year.

The *Bismarck* has been operated continuously throughout the year. Over 100 tons of high-grade silver ore have been shipped, and 100 feet of development done. Three men have been employed.

Other claims of note on branches of the south fork are the *Revenue*, on which 30 feet of tunnel have been driven, disclosing a fine body of silver-lead ore; the *Flint*, from which 11 tons of ore of a high grade have been marketed; and the *Index*, which has a promising ore body exposed on the vein, and 10 tons of ore sorted on the dump and ready for shipment. The respective owners of these properties intend working them extensively the coming year.

Whitewater.

At Whitewater, Messrs. Fowler, Retallack and Koch have obtained a lease on the *Whitewater* and *Whitewater Deep* and are continuing the tunnel on the latter to connect with the old *Whitewater* workings. Ffteen men are working on development and on sub-leases.

The *Jackson* mines have been worked steadily since early in the year. An average of ten men has been employed. Two hundred tons of silver and 130 tons of zinc ore have been shipped.

The *Bell*, *Silver Glance*, *Empress* and *Mountain Goat* have each been worked continuously, and all of them have made small shipments of ore.

Hamill Creek.

On Hamill creek, the Argenta Mines Company has employed an average of 8 men steadily in development, and over 1,000 feet of tunnelling and cross-cutting on the vein has been accomplished. The management expresses itself as entirely satisfied with the results obtained. All arrangements are completed to put in an air-compressor for more extensive development, and for the erection of a concentrator to treat the product in the early spring.

Office Statistics—Ainsworth Mining Division.

Free miners' certificates, personal	328
" " companies	8
New claims recorded	165
Trasfers recorded	119
Certificates of work issued	518
Payments in lieu of work	8
Water records issued	40
Pre-emptions issued	35
Certificates of improvement issued	43
Certificates of purchase	51

SLOCAN MINING DIVISION.

Report by Angus McInnes, Mining Recorder.

I have the honour to submit herewith my annual mining report and office statistics for the Slocan Mining Division for the year ending December 31st, 1905:—

I am pleased to say that the majority of the properties in this district have been fairly active during the year, and it is noticeable also that leasing is increasing in favour with a great number of miners and prospectors, as at the present time there are no less than twelve properties in this district operating very successfully under the leasing system.

The *Slocan Star* mine is owned and operated by the Byron N. White Co., under the management of O. C. White, and although it has shipped a large tonnage of ore during the year, its operations have been confined largely to development work, and the coming year will see the ore shipments more than doubled.

The well-known *Payne* mine has been worked under leases during the past year by several parties, and much ore has been shipped. Geo. F. Ransom is manager.

The *Reco* is keeping up its old time reputation as one of the steady shippers of the camp, and is noted for the high-grade value of its ore. J. M. Harris is manager.

The *Goodenough* adjoins the *Reco*, and is owned and operated by J. Whittier. This is considered a very rich property, having the same vein as the *Reco*.

The *Ruth*, of which George Alexander is manager, has confined operations during the year principally to development work. It is understood that the property is in such shape now that a large amount of ore can be taken out at a very small cost.

The *Last Chance* mine has been worked steadily during the year with a small crew, under the management of Louis Pratt, and it is understood that the owners are well satisfied with the year's work.

The *Silver Glance* mine is situated near Bear lake and is controlled by J. H. Powers, of Sandon. The ore is what is known in this camp as "dry," and is very rich.

The *Sunset* mine is owned and operated by George W. Hughes, Finucane and Daly, and has been worked steadily during the year, under the able management of Tony Becker.

The *Mountain Con* mine has done better this year than it has ever done before. It is operated by the locators, Thompson and McLeod.

The *Blue Bird* is being worked on a small scale, only development work being done.

The *Idaho*, with the *Alamo*, is working only a small force of men, pushing development work. Mr. R. Roberts is manager.

Operations at the *Rambler* have been confined to work on the long tunnel which was started nearly two years ago and is in now nearly one mile. About another thousand feet will reach the lead. W. E. Zwicky, manager, Kaslo, B. C.

The *Antoine* is being operated by Mr. George Alexander, and the work during the year has been confined to developing the property.

The *Emily Edith* is situate near Silverton, and is operated by Mr. M. S. Davys, under lease and bond, and it is reported that there is sufficient ore in sight now to pay for the mine.

The *Comstock* mine also is situate near Silverton and is operated by Mr. William Hunter.

The *Fisher Maiden* has been operated during the early part of the year and shipped a considerable amount of ore, but has lately been closed down for reasons unknown.

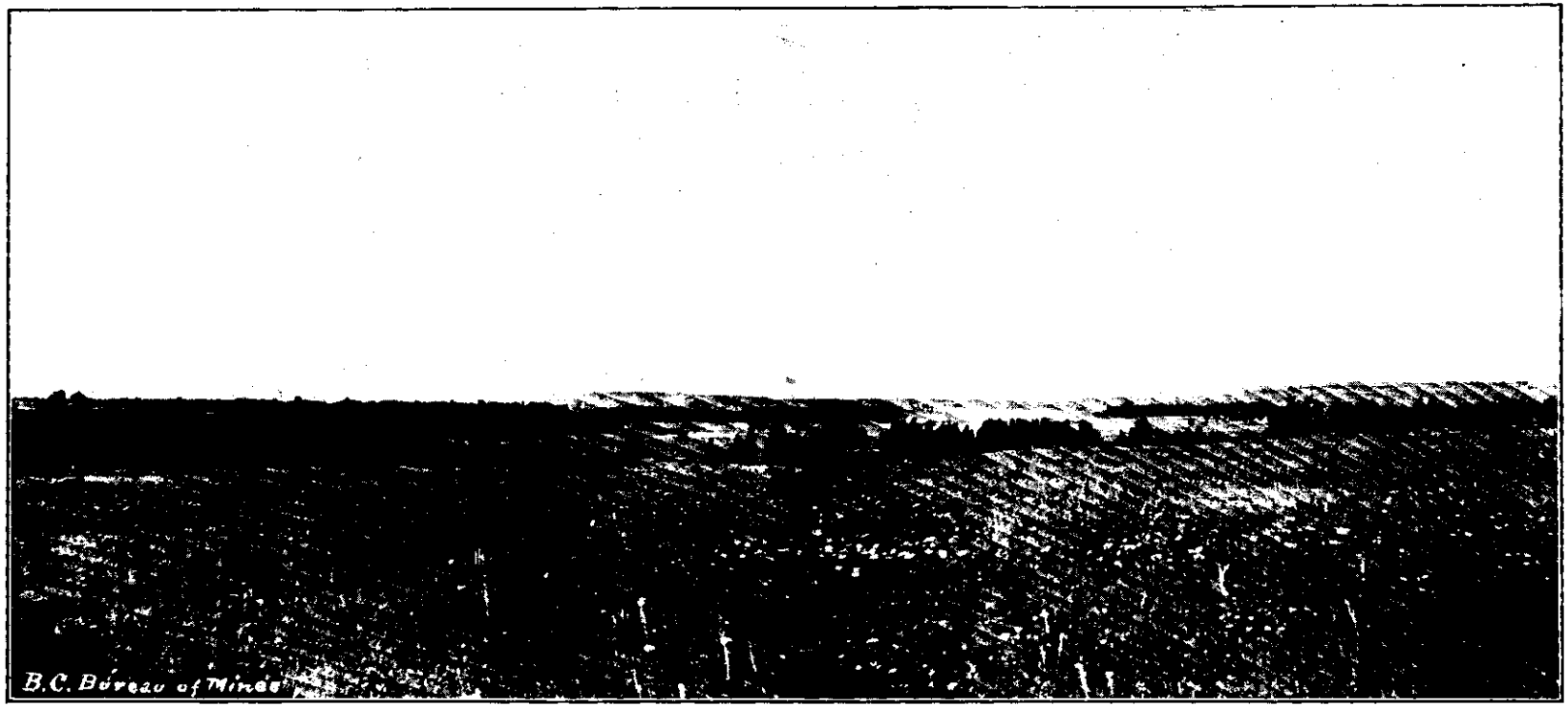
Mr. William Hunter is operating and managing the *Wakefield* mine also with success.

The *Monitor* and *Bosun*, two well-known mines, are now controlled by the Monitor and Ajax Fraction Company, which also owns the zinc and lead concentrating plant at Rosebery. There has been very little work done at these mines during the year, as the management was devoting most of its time to getting the mill ready for the coming season. It is understood that both of these mines will be operated to their full capacity this coming year. Mr. Morris Gintzburger is manager.

The *Red Fox* mine has been operated with a small force, under the management of Neil Gething.

The *American Boy*, situated near Sandon, is controlled by a company of Spokane people. The mine has been worked during the year with very good results and has shipped a great deal of ore, principally lead and zinc. T. McGuigan is manager.

The *Hewitt* mine is situated on Four-Mile creek, about three miles from Silverton, and has shipped more ore this year than any other mine on the creek. M. S. Davis is manager.



MEADOWS ON TRAIL NORTH OF OOTSA LAKE.

The *R. E. Lee*, of which Lorenzo Alexander is part owner and manager, has worked a small force during the year, and has taken out some ore, but the work was confined chiefly to development.

The *Mercury* is situated near the *Payne*, on the Sandon slope, and is owned and operated by Messrs. Twigg, Cunning and Drewry. It is believed that they have the *Payne* lead.

The *Lucky Jim* is situated in the Bear lake section of this district, and is owned and operated by George W. Hughes. The ore is zinc blende and galena, the zinc being found in large bodies and very pure. There is a force of about 14 men working steadily.

The *Standard* has come to the front this summer. It is worked by George Aylard, who has a bond on it, and is situate near Silverton. There is a very large tonnage of ore now in sight.

The *Lone Bachelor* mine is under lease to Messrs. Lowe, Cameron and Sloan, who have discovered a big chute of very good ore, which they are now engaged in taking out and shipping. It is situated near the *Monitor*, at Three Forks.

W. H. Brandon has been doing development work on the *Canadian Group*, with good results.

Besides these properties mentioned above, there are the *Little Daisy Group*, the *F. L. H. Group*, *Queen Bess*, *Mollie Hughes*, *Bob Fraction*, *Majestic*, *Elk Horn*, *Joe Joe*, *Rowse Fraction*, *Silver Bell*, *Yakima*, *Vulture*, *Marion*, *California*, *Hartney*, *Buffalo*, *Empress*, *Wonderful*, *Cinderella* and *Slocan Boy*, which have all had some work done, in most cases with success.

There were approximately 7,000 tons of silver-lead and 7,500 tons of zinc ores shipped from this division during the year.

Office Statistics—Slocan Mining Division.

Free miners' certificates issued	296
Company certificates issued	9
Special certificates issued	1
Locations recorded	72
Certificates of work issued	282
Transfers and other documents	61
Certificates of improvements	32

SLOCAN CITY MINING DIVISION.

Report of H. P. Jorand, Mining Recorder.

I have the honour to submit the annual report on the Slocan City Mining Division for the year 1905.

Although there was no increase in the shipments of ore during 1905, in other directions there has again been a decided improvement over previous years in the mining situation. More properties are being worked, the average value of the ore shipped is greater, and almost without exception the results of work done have been most encouraging. Probably the most encouraging feature of the year has been the proving of the existence of large bodies of ore at a depth greater than before obtained, and, as in the case of the *Ottawa* mine, the fact that these ore bodies carry even higher values than those nearer the surface. Leases are still being sought for, and in nearly all cases have proved profitable.

SPRINGER CREEK.

The *Arlington* mine, after a lengthy close-down, has been opened up again. During the spring and early summer a small force was engaged to put the mine in repair, and at midsummer shipments were resumed, over 500 tons, including some dump ore, being shipped to date. Six men are now employed at the mine.

The *Slocan Prince* discontinued shipments when the roads broke up in the spring, and but an insignificant force was kept at work during the summer doing development work. This force was increased with the coming of winter to 17 men, and regular shipments are again being made, over 100 tons of high-grade ore being shipped during December.

The *Ottawa* has been busy all the year and some 40 men are now being employed. During the summer a new level (No. 5) has been opened up and a fine body of ore exposed. From this level, which gives the greatest depth as yet attained on the property, over 550 tons have been shipped, the average contents of which in silver, on the whole 550 tons, amounted to a little over 235 oz. to the ton, or 35 oz. per ton higher than the values in the shipments made from the higher levels. The *Mayetta Group* has been consolidated with the *Ottawa*, and Crown grants have been obtained for the whole group. During the year new buildings have been erected at the mine, at a cost of about $2,000, and accommodation prepared for a substantial increase of the working force.

The *Myrtle Group* has been steadily developed during the year, and a good grade of shipping ore opened up. The lead containing this ore is one of the largest in the district. Arrangements have been made to commence shipments.

The *Graphic* was worked during the spring and fall under lease, some 10 tons of high-grade ore, averaging approximately 225 oz. in silver to the ton, being shipped.

The *Hampton* also was worked this summer and fall. The vein on this property carries exceptional values. Some 40 tons in all were shipped during the year, one substantial shipment giving the amazing smelter returns of 1,960 oz. in silver to the ton.

Some encouraging work was done on the *I. X. L. Group* during the year.

Some work was done on the *Calumet* and *Hecla* during the fall, which increased the reserves of ore in sight.

The *Meteor* is under lease, two men being at work, with the result that a car of ore is now ready for shipment.

The *Dayton* shipped over 11 tons during the year, giving returns of about $100 in all values to the ton.

The *Tamarack* is now under lease to Messrs. Lea and Nichol. Three men are at work getting out ore, some 20 tons being now ready for shipment. Under a previous lease some 35 tons of ore were shipped in the spring.

The *Triune* is being developed by its owner, Mr. R. I. Kirkwood.

The *Kimberly Group* has just been bonded by New York people, three men being employed in developing the same.

The *Jack* and *Lakeview* were under lease during the summer and a small shipment was made.

TWELVE-MILE CREEK.

The *Colorado* made a shipment of 20 tons taken out in development work during the month of June, and is now under option to New York capitalists, development work being carried on by three men.

The *International* and *Happy Medium* also made a shipment of 6 tons in September, which netted the owners about $125 a ton in all values (gold and silver), after paying freight and treatment. This group is now under option to Eastern people, who are developing same with a small force.

A cross-cut tunnel was run on the *May* for some 70 feet on a large vein running north and south, but the hanging-wall supposed to contain the paystreak has not been reached yet. Further development is mapped out for next year.

Ten-Mile Creek.

The *Neepawa*, worked under lease during the spring, netted the lessors a handsome profit over expenses, nearly 300 tons being shipped, giving net smelter returns, after paying freight and treatment, of $18,258. All this ore was taken out by about three men. This was the most successful lease of the year in this division. Since the lease expired the owners have worked the property, and shipped on their own account some 30 tons of ore.

The *Enterprise* was not worked as extensively as last year, only some 210 tons being shipped. This mine is still under lease to Mr. W. C. E. Koch, who sub-let a part of the mine during the year.

The *Westmont* and *Black Cloud* were steadily developed during the year by the owners.

The *Riverside* and *Mabou*, both owned by Mr. R. I. Kirkwood, had considerable work done during the year.

The *Bannockburn* has been continuously worked under lease, and while no shipments were made, lessors are now working in the ore chute and taking out some ore.

New quarters were built at the *Blackhawk*, which is being developed by the owners, sufficient supplies having been taken in to last the present force all winter. A small shipment was made when the supplies were taken in.

Lemon Creek.

Very little work was done on this creek during the present year, beyond the regular assessment work. Some *Kilo* ore was treated at the *Chapleau* mill with satisfactory results. The *Chapleau* was leased during part of the year.

The only work of importance was done on the *Barnett*, operated by Mr. R. G. McLeod, of Seattle, from which nine tons were shipped last fall, giving returns of over $90 a ton in gold and silver. The property is being further developed.

Official Statistics—Slocan City Mining Division.

Free miners' certificates issued, ordinary	169
" " " company	6
Certificates of work recorded	322
New locations recorded	77
Conveyances recorded	69
Certificates of improvements recorded	12
Cash paid in lieu of work	$300

NELSON DISTRICT.

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NELSON MINING DIVISION.

REPORT OF ROBERT A. RENWICK, GOLD COMMISSIONER.

A general improvement in mining conditions will be noted when comparison is made between the conditions in the Nelson Mining Division at the close of December, 1905, and those which presented themselves at the close of the previous year.

In the case of the Hall Mining and Smelting Company this is especially significant. An increase is shown in the net profit on the company's smelting operations; substantial profits have resulted from the company's participation in the operation of the *Emma Group* of mines (Boundary), and considerable encouragement has been met with in the development of the *Silver King Group* of mines, owned by the company.

The results from the experiments carried on at the *May and Jennie* mine were also important. Here the adaptability of the Hendryx process has been demonstrated in connection with the cyaniding of ore of the character found so extensively in the *May and Jennie* workings. The only disappointing feature brought out in connection with these experiments is that the 50-ton plant which the company installed during the year is of insufficient capacity for the profitable working of the property, but with this defect remedied, and the enlarged plant operating on a successful basis, there is every reason to believe that considerable quantities of this character of low grade ore will be profitably treated.

Confident reports as to the later development that has been carried on in the west workings of the *Ymir* mine have also tended to improve the general feeling. The nature of this recent work has not permitted the application of the test of actual results in the way of increased tonnage of higher grade ore.

Results at the *Second Relief* mine are even more tangible. The past season was the first in which the mine was worked continuously throughout the winter months, when it was demonstrated that with existing ore reserves, and mine and mill equipment, it was possible to make regular earnings of $3,000 a month and not deplete the supply of ore. The grade of the ore milled was about the same as that milled heretofore, yielding on an average $10 to the ton in amalgam and concentrates; but the extraction in the mill has been better and the profit margin per ton over mining, milling and marketing has been increased to $4.70 per ton.

At the *Arlington* mine the operating company's operations were so successful that a dividend of one shilling per share was declared.

Hall Mining and Smelting Co.

This company made a marked advance during its last fiscal year ending June 30th, 1905, the net profit being £6,013 4*s.* 4*d.*, as against £1,696 16*s.* for the previous year. The earning of the past year is shown under four heads: Operation of the *Silver King Group* of mines, £159 8*s.* 6*d.*; smelting profit, £5,094 14*s.*; profit from the working of the *Emma* mine, £2,849 15*s.* 10*d.*, and sundry receipts including metal market earning, £1,220 8*s.* 1*d.* From the aggregate of these figures general expenses of the company, debenture interest and exchange reduce the net profit to the figures given above.

The company's No. 1 furnace was in operation 264 days, and the No. 2 for 290 days; representing 76 % of the furnace capacity. The ores treated were 5,138 tons of dry ore; 8,210 tons of lead ores not roasted; 8,281 tons of lead ores roasted, including a large quantity of lead concentrates. In addition to these, the fluxing ores from the *Emma* and *Standard* mines amounted to 12,745 tons. In addition, there were treated in the furnaces 8,600 tons of matte. The bullion shipped amounted to 7,603 tons. There were also shipped 252 tons of concentrated copper-lead matte. The total contents of these two items were 1,206,920 oz. silver; 9,021 oz. gold; 40 tons copper; and 7,436 tons of lead; with total values of about $1,100,000.

The ore supplies for the smelter were drawn from 125 different mining properties, which circumstance is taken by the company management to indicate a widespread revival in mining, which in turn should present results in increased tonnage. The increased import duty on corroded lead and lead ground in oil, and the establishment of corroding works in Montreal, are also regarded as important factors for the improvement of conditions during the ensuing year.

In the company's mining branch the outlook is also regarded as promising. The existing arrangement for the working of the *Silver King Group* in partnership with M. S. Davys was in operation for but a short period of the year. Some good ore has been discovered in the upper workings of the mine, and Mr. Davys is so confident of the values disclosed that he anticipates a sufficient margin in the mining of the ore to pay for the cost of unwatering the mine to the seventh level, to carry on the extensive work mapped out between this level and the surface.

At the *Emma* mine, in the Boundary District, in which the company has a quarter interest, 25,505 tons of fluxing ore were mined and shipped to the smelters; the company's proportion of profit from which amounted to £2,849 15s. 10d. A double-compartment shaft has been put in at the *Emma* to cheapen the cost of mining.

Silver King Mine. The development work in this property has been carried out under the direction of M. S. Davys. Attention so far has been restricted to the upper workings. On the *Kootenay Bonanza* a shaft has been sunk for 35 feet on a showing of ore, and in the bottom of the shaft the ore has widened out to five feet, and samples 16 oz. silver and 2 % copper. Work is to be resumed on the shaft in the spring and carried down to a depth of 100 feet, when a connection will be made by drift 350 feet in length from the *Kootenay Bonanza* level. Another chute of ore has been opened up between the No. 1 and No. 2 levels. This ore is irregular, but some good bunches have been encountered. From this, and the caved ground between the No. 4 Level and the surface, 800 tons of ore were mined and shipped, yielding 20 oz. silver and from 3 to 4 % copper.

May and Jennie Mine. The 50-ton mill and cyanide plant which was in course of erection on this property for several months was completed in July last. Experiments were then made with the ore, which brought out the necessity for considerable adjustment in the cyanide plant, and it was not until December that the desired changes were effected and regular milling commenced. The best commercial results were obtained while milling at the rate of 40 tons per day, the total recovery being 85 % of the values. The net result of the experiments carried on may be summed up in the statement that the adaptability of the process applied has been demonstrated; but it has also been shown that in order to obtain financial results in the working of the *May and Jennie* property, the capacity of the cyanide plant will require to be very materially enlarged. The ore reserves in the mine are very extensive, being estimated by the management at 80,000

tons, the average value of which is computed at $4. With the process adopted for the treatment of the ore, and the favourable circumstances attending the mining and handling of ore, the management announces its ability to mine, tram and treat the *May and Jennie* ore for $1.40 a ton. Work done in the mine consisted in stoping 1,500 tons of ore and breaking down about 3,000 tons in the mine. The milling plant consists of a Chilian mill with a nominal capacity of 50 tons, Blake crusher, rolls and the "Hendryx electro-cyanide process."

Poorman-Granite Group.

On these properties the lessees restricted their attention to the *Poorman*, practically abandoning the *Granite*. In the *Poorman* results were not satisfactory. One lot of 600 tons of ore was put through the mill and yielded but $4.80 to the ton. As much more was broken down in the mine ready for treatment, and future operations will depend upon milling results upon it. A nice chute of ore has been opened up in the mine for a length of 140 feet, the ore having an average width of 20 inches, but a considerable improvement in values will require to be shown before any profit from working could be anticipated.

Eureka Group.

During the first months of the year this property was worked by the owner, J. P. Swedberg, with a crew of four men, sinking and drifting about 120 feet, and a trial shipment of 14 tons was sent to the Trail smelter. As the result of this work, a bond was taken upon the property by J. A. Kirkpatrick, and other Nelson men, in July. The working shaft was then put down for another 50 feet and 200 feet of drifts from the bottom. The vein was found to average well up to 3 feet in width, the vein filling being carbonates carrying gold and copper values. The full width of the vein was mined and shipped to the smelters, the average returns being 7 % copper, $7 in gold and $2 in silver. During the first six months of the bond the smelter shipments aggregated 250 tons of this grade of ore, and at the end of the year the property was said to be in shape to warrant shipments at the rate of 300 tons a month.

Greenhorn.

Messrs. Swedberg & Nelson, the owners of this property, did about 125 feet of work on the *Greenhorn* vein during the year, the vein varying from 2 inches to 24 inches. Considerable shipments from this property during the previous year showed recoverable values in the ore of $10 to the ton, but the milling arrangements offered for the custom treatment of the ore in the *Granite* mill did not appeal to the *Greenhorn* owners and no attempt was made to stope ore.

Molly Gibson Group.

This property, situated at the head of Kokanee creek, was operated throughout the year by the La Plata Mines Company, Limited, of which T. H. Tretheway is manager. During this period a crew of 23 men was employed in the mine, and up to December all work was restricted to development. Considerable ore was taken out in the course of this work, and some 820 tons were shipped, which gave a return over smelter treatment and freight rate of $15,000. The development accomplished consisted of 1,500 feet of drifting, and 500 feet of raising, and disclosed sufficient ore of milling grade to keep the company's concentrator running for three years. This ore has been made in the Nos. 5 and 4 levels, and in the No. 4 intermediate, the vein varying from 6 inches to 5 feet. From samples made of the ore the management estimates that one-third of it can be shipped clean and should yield from 40 to 70 oz. silver and from 10 to 18 % lead. The remaining two-thirds of the ore will concentrate from five to ten into one, and should make a concentrate carrying 100 oz. silver and from 40 to 50 % lead. Late in the summer work was commenced upon a 75-ton concentrator, and had progressed so satisfactorily that the management expects to have it in operation in the spring. Regular shipments of 10 cars of ore and concentrates are contemplated when the mill is in operation.

Ymir.

Operations were carried on at the *Ymir* by the owning company, under the respective managements of S. J. Speak and E. M. Hand. The settled policy of the *Ymir* company for several years past has been to develop the eastern workings in the mine. This was based upon the best expert opinion obtainable, but for the past two years it has been barren of results, and the developed ore in the upper workings having become depleted, the company has been hard put to keep the mill running and to continue operations. This was the condition of affairs late in the year when the present manager, Mr. Hand, was installed. He received permission to do a limited amount of work in extending the workings westerly, in the hope of picking up the lost pay chute. This work was started from the fifth level and with very little work a stringer of ore was encountered. It was followed for 60 feet and as a result of this further work the management claims to have an ore-body of substantial worth. Work was later started in the sixth level and the same chute of ore encountered in the fifth was met with. From the point where the ore was struck in the sixth level it is estimated that the new chute has a length of 150 feet. Ore has also been discovered in the west drift off the 1,000-foot level, which, it is also thought, will prove to be the same chute picked up in the five and six. This ore found in the lower level is said to sample $15 to the ton, but the extent of the ore at this point is entirely speculative. An upraise is being put in on this lower showing, and the western drift on the level is being steadily advanced. These discoveries have been made too late in the year to have had any effect upon the mine's output, but they have had a very marked effect upon the market quotations for the company stock.

The output of the mine for the year was considerably less than for 1904, and the recovered values per ton were also lower than for the same period. The only figures available are for the first three quarters, ending September 30th, the tonnage being 17,736, the recovered values from which, over and above the cost of tramming, milling, and the cost of freight and treatment on the concentrates, was $32,878.

Wilcox.

Operations at this property were interrupted during the year by the financial difficulties of the owning company, the Broken Hill Mining and Milling Company, brought about by expenditures in connection with the development and equipment of the mine. These difficulties resulted in the appointment of Stephen Bywater, one of the largest individual holders of stock, as liquidator. Late in the year he resumed work at the property and from the mine earnings has paid off 50 % of the preferred claims. The property is generally considered as capable of weathering present difficulties, but the results achieved during the past year, in a mining sense, are insignificant.

Yankee Girl.

This property was operated during the greater part of the year by the Doyle Brothers, under lease and bond. During the life of the bond, 250 tons of ore were shipped to the Nelson smelter, the net returns from which were $6,600. The operators got into legal difficulties with the owners of the property and the latter regained possession of the property. Some further operations were carried on, but they were not considered profitable, and work was discontinued.

The reported intentions of the company owning the *Dundee* to resume work were not carried into effect. A short lease was given on the property and two cars of ore were shipped, after which operations were suspended.

Arizona.

This property being situated close to the *Wilcox* mill, an attempt was made to work it on a lease and treat the ore at the *Wilcox*. In this attempt 250 tons of ore were mined and moved to the mill, but the value of the ore was not sufficient to stand the charges of $6.75 for hauling and milling, and the venture resulted disastrously to the lessees.

Tamarac.

Lessees made a venture with this property during the year, which has been idle for a number of years. From samples of the ore sent to Boundary smelters it was thought that exceptionally favourable rates of treatment could be secured, and as a result a small tonnage was rawhided out to the Ymir road and shipped. As nearly as could be learned, the character of the ore shipped did not conform to the samples submitted, and altered rates for treatment robbed the venture of its probable profit.

Hunter V.

Results obtained at this property for the first six months of the year were not satisfactory, there being a marked depreciation in the value of the ore shipped. The limited capital of the owning company also proved insufficient for the development requirements of the property, and it went into liquidation. The mine, by an arrangement, was worked for the remainder of the year by the Hall Mining and Smelting Company. One of the changes introduced was an abandonment of the glory-hole system of working, all of the ore shipped during the latter part of the year being taken from the underground workings, the smelter returns from which showed a very marked increase in values over that shipped during the first six months. In all some 6,600 tons were treated during the year.

Second Relief.

This property passed into the hands of the newly organised Second Relief Mining Company in March, 1905, mining operations being started on April 6th, and milling one week later. The Company employed a crew of 35 men throughout the balance of the year, 24 of whom were in the mine. During this period 710 feet of work was done, of which 160 feet was sinking and raising and 550 feet cross-cutting and drifting. The ore production was 5,582 tons, of which 22 tons was shipped crude and the balance treated in the Company's mill, the concentrates being shipped to the Nelson smelter and the smelter at Northport. The average yield of ore milled was $7.20 in the amalgam and $2.80 in the concentrates. The average cost of mining, milling, tramming and marketing the product was $5.30 per ton. The profit on the nine months' work was something over $26,000, out of which $7,600 was spent in development, $3,600 on construction, and $13,000 applied on the purchase price of the property.

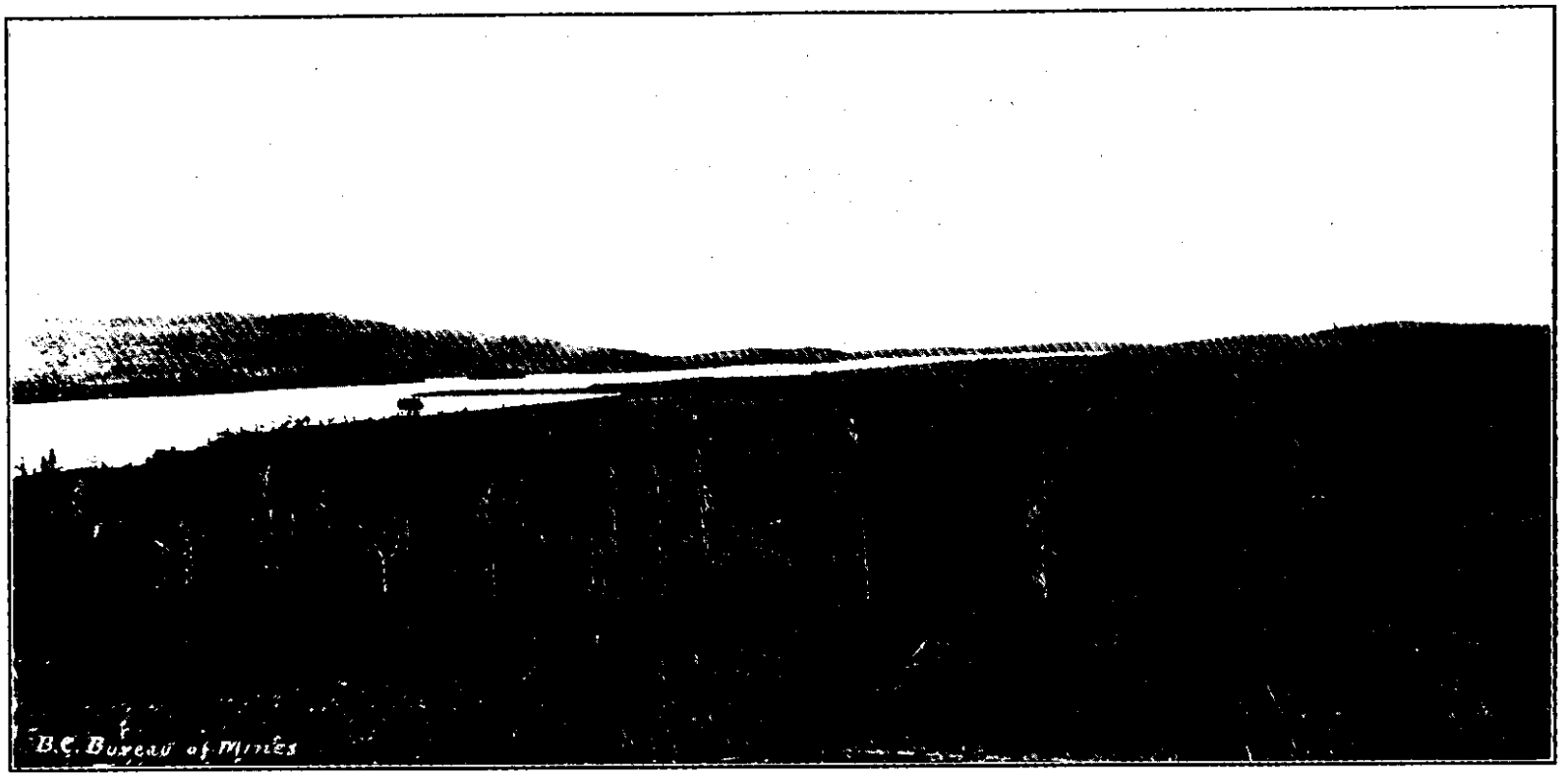
The management considers the value of the property considerably enhanced also, there being ore actually blocked out to keep the mill in operation for three years; and probable ore, that is, ore opened on one or two sides, greatly in excess of this.

Porto Rico.

This property is still under lease to G. H. Barnhardt. Nothing was attempted in the way of systematic work during the year to develop the virgin ground between the No. 4 and No. 3 levels. About 600 tons of ore were extracted from the upper workings, which yielded $10,000 in bullion and $1,300 in concentrates. Considerable work has been mapped out for the property during the coming summer.

Arlington.

Work was carried on continuously on this property by the Hastings (B.C.) Exploration Company, the Company's fiscal year ending May 31st. In the manager's report for the year it is shown that 1,128 tons of ore were mined and shipped to the Nelson smelter, the gross value of which was $66,140, and after deducting freight and treatment, $52,700. The average value per ton of ore shipped was $58.60, and the net smelter value $46.70. On the year's operations the Company declared a dividend of one shilling per share, amounting to £3,018 15*s*. For the first few months of the current year the ore shipped showed a falling off in values, but a new level has been opened up, the vein in which carries values which it is thought will permit of raising the values per ton up to the figures of the previous year. The mine furnished employment throughout the year to a crew of 30 men, all but five of whom were employed in the mine.



COUNTRY NORTH OF OOTSA LAKE—LOOKING WEST.

Queen.

Operations at the *Queen* mine were carried on throughout the year by William Waldie, in the course of which he completed payment for the property. The tonnage for the year was 6,100, of which 124 tons were shipped crude and the remainder treated in the *Yellowstone* mill, producing 405 tons of concentrates. The total return from this ore was $64,000, of which $43,000 was in bullion, $16,000 in concentrates, and the balance representing the crude ore. Development work, consisting of 600 feet of drifting and cross-cutting, and 290 feet of sinking and raising, was performed during the year. Employment was furnished for a crew of 40 men during the summer, which was reduced to 25 men during the winter. In a winze sunk from the No. 4 level Mr. Waldie claims to have ore all the way for 100 feet, the width of which is 15 feet, and from which he estimates he will be able to extract 7,000 tons of ore, which will yield in bullion and concentrates $90,000. This he estimates will be the output for the ensuing year. In addition to this ore, there are large quantities of a baser ore exposed in the mine which will require cyaniding to recover the values, and the erection of a plant of this nature will receive the attention of the owner during the year.

Kootenay Bell Mine.

This property was under bond to Patrick Clark during the first half of the year, a 200-foot cross-cut being run to tap a very fine surface showing. The work furnished employment for a crew of 20 men, but when the ledge was struck in the cross-cut the appearance of the same did not warrant the taking up of the bond. From the workings on the property, during the life of the bond, 83 tons of ore were shipped, the net smelter returns from which were $4,625.81. Upon the expiry of the Clark bond a lease was taken on the property by the Bell brothers and small shipments were made.

Alice Mine.

The Alice Broughton Mining Company continued operations on this property throughout the year. The mine output was put through the company's concentrator, producing 450 tons of concentrates, containing approximately 70 % lead and from 20 to 25 ounces silver.

Bayonne Mine.

Development work was carried on at this property throughout the year. As the property is situate on the Summit creek slope, about 25 miles back from Kootenay lake, with no means of communication except a trail, the owners have no immediate prospect of shipping, but are putting into effect an extensive programme of development, and are credited with having met with very gratifying results.

Office Statistics.

Free miners' certificates, ordinary	725
" " company	11
" " special	1
Certificates of work	573
Money in lieu of work	1
Locations, mineral	264
" placer	9
Placer leases	8
Transfers, etc	113
Certificates of improvement	38
Crown-granted mineral claims	791

ARROW LAKE MINING DIVISION.

REPORT OF WALTER SCOTT, MINING RECORDER.

I have the honour to submit my annual report on the Arrow Lake Mining Division for the year ending December 31st, 1905 :—

Monarch Group. This group is situated on Big Ledge, Pingston creek, and comprises the *Monarch, Empress, Delenger, Anna S., Maple Leaf, Ontario, Forest Chief* and *White Heather* mineral claims. The width of the vein is 316 feet. On the *Monarch* there is an open cross-cut, all in zinc ore, assaying 30 % zinc, and there is another band of zinc ore 24 feet wide. In *Anna S.* gulch and *Delenger* gulch there are exposures of 40 feet each of zinc ore. On the *Empress*, on the west side of *Empress* gulch, the vein is exposed for 550 feet, showing 40 feet in width of zinc ore, and four feet of concentrating galena. The zinc ore assays 47 % zinc. The owners of the *Monarch Group* have constructed this season six miles of waggon road from Arrow lake towards the mine, and have expended some $4,000 on the works, and it is hoped that next year the Government will assist in the completion of the road.

Adventurer Group. This group also is on the Big Ledge, and consists of the *Adventurer, Sunshine, Outlook, Watchman* and *Iron Duke*. The property is under bond, and development work, in the form of a tunnel run on the lead, will be carried on all winter.

Millie Mack. This claim has had a force of men at work on it all summer, and the following development has been done:—Tunnel, 160 feet; cross-cut, 20 feet; and an upraise and drift, 60 feet. Ore will be shipped to the Trail Smelter as soon as the trail is in condition for raw-hiding.

OFFICE STATISTICS—ARROW LAKE MINING DIVISION.

Free miners' certificates	60
Mining claims recorded	18
Certificates of work	45
Conveyances, etc., recorded	23
Certificates of improvement	9

ROSSLAND DISTRICT.

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TRAIL CREEK MINING DIVISION.

Report of J. Kirkup, Gold Commissioner.

I have the honour to submit my report of mining operations in the Trail Creek Mining Division during the year 1905:—

The shipments of ore from this division for the past year are considerably in excess of those of the previous year, although the average value of such is somewhat less, the output being approximately 321,464 tons, of the approximate value of $3,545,132. The depreciation in the average value is largely accounted for by the including of several thousands of tons of low-grade ore, which was treated by the different concentrators, three of which were in active operation during a portion of the year, viz.:—The *White Bear*, *Le Roi* and *Le Roi No. 2*, the latter being in operation during the whole year, during which time 11,350 tons of low-grade ore was treated. The development work done has been far in advance of that of any previous year (the *War Eagle* and *Centre Star* mines alone having done something over two miles of underground work), a large portion of such work consisting of sinking to the deeper levels, where very satisfactory results are being obtained.

The development of the lower levels of the *Le Roi* is being prosecuted as rapidly as possible, sinking from the 1,450 to the 1,750 foot level being now carried on under contract. Shipments of ore are being made generally from the different levels throughout the mine to the 1,350 foot level, the ore being of a good average grade. During the past year the Le Roi Company erected a small concentrating plant, at a cost of $30,000, which was operated for a short time only, during which time 2,856 tons of ore was treated.

The *Centre Star* mine has been operated continuously during the year and a large amount of development work has been done, consisting in part of deepening the main working shaft (9 feet by 18 feet) by 280 feet. A station has also been cut at the 11th level and sinking is being continued. The ore taken from the deeper levels is of the average value of that taken from other levels throughout the mine.

During the year the head works of this mine were re-modelled, a new blacksmith's shop was built and an electric haulage system installed, the cost of such improvements being $25,000.

The *War Eagle* mine has been working steadily, ore being taken from all levels to the 11th, the average value being about the same as last year. Some 4,000 feet of diamond drilling has been done on the lower levels, and indications are that large bodies of ore are being discovered. In addition to the large amount of drifting, etc., which has been done in this property during the year, a great deal of work has been done in cutting stations and pockets and timbering and repairing the main shaft.

The *Le Roi No. 2* has been worked steadily during the year, and although the output is much less than that of some of the other properties, the values are very much higher. The lowest workings of this property are 900 feet below the surface, but at the present time a cross-cut is being run from the 1,350-foot level of the *Le Roi* mine to tap the ledge of this property at that depth.

The *White Bear* mine was closed down in the latter part of May, for the purpose of enlarging the power plant, which has been completed by the addition of a new motor of 400 h.-p., at a cost of $8,000, and three transformers of 100 K. each, costing some $2,500. During

the interval in which the mine was closed the company was re-organised, with sufficient capital to meet any future requirements, and the mine is expected to be in full operation within the next few weeks.

The *Jumbo* mine has been worked steadily during the year with a small force of men, and has kept up a regular shipment of ore of a paying value.

The *Spitzee* mine was operated during only a portion of the year, being compelled to shut down through lack of funds, but it is expected that work will shortly be resumed under new management and with ample means to put the property on a paying basis.

The *Crown Point* was operated under lease during three months of the year, closing down about the 15th September. The *Gopher*, *Homestake* and *Lily May* were also operated under lease during a portion of the year, during which time some small shipments of ore were made, which were evidently not of sufficient value to make it profitable, as these properties were all shut down early in the fall.

The *Cascade-Bonanza* mine, which is situated on Iron creek, between Grenville and St. Thomas mountains, and is connected with the Columbia and Western Railway by a good waggon road, was operated for a few weeks during the past year, during which time about 125 tons of ore was shipped. This property is owned by Philadelphia parties, and it is generally supposed that it will be operated quite extensively during the coming season.

The *Inland Empire* mineral claim, which is also situated on St. Thomas mountain and in close proximity to the waggon road leading from the C. & W. Railway to the *Cascade-Bonanza* mine (commonly known as the Norway mountain waggon road), is under bond to some eastern capitalists and is being steadily operated by a small force of men, under the supervision of Mr. S. F. Griswold, who is one of the owners of the property. The indications are very promising in respect of this property.

The *Velvet* mine, which is situated on Sophie mountain on the east side of Big Sheep creek and close to the International Boundary Line, and is connected with the Red Mountain Railway by a good waggon road, has not been operated during the year, with the exception of a three days' run, for experimental purposes, of the small concentrating plant with which the property is equipped.

With the exception of the foregoing, no work other than some assessments was done during the year, and as practically all of the properties of any value in this Division are Crown-granted, the assessment work has diminished very materially.

The ore shipments from the different mines during the year 1905 were approximately as follows:—

Le Roi	109,765 tons.
Le Roi concentrated	2,856 "
Centre Star	101,908 "
War Eagle	60,860 "
Le Roi No. 2	11,690 "
Le Roi No. 2 concentrated	11,350 "
Jumbo	11,188 "
Spitzee	4,700 "
White Bear	1,100 "
White Bear concentrated	5,188 "
Crown Point	420 "
Cascade-Bonanza	125 "
Gopher } Homestake }	213 "
Miscellaneous	100 "
	321,463 tons.

DETAILED STATEMENT.

Le Roi Mining Company, Limited—Le Roi Mine.

Tons of ore shipped (dry)	109,765	
Tons of concentrates shipped	491	
Average number of men employed	225	
Development:		
Drives	2,984	feet.
Raises	396	"
Cross-cuts	1,541	"
Winzes	200	"
Diamond drilling	1,367	"

The Centre Star Mining Company, Limited—Centre Star Mine.

Tons of ore shipped (dry)	101,908	
Average number of men employed	250	
Development:		
Drives and cross-cuts	5,384	feet.
Raises	659	"
Main shaft	280	"
Winzes	185	"
Diamond drilling	3,755	"

The War Eagle Consolidated M. and D. Co., Limited—War Eagle Mine.

Tons of ore shipped (dry)	60,860	
Average number of men employed	145	
Development:		
Drives	5,809	feet.
Raises	636	"
Winzes	208	"
Diamond Drilling	4,082	"

Le Roi No. 2 Limited—Josie, etc., Mines.

Tons of ore shipped (dry)	11,690	
Tons of concentrates	524	
Average number of men employed	85	
Development:		
Drives	2,274	feet.
Raises	252	"
Cross-cuts	944	"
Winzes	24	"
Diamond drilling	3,131	"

Additions to plant during year, approximate value, $7,000

Jumbo Gold Mining Co., Limited—Jumbo Mine.

Tons of ore shipped (dry)	11,188	
Average number of men employed	16	
Development:		
Cross-cuts	460	feet.
Diamond drilling	550	"

No additions to plant during year.

Spitzee Mines, Limited, Spitzee Mine.

Tons of ore shipped (dry)	4,700
Average number of men employed	16
Development:	
Drives	100 feet.
Raises	350 "
Cross-cuts	150 "
Winzes	40 "

No addition to plant during year.

Consolidated White Bear Gold Mining Company, Limited—White Bear Mine.

Tons of ore shipped (dry)	1,100
Tons of concentrates	421
Average number of men employed	40
Development:	
Drives	70 feet.
Raises	80 "

Additions to plant during year, approximate value, $10,500.

OFFICE STATISTICS.—TRAIL CREEK MINING DIVISION.

Mineral claims recorded	30
Placer claims recorded	1
Certificates of work	70
Payments in lieu of work	2
Certificates of improvement	12
Bills of sale, etc., recorded	15
Water grants issued	2
Free miners' certificates:	
Companies	7
Personal	276
Special	8

BOUNDARY DISTRICT.

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GREENWOOD MINING DIVISION.

Report of W. G. McMynn, Gold Commissioner.

I have the honour to submit my annual report of mining operations in the Greenwood Mining Division during the year 1905.

For the matter contained in this report I am largely indebted to Mr. E. Jacobs, of the "B. C. Mining Record," who is noted for his reliability and accuracy in all matters relating to mining in this Province.

As with last year, 1904, the principal features are the steady increase in the output of ore from the larger copper-producing properties and the sustained success of the smaller but richer high-grade ones.

While the expected output of 1,000,000 tons during 1905 was not reached, yet an aggregate of about 930,000 tons in the Boundary District is one that all interested in the advancement of the Province may well feel proud of, more particularly since the increase witnessed this year gives excellent promise of proving a permanent one, and but a step in the march of progress towards greater results yet to be achieved. For the total increase of about 100,000 tons in the quantity of ore produced in 1905, as compared with 1904, the Granby Co.'s mines were largely responsible, their output having increased by about that amount. The mines of the Dominion Copper Co., which a year ago were being operated by the Montreal & Boston Copper Co., also show a substantial increase—about 43,000 tons—but against their gain must be placed a reduction in output of the *Emma* mine by about 29,000 tons. and the *Oro Denoro* of 13,000 tons. It is also noteworthy that the high-grade mines produced an aggregate of about 2,550 tons in 1905, as compared with about 3,200 tons in the two previous years, 1903-1904.

The following table will serve to show the approximate tonnage of the larger mines, and the total of the smaller ones for 1905:—

Granby Co.'s mines		645,000 tons.
B. C. Copper Co.'s mines	Mother Lode 180,000	
	Emma 9,000	
		189,000 "
Dominion Copper Co.'s mines		88,000 "
Oro Denoro		3,000 "
Sundry small shippers		5,000 "
Total		930,000 "

In the following notes of individual mines prominence has been given to the chief producers:—

Granby Consolidated Mining, Smelting & Power Company, Ltd.

This Company is the largest and most important mining and smelting company in British Columbia. It is capitalised at $15,000,000, of which $13,500,000 is issued stock, and the balance of $1,500,000 is in the treasury. Much of the issued stock is held in the United States, and among its directors are men prominently connected with the copper industry of

that country and others of high financial standing in New York. It owns a large and valuable group of mineral claims in Phoenix Camp and the biggest copper-smelting works in Canada, the latter being situated at Grand Forks, and distant from the mines about 20 miles by rail. The aggregate of all shipments to date is about 2,200,000 tons, of which some 645,000 tons represent the production during the calendar year 1905. It may be mentioned that, after he had visited and examined the company's mines, Mr. John Stanton, of New York, who had been designated the "father of the copper industry," was reported in the public press to have said :—

"The Granby ore body is the largest sulphide ore deposit I have ever examined, and my mining experience has extended to every variety of copper ore. It is analagous to the famous Rio Tinto, of Spain. The Granby ore is lower in copper, but it carries larger values in gold and silver. It is larger than the famous Tennessee deposit. Hitherto sulphide ore bodies from 40 to 80 feet wide have been considered large, but this one at Phoenix eclipses anything else I ever inspected. I don't know of its equal on the continent. The millions of tons of ore in sight, and the vast stopes, proved a veritable revelation to me. I believe the Granby can operate at a profit, no matter to what figure copper might fall. With the advantage of gold and silver in its ores, it can produce copper at a price that would put less favourable mines out of existence."

The development work done in this company's mines during eleven months of this year (to November 30th) totalled 5,339 lineal feet, consisting of 1,878 feet of sinking and raising, and 3,461 feet of cross-cutting and drifting. The total development for all years is 32,183 feet —more than six miles of underground work. This leaves out of account the large area of stoping and quarrying. Additional prospecting was done by means of the diamond drill. The tonnage of ore shipped during eleven months was 575,788 tons; the estimated production for December, 70,000 tons; a total for the year of 645,788 tons. Ore is being mined from the quarries or "glory holes" and from several levels down to 400 feet in depth.

Additions to plant and equipment were made in 1905, as follows :—A mammoth crusher of the Farrel-Bacon style, B pattern, made and supplied by the Jencks Machine Co., Ltd., of Sherbrooke, Quebec. This crusher is a duplicate of one previously obtained from the same manufacturers. Its receiving opening is 42 by 30 inches, and its capacity per day of 10 hours is 1,400 tons of ore broken to not larger than 8-inch cube. The heaviest single piece of this machine is 75,000 lbs. in weight, and its total weight is 120,000 lbs. New electric machinery, &c., was purchased from the Canadian Westinghouse Company, of Hamilton, Ontario, including one 75 horse-power locomotive, one 75 horse-power generator to operate locomotive, and three 75 horse-power induction motors. About 1,000 feet more of tramways were constructed, and another crusher building and more ore bins were erected.

Further enlargement of plant is intended, the Jencks Machine Company having been given an order for a 150 horse-power double drum electric hoist. The drums are to be conical in shape; dimensions, 7 feet in diameter at the larger end, 5 feet in diameter at the smaller end, and 5 feet long. By means of friction clutches each drum will be operated independently of the other, and both will be controlled by powerful brakes. The capacity of the hoist will be a load of 10,000 lbs., raised at a rate of 700 feet a minute. Its shipping weight will be more than 50,000 lbs.

During the year the company materially increased its mining holdings at Phoenix by acquiring the *Monarch Group*, the *Marshall Group*, the *Missing Link* and the *Gold Drop Group*—all adjoining the properties previously held. These acquisitions will facilitate the working of the mines heretofore operated by the company, and, with the large ore reserves on hand, will, for a long time to come, provide for meeting the demands of the company's smelter for an increasingly large supply of ore.

At an extraordinary meeting of shareholders the company recently decided to make application in the proper quarter for power to change the number and par value of the shares from 1,500,000 shares at $10 to 150,000 shares at $100. A dividend of three per cent. on the capital stock, payable on 15th January, 1906, was declared, the total being $405,000. This will be the second dividend paid by the Granby Co., the first having been one of one per cent., amounting to $133,630 declared in December, 1903.

THE BRITISH COLUMBIA COPPER COMPANY, LIMITED.

Mother Lode Mine.

The British Columbia Copper Co., Ltd., owns the *Mother Lode Group* of six mineral claims in Deadwood Camp, and the smelter at Greenwood. The company is a New York organisation, having a capital of $2,000,000. It acquired the *Mother Lode* mine early in 1898, and has since operated it almost without intermission. The mine is situated about three miles from the smelter, with which it is connected by a railway, the C. P. R. having constructed a branch to the mine from its Columbia & Western Railway at Greenwood.

The ore bodies here are large. The main lode has a surface width varying from 80 to 160 feet. Its continuity has been proved by surface trenches along a distance of 1,100 feet north from the main shaft, while a big surface exposure about 700 feet in an opposite direction indicates the extension of ore-bearing rocks to the south as well. The main shaft is down 350 feet, and is being deepened. Long levels have been run at 200 and 300 feet depth, respectively, and a level will be opened at 400 feet as early in 1906 as shall be found practicable. The ore body, as mined at the 200-foot level, had a width of 100 to 125 feet, and the mine workings now show it to extend to fully 90 feet north from the shaft. At the 300-foot level the workings are not so long, but the diamond drill has lately proved the occurrence of a chute of ore at least 125 feet in length, commencing from a point in the bore-hole 17 feet beyond the end of the present level. As far as extended, the workings on the 300-foot level have shown the ore body to be quite as wide as on the 200-foot level. The diamond drill has also shown that the ore goes down, a hole dipping at an angle of 75 degrees having been in ore of higher than ordinary grade for 100 feet before it passed into the country rock.

The total output of the *Mother Lode* mine for five years, 1901-05, has been 754,000 tons, of which about 180,000 tons were produced in 1905. Practically all this ore was smelted at the company's smelter.

The present output capacity of the *Mother Lode* mine is about 600 tons per diem, but enlargement is being provided for. Extensions of development and additions to power equipment made in 1905 consisted in part of driving a new tunnel to intersect the shaft, while a second crusher was installed near the shaft and two 4 to 5-ton self-dumping skips were substituted for the cages previously in the shaft. Briefly described, the new arrangements are as follows: all ore from every part of the mine, whether from open quarries or underground stopes, is centered at the shaft, where it is delivered into the large pockets which discharge automatically into the big skips that hoist it to the crushing plant bins. After passing through the crushers the ore falls on a belt conveyor which takes it to the railway bins, about 160 feet away.

Other improvements in connection with plant and buildings include the removal of two 60 horse-power steam boilers to a position near the big double-cylinder hoisting engine, where they will ultimately come into service when the work underground shall have increased to such an extent that the 32-drill air-compressor will not be able to supply air for hoisting purposes

as well as for underground operations. Carpenter shop, saw-mill, diamond-drill shop, new powder magazine, several small dwelling-houses, storage cellar for food supplies, and other conveniences have been provided. The ore-bins have been covered and sheathed and steam pipes placed between the sheathing and the inner walls of bins, to prevent the freezing of ore in extreme cold weather.

For prospecting uses a diamond drill plant was purchased early in the year, since when drilling has been steadily carried on. Besides accomplishing much useful work in indicating where ore does not occur, the drill proved the presence of a number of valuable bodies of ore, the existence of some of which was not even suspected previously. The most effective work done was at the 300-foot level, from which several holes have, as above-mentioned, disclosed the presence of large bodies of ore of excellent quality, and which may be expected to continue with depth. One of the large chutes of ore was found to be high in sulphides—a very desirable ore for controlling the matte in smelting, besides carrying good metal values.

The year's development work was as follows:—The main shaft was enlarged, by the addition of a third compartment, from the tunnel entrance on the 60-foot level down to the 300-foot level, this being used for ladders and pipes. The shaft has been deepened from 325 to 350 feet, and sinking is to be continued. From the 300-foot level downwards the shaft has been made large enough for four compartments—two for the skips, one for men and timbers, in which there is an ordinary cage, and one for ladder-way and pipes. Most of the ore mined is still from the big open quarries, but an increasing quantity is being extracted from underground stopes.

Although the output of ore from the *Mother Lode* has not been much larger in 1905 than in 1904 (owing to the quantity of custom ores received at the company's smelter), the development work done, and the additions made to the plant and general equipment, have added materially to the producing capabilities of the mine.

EMMA MINE.

The *Emma* mine, in Summit camp, a three-fourths interest in which was last year acquired by the B. C. Copper Co.—the other fourth having been previously purchased by the Hall Mining and Smelting Co., of Nelson, B. C.—shipped in 1905 less than one-fourth of the tonnage of ore that it sent out in 1904. The cause of this much reduced output was that the shipment of ore from open quarries was discontinued, and the development of the mine along lines making for permanent working was entered upon. Early last spring the sinking of a two-compartment inclined shaft was commenced. This shaft is now down 185 feet. On the 150-foot level a cross-cut was driven north 60 feet. At that distance it entered the ore-body, along which a drift was run about 70 feet. The ore was found to be of exceptionally good grade, as compared with that taken from the open workings, and the vein to maintain its normal width of 18 to 20 feet. Everywhere, so far explored, the vein has well-defined walls and presents the appearance of being an ore-body "living" down to great depths. The intention is to drift as far north in the mine as the ore shall be found to continue, and stopes will be carried up until connection shall be made with the quarries overhead. A well-built gallows frame, 58 feet high, was raised over the new shaft and a small hoist removed to it from the old workings. Hoist-house, ore-bins, and store-rooms were built, and other necessary surface improvements made. Air for operating the hoist and machine drills is obtained from the steam-driven compressor of the *Oro Denoro* mine, which adjoins the *Emma* property. During four years, 1902-05, the *Emma* has shipped nearly 80,000 tons of ore to the B. C. Copper Co.'s smelter at Greenwood, and the Hall M. & S. Co.'s smelter at Nelson. The ore possesses con-

stituents that make it useful for fluxing silicious ores and it is consequently in demand at the smelters. Included in the *Emma Group* are the adjoining *Jumbo* and *Minnie Moore* claims, but although ore has been found in prospect holes, no development work has yet been done on them by the present owners.

DOMINION COPPER COMPANY, LIMITED.

The Dominion Copper Company, Limited, of New York, is a reorganisation of the Canadian company of the same name which owned the *Brooklyn*, *Stemwinder*, *Idaho Group*, and the *Rawhide*, properties at or near Phœnix on which development work had been done and from which ore had been shipped by the Montreal and Boston Consolidated Mining and Smelting Company, Limited, after it had obtained possession of them under agreement of purchase from the original Dominion Copper Co. Besides the old Dominion Copper Company's properties, the Montreal and Boston Co. had the following Boundary properties: *Athelstane* and *Jackpot Fraction* in Wellington camp, *Sunset Group* and *Morrison* in Deadwood camp, and a three-fourths interest in the *Mountain Rose* in Summit camp. The aggregate of all shipments to date from the several properties acquired by the reorganised Dominion Copper Co. is 163,000 tons. About 9,000 tons is the output of the *Brooklyn*, *Stemwinder*, *Rawhide* and *Sunset* since the present owning company commenced shipping a few weeks ago. At the *Brooklyn* the power plant consists of the low pressure half of a 20-drill air compressor, 60 h.-p. hoist, No. 8 Cameron sinking pump, etc. The compressor supplies air for the *Stemwinder* as well. The latter mine has a 40 h.-p. hoist. Between them these two mines have twelve machine-drills. Since work was resumed, the *Brooklyn* shaft has been deepened 80 feet, being now 430 feet in depth; development has been commenced on the 350-foot level, and stoping has been in progress at the 250-foot level, with a daily output of about 250 tons. At the extreme south end of the *Brooklyn* 250-foot level, in *Idaho* ground, a raise met ore at 30 feet up—chalcopyrite in an irony gangue. A tunnel has been started on the *Idaho* from a point about 35 feet above the Great Northern Railway. No development work is being done on the *Stemwinder*, but ore is being stoped at the 114-foot level and an output of about 50 tons a day is being made. More open quarries have been started at the *Sunset*, where about 60 tons of ore are being mined daily. No work is being done underground at this mine.

DENORO MINING COMPANY.

The *Oro Denoro* shipped about 2,900 tons of ore in 1905, bringing the aggregate up to nearly 35,000 tons. The mine has a large tonnage of ore available.

THE HIGH GRADE MINES.

What are known as the high-grade mines of the Boundary District include from twenty to thirty properties, most of them within a short distance of the town of Greenwood. Together they have provided employment for about 150 men, and during rather more than two years have produced an aggregate of nearly 5,800 tons of ore, much of it ranging in value from $50 to $100 per ton, and in cases even higher. The most important of these, with regard to production, are the *Providence*, *Elkhorn*, *Last Chance*, *Skylark*, *E. P. U.*, *Crescent*, *Helen* and *Prince Henry*. Others may yet come into prominence as they shall be developed.

Providence Mining Company, Ltd.

Much development work was done by this Company during the year long drifts have been run, both north and south; at the 400-foot level the inclined shaft was deepened to 500 feet, and a level opened at the latter depth. Several new chutes of ore were found, and the vein at the 500-foot level proved to be as strong and to carry as good values as at the 400-foot. During the

year there was a temporary suspension of operations, resulting from litigation between some of the large shareholders, but when the legal troubles were disposed of work was resumed, with better results than at any previous time. The ore reserves are now larger, as is shown by the fact that shipments for December totalled about 150 tons. A new power plant, including a large steam boiler and a ten-drill air compressor, were installed in 1905, and substantial building improvements were also made. The aggregate of all ore shipments made by the *Providence* mine to date is about 2,500 tons.

Elkhorn Mining Company.

During the year a local company was organised to acquire the *Elkhorn*, upon which operations had been suspended owing to the lack of capital for development work, which had not been kept ahead of stoping. Development is now being pushed, the ore chute has been picked up again, a small electrically driven plant put in, and matters generally are in a condition promising profitable returns. To date the *Elkhorn* has shipped 870 tons of ore, of which about 150 tons were produced in 1905.

Last Chance.

The *Last Chance* mine, owned by a Spokane company, was the largest shipper in 1905, among the high grade properties, its total having been 690 tons. Operations were resumed last year after a period of idleness, and much development work has since been done. Lengthy cross-cuts and drifts at the 100-foot level have opened up bodies of ore up to 10 feet in width, with about two feet of galena running well in silver. The mine is equipped with a steam power plant, and is being energetically developed under the direction of Mr. D. W. McVicar.

Skylark.

This property was acquired last year by a Phœnix syndicate, who have done well out of it, having, it is stated, paid out of returns from ore shipped all operating expenses, and as well the instalments due on account of purchase of the property. The shaft is down 150 feet, and some 600 feet of drifts have been run. Production this year totalled about 470 tons.

Stoping has overtaken development work on the *E. P. U.* which during the months it was worked produced 254 tons of ore, making its aggregate 722 tons.

A shaft was sunk 130 feet on the *Crescent* and 150 feet of drifting was done at this depth. The vein averages 20 inches of solid ore, of which about 90 tons were shipped. Several prospect shafts have been put down on other veins.

Helen.

The Helen Mining Company, of Chicago, did 276 lineal feet of sinking and raising, and more than 400 feet of cross-cutting and drifting. Some 60 tons of ore were shipped, an air compressor and steam hoist installed, shaft-house and ore-bins built, and other improvements made. Drifting north and south is in progress, the shaft is down 210 feet, and ore is being blocked out, but no stopes are being opened yet. The ore body is five feet wide, with a paystreak of about 22 inches.

Prince Henry.

The Prince Henry-Abercraig M. & D. Syndicate has sunk a shaft 112 feet and drifted 67 feet, erected several mining buildings, and made a test shipment of 30 tons of ore. The ore is rich, running high in gold and silver. It is about 18 inches in thickness.

Preston.

The Preston Mining Company, of Chicago, has sunk a shaft 115 feet, and run drifts and cross-cuts 265 feet, besides having done a lot of surface stripping. A small electric hoist has been put in, shaft-house and blacksmith's shop built, a road built to the mine, and a trial shipment of 22 tons of ore sent out.

Other Properties.

Among the number of other properties on which development work has been done are the *Bay, Dom Pedro, Mavis, Bonnie Bell, Goldfinch, Gold Bug, Strathmore, Dynamo, Meadow Lark, Silver Cloud, Hope No. 2, Capital Prize, Dandy,* and *Highland Chief.*

WEST FORK OF THE KETTLE RIVER.

The west fork of Kettle river had more work done in 1905 in its mining camps than for several years. Between Rock creek and the confluence of the west fork with the main Kettle river are two camps—the *Riverside* and the *Crown Point.* The former is about four miles above Rock creek; development work has been proceeding in it on a small scale, and occasional shipments of ore have been made. Smelter returns have been about $40 per ton, with values in gold and silver. Most of the claims in Crown Point camp are low-grade properties, and but little has been done on them in late years.

Up the main river, above the west fork, only the annual assessment work was done, except on the *Silver Dollar* and *Mogul,* which were further developed, and on the *Lottie F. Group,* on which the bond was taken up and a large amount of work was done.

In Boomerang camp, about 10 miles up the West Fork from its mouth, the only development work, other than assessments, done during the year was on the *Enterprise* and *S. M.* claims. This is a gold-bearing camp and values are good.

About three miles farther up, on the west side of the stream, opposite Bull creek, the *Monte Carlo Group* has been worked. A shaft was sunk 50 feet and drifts were run. The surface showings here are five to ten feet wide and the ore carries good values in gold and copper. Thence, up to Dry creek, there was little work done, but between Dry creek and Curry creek there was activity on several properties, principally on the *Rambler, Sally Group* and *Curry Group.* The few men employed on the *Rambler* have been stoping ore, of which there has been sacked four carloads that is estimated to average at least $150 a ton, the silver values being high.

The *Sally* has had an average of 15 men at work the year through. Three miles of waggon road have been constructed from Beaverdell up the hillside to the camp, the grade being ten per cent.; and a two-storey boarding and lodging house, 32 by 32 feet, and a kitchen 15 by 20 feet, have been built. The year's development work has included a drift 620 lineal feet on No. 1 lead, one 75-foot on No. 2 lead, and one 64-foot on No. 3 lead. Returns from nine carloads of ore shipped have, it is claimed, met the expenditures, even after paying $16 per ton hauling charges from the mine to the railway at Midway. This was sorted ore, the second and third class grade having been stored for concentration later. The Vancouver & Boundary Creek Development & Mining Co., which owns this group, has a water-power at the foot of the hill sufficient to operate a mill whenever one shall be put in. A number of slips and jogs and crushes met with in the long tunnel have caused the superintendent, Mr. Clement Vacher, much difficulty in development work. Driving south to catch the vein in solid ground is in progress; this may pass the big slip and be away from the ground that has been so difficult to work. Notwithstanding the obstacles thus far met with, the management is encouraged by the results achieved, and is confident that the mine will pay its way and eventually provide sufficient funds for power equipment, and thereafter yield the shareholders dividends.

On the *Curry Group* of five claims, last summer a tunnel was driven 100 feet on a vein carrying $24 a ton in an iron gangue. Work was also done on the *Atlantic Cable-Comstock* claims. A little work was also done on several claims on Cranberry creek, on the west side of the West Fork.

In Carmi camp very little work was done.

SMELTERS.

British Columbia Copper Company's Smelter at Greenwood.—These works were operated steadily throughout the year and smelted about 180,000 tons of ore from the company's *Mother Lode* mine, and some 25,000 tons from other mines. The principal addition to the smelter in 1905 was a briquetting plant, which was put in operation last May, since when a large portion of the dump of flue dust, which had been accumulating ever since the smelting of ore was commenced here in 1901, has been disposed of.

The company has made public its intention to enlarge its smelter to an extent that practically means reconstruction and re-equipment along the latest and most approved lines. The new plant is to include three blast furnaces of a capacity and size—approximately, 600 tons per day each—larger than any copper furnaces now in Canada. The hearth area of each furnace is given as 48 by 120 inches. Furnace charging will be from side-dumping cars hauled by trolley motors. Molten slag will be hauled to the dump in 25-ton cars by electric motors. The slag cars will each have an electric motor for tilting the car. There will be three large Root blowers, each driven by a 300 h. p. induction motor. A 100 kw. motor generator and several smaller motors will also be installed. Five trolley locomotives will be used for hauling ore to the furnaces and slag to the dump. Ore-bins are to be enlarged, coke-bins to be constructed, railway trestles raised, a larger railway scale put in, a machine shop with full equipment of power tools provided, together with all accessories necessary to make the smelting plant modern and complete. The new furnace building will be of steel, and generally buildings and plant will be such as to make the works second to none in regard to completeness of equipment and in provision for economy of operation. Contracts for machinery were made four months ago. The improvements will cost about $300,000. The mines and smelter together will then employ from 300 to 500 men.

Dominion Copper Company's Smelter at Boundary Falls.—The Dominion Copper Company's smelter was idle the greater part of the year. It was operated by the Montreal & Boston Copper Co. until May 20th, when it was shut down and remained idle until, at the end of November, one furnace was blown in, the Dominion Copper Co. having meanwhile acquired possession of the works. Altogether, between 150,000 and 200,000 tons of ore were melted here in 1905.

OFFICE STATISTICS—GREENWOOD MINING DIVISION.

Free miners' certificates issued	624
Location records issued	263
Certificates of works recorded	597
Bills of sale recorded	109
Certificates of improvement recorded	44
Water grant issued	1
Placer claims recorded	3

Ore Shipments of Boundary Mines, 1900–1905.

The following table gives the approximate ore shipments of Boundary mines for 1900, 1901, 1902, 1903, 1904, 1905, as reported in the "Phœnix Pioneer," and will be of interest:—

Mine.	Camp.	1900.	1901.	1902.	1903.	1904.	1905.
Granby Mines	Phœnix	64,553	231,762	309,858	393,718	549,703	652,651
Snowshoe	"	297	1,731	20,800	71,212	.....	.....
B. C. Copper Company:							
Mother Lode	Deadwood	5,340	99,034	141,326	138,079	174,298	174,560
Bonnie Belle	"	.....	.....	.....	.....	.....	20
Dominion Copper Company:							
Brooklyn-Stemwinder	Phœnix	.....	.....	.....	.....	32,350	52,821
Rawhide	"	.....	.....	.....	.....	3,070	25,108
Sunset	Deadwood	.....	802	7,455	15,731	3,250	3,056
Mountain Rose	Summit	.....	.....	.....	.....	1,759	4,747
Athelstan-Jackpot	Wellington	1,200	550	.....	5,646	4,586	.....
Morrison	Deadwood	.....	.....	150	3,339	.....	.....
B. C. Mine	Summit	19,494	47,405	14,811	19,365	.....	.....
R. Bell	"	.....	.....	560	.....	.....	.....
Emma	"	.....	650	8,530	22,937	37,960	9,035
Oro Denoro	"	.....	.....	.....	15,537	16,400	3,007
Senator	"	.....	.....	.....	363	3,450	1,833
Brey Fogle	"	.....	.....	.....	.....	222	.....
No. 37	"	.....	.....	.....	.....	364	.....
Reliance	"	.....	.....	.....	.....	33	.....
Sulphur King	"	.....	.....	.....	.....	.....	33
Winnipeg	Wellington	1,076	1,040	785	2,435	.....	150
Golden Crown	"	2,250	.....	625	.....	.....	.....
King Soloman	Copper	.....	875	.....	.....	.....	.....
No. 7 Mine	Central	.....	665	482	.....	.....	.....
City of Paris	White's	.....	2,000	.....	.....	.....	.....
Jewel	Long Lake	160	350	2,060	.....	.....	.....
Carmi	Carmi	.....	.....	890	.....	.....	30
Providence	Providence	.....	.....	219	993	726	770
Elkhorn	"	.....	.....	.....	400	325	150
Strathmore	"	.....	.....	.....	.....	.....	20
Skylark	Skylark	.....	.....	.....	.....	52	588
Last Chance	"	.....	.....	.....	.....	50	689
E. P. U. Mine	"	.....	.....	.....	167	300	255
Bay	"	.....	.....	.....	.....	.....	73
Mavis	"	.....	.....	.....	.....	.....	20
Don Pedro	"	.....	.....	.....	.....	.....	40
Crescent	"	.....	.....	.....	.....	.....	90
Helen	Greenwood	.....	.....	.....	.....	.....	80
Ruby	Boundary Falls	.....	80	.....	.....	.....	.....
Republic	"	.....	.....	.....	.....	60	20
Miscellaneous	.....	3,230	3,456	325	500	750	.....
Total tons	.....	96,600	390,800	508,876	690,419	829,808	928,352

Ore Treated at Boundary Smelters, 1900–1905.

Smelter Treatment.	1900.	1901.	1902.	1903.	1904.	1905.
Granby Con. M. S. & P. Co.	62,387	230,828	312,340	401,921	596,252	665,097
B. C. Copper Co.	.....	117,611	148,600	162,913	210,484	194,056
Dominion Copper Co.	.....	.....	.....	132,570	30,930	82,664
Total Ore Smelted	62,387	348,439	460,940	696,404	837,666	941,817

GRAND FORKS MINING DIVISION.

REPORT OF S. R. ALMOND, GOLD COMMISSIONER.

I have the honour to submit my report of the mining industry in the Grand Forks Mining Division for the year 1905:—

Through the courtesy of Mr. Burrell, editor of the "Grand Forks Gazette," who has covered almost all the ground in this Division, I am enabled to furnish the greater part of the following report:—

WELLINGTON CAMP, ON HARDY MOUNTAIN.

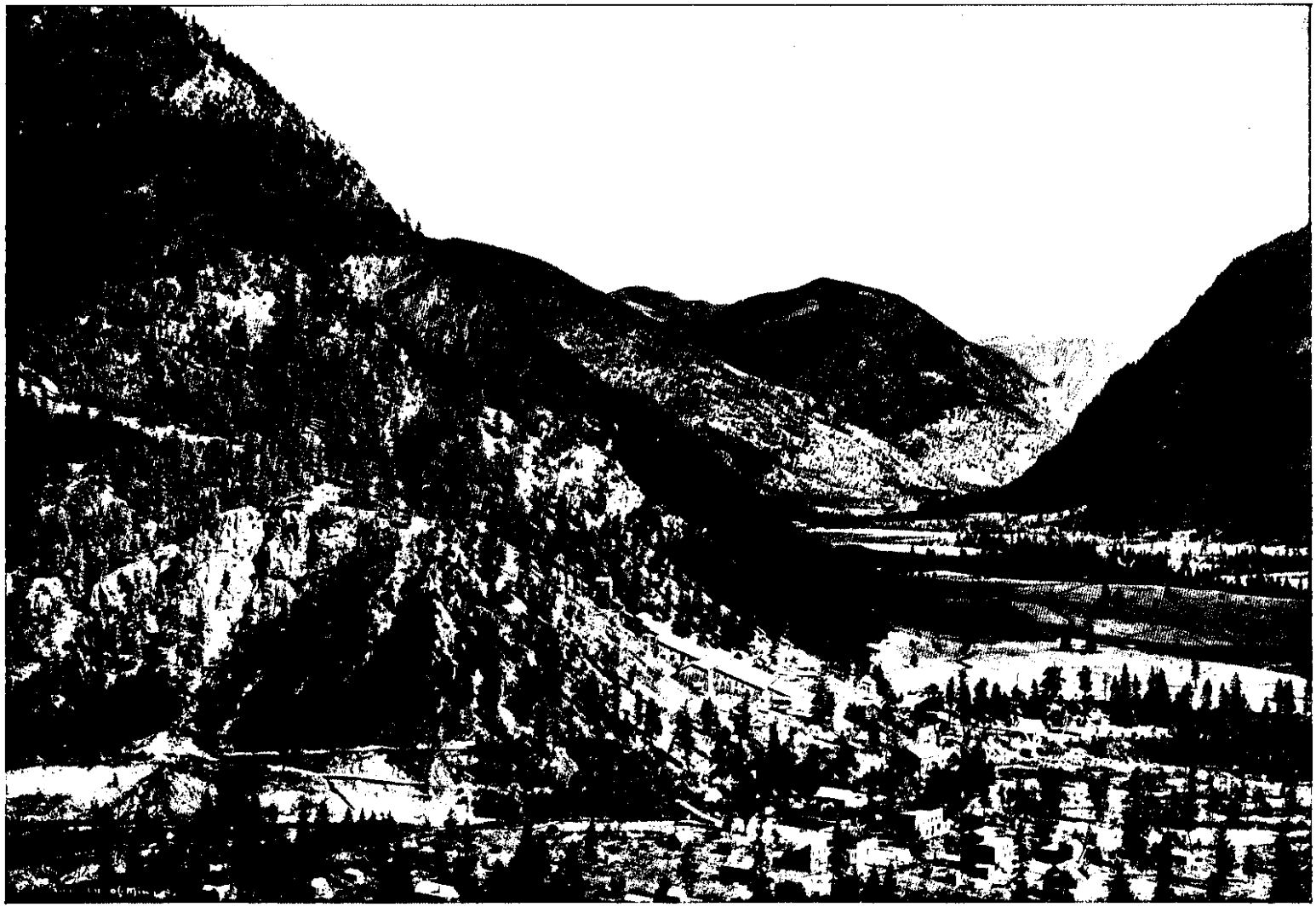
The valuable and practical results in the smelting of low-grade ores by the Granby company necessarily stimulates development work on all properties in the district, and in the *Betts & Hesperus Group*, situated on the south-west of Hardy mountain and only three miles from the city of Grand Forks, we find a property which is fast coming to the shipping stage. The *Betts & Hesperus* was originally located in 1896 by E. E. Alexander, of Spokane, then passed into the hands of Campbell and Finch of the same place, and was finally acquired by the present owners, who organised the Betts & Hesperus Mining Co. in February, 1903.

The *Betts & Hesperus* is a sulphide copper ore somewhat similar in character to the big low-grade bodies of the Phœnix district. Previous to the time when the present company took hold of the property, about $5,000 of development work had been done, and during the past three years something like $50,000 has been expended in further exploration of the ore-bodies. For the first two seasons a large amount of surface work was done, first by an open cut 100 feet long, and subsequently by other systematic efforts to prove the extent and direction of the ore-body. The results were sufficiently satisfactory to induce Supt. Rea to advise the directors to authorise the driving of a tunnel to tap the ore at depth. This was commenced last February, and at the present time is in 825 feet, an amount of work which has been done at an exceedingly economical figure. This gives a depth of 375 feet below the surface showings, and the latter stages of the work have been evidently in the main ore-body.

When 575 feet in on the tunnel, cross-cutting was commenced into a fine chute of pyrrhotite ore, which is evidently a big body. So good a showing is it that a contract of a favourable character is now pending with the Granby Co. for all the ore taken out of this particular chute. The management is so well satisfied with the results obtained that the step has been taken of contracting with the Spokane Diamond Drill Co. to do at least 1,000 feet of work in further testing the capacity of the property. The drill will be in shape to commence operations early next month.

It is gratifying to know that the directors are thoroughly satisfied with the nature of their property and with the results of the work already accomplished. President Magee, who was out for his third visit this summer, spoke enthusiastically of the propects, not only of the *Betts & Hesperus* but of the whole district, and we shall see with immense pleasure this property join in the list of shipping mines, and swell not only the pockets of the company, but the prosperity of the immediate district.

The *Wolfard*, not far from the *Betts & Hesperus* mineral claims, in Wellington camp, has had 120 feet of tunnelling and 1,000 feet of diamond drill work done upon it during the year 1905. A cook-house, 16 by 30 feet, and a bunk-house, 16 by 20 feet, have been built on the claim in the same period. The tunnel is all in ore, the general values ranging about $5. There are about 3,000 tons of ore on the dump. The diamond drill cut through 384 feet of ore, 44 feet of which showed an average value of $8 and the balance ranging from $5 to $6. Besides the above there is a tunnel 55 feet long, one shaft 54 feet and another 28 feet deep, besides considerable work in prospecting cuts.



DALY REDUCTION CO.'S MILL, HEDLEY, SIMILKAMEEN VALLEY.

The *Kate*, adjoining the *Wolfard* and owned by the same parties, has a shaft 15 feet deep in ore and an open cut 50 feet long by 10 feet deep and 6 feet wide, to show for the year's work.

These properties at present are owned by A. L. Rogers, of Grand Forks, and Vert A. Wolfard, of Spokane, but in the near future will be under the management of a company, said to be now forming to take over the group.

Yankee Boy and Yankee Girl.

Formerly owned by McGregor and Spraggett, the group of properties comprising the *Yankee Boy*, *Yankee Girl* and the *Belle*, is also situated on Hardy mountain, and within one mile of the city limits of Grand Forks. In 1899 the owners bonded and sold the property to Major Leckie, and it is at present owned by Montreal men. It is a quartz, carrying gold and silver, ranging as high as $220 to the ton. Considerable development work has been done, and several profitable shipments were made prior to 1900, since which time the property has been idle.

Up the North Fork.

The north fork of the Kettle river is the district to which eyes have been turned as likely to provide the biggest camp in southern British Columbia.

The first mineral properties of any note are struck about eight miles up on the east side of the river, viz., the *French and English Group* of seven or eight claims. This property is owned by a company, of which Hay and McCallum are the principal holders. The ore is a galena and about 100 feet of development work by tunnel and shaft has been done.

Next comes a group of four claims, all ready to be Crown-granted, and owned by Captain Bentley, of Grand Forks. These are situated between Volcanic mountain and the river. On the northerly claim is a quartz, carrying free gold. The greater part of the properties exhibit a lime and iron capping, and, where stripped in three different places to a depth of 25 feet, expose an excellent quality of iron ore, sulphide in character, and freely studded with chalcopyrite. Of the assays taken, the average sample goes $15 to the ton.

Golden Eagle.

On the *Golden Eagle*, about twelve miles up, we have a property which has had a lot of development work done, and which only awaits the advent of transportation to be further developed. This is owned by the Royal Victoria Mining Co., John Fox having been the manager. The ore of the *Golden Eagle* is a calcite, carrying copper and gold. Over 200 feet of shafting has been done, and on the 60-foot level a drift of 75 feet, and a further drift of 120 feet on the 150-foot level. One shipment to the Trail smelter returned $40 to the ton, and it is only a question of a short time when this valuable property will be exploited on a large scale.

The *Earthquake*, closely adjoining the *Golden Eagle*, is another property which has been much talked of, and which may yet prove a winner. The Sears estate still holds a considerable interest in the property, on which 500 feet of tunnel and shafting have been accomplished. The ore varies in value, different samples going from $3 to $32 per ton. About 350 tons of ore are on the dump, the values being in gold and copper.

Volcanic.

Of the well-known *Volcanic* property, owned by R. A. Brown, little need be said. Anyone who has heard of the Boundary country has heard of "Volcanic" Brown. This great hill of iron, a pyrrhotite carrying some values in copper and gold near the surface, and promising all sorts of good things lower down, has become historic. Brown's famous tunnel is 800 feet into the bowels of the mountain, though he has not struck the "real thing" yet.

The Seattle.

On the west side of the river, from 10 to 12 miles up, there are three claims worthy of notice, viz., the *Strawberry*, the *Humming Bird* and the *Seattle*. The two former are meritorious properties with considerable development work done and good values, the lack of transportation being the cause of cessation

of further work. The *Seattle* is another mineral claim which has merits. The proposition is a copper-gold one with large bodies of magnetic iron. A 30-foot tunnel was driven as far back as 1896. Later a bond was taken by the Canadian Smelting Co., at Trail, which did 270 feet of drifting and raising, and then threw up the bond. In 1905, W. T. Hunter and Mr. Pemberton, of Greenwood, took a bond on the *Seattle* at a high figure, and after 130 feet of tunnelling ceased work.

Pathfinder.

Crossing again to the east side of the river, we have a mine which has had more development work than any property in the north fork country. Located by Parkinson and Pfeifer in 1895, this property lies on Pathfinder mountain, 14 miles from the City of Grand Forks, and at an elevation of 3,100 feet. There are four distinct veins, running parallel, and from 8 to 21 feet in width. The ore is the typical sulphide, viz., pyrrhotite and chalcopyrite and a small amount of quartz gangue. The analysis of shipping ore shows, iron, 25 to 47 per cent.; sulphur, 20 to 40; silica, 5 to 24; lime, 1 to 8; copper, 2½ to 4 per cent., and gold ranging from $2 to $40 per ton.

Previous to the organisation of the Pathfinder Mine Co. in 1901, of which John Rogers is still the president, about $45,000 had been spent on the property. There are now from 500 to 600 tons of ore on the dump, though work has been suspended until transportation comes. The railway survey goes just below the mine, and shipping facilities will be of the very best.

The buildings include bunk-houses, storehouses, blacksmith shop, powder magazine, etc., and the machinery consists of a 50 h. p. boiler, a 20 h. p. hoist, a 7.drill Rand compressor, a Snow duplex pump and a feed pump.

Three hundred and thirty-seven feet of shaft work and 800 feet of tunnelling have been done, there being three shafts with cross-cutting and drifts at various levels.

Little Bertha.

The only claim which need be noticed between the *Pathfinder* and the Franklin camp district is the *Little Bertha*, owned by A. T. Kendrick and Slosson. This is a gold and silver proposition, and in 1901, when the last shipments were made to the Granby smelter, results showing from $45 to $77 to the ton were obtained. A 40-foot shaft is sunk on the claim and something like 250 feet of tunnelling done. Two hundred tons of ore have been shipped.

FRANKLIN CAMP.

The district known as Franklin camp is situated about 45 miles up the north fork and may be locally subdivided into McKinley camp, then Franklin to the north and a little farther north on Gloucester creek, Gloucester camp. Located about 12 miles due west of Arrow lakes, the camp covers the area of older rocks in the basin of the east branch of the north fork. The past year has witnessed the staking of nearly all the ground in the mineral belt which extends for a width of some three or four miles, and a length of six or eight, and more development work has been done than in any time in the history of the camp. Prof. Brock dealt with the general geological features of the district in his report of 1900 in a most favourable way, though at this time, with the exception of the *Banner*, nothing had been shown up. This year matters have assumed a different phase. Broadly speaking the claims so far developed show ore carrying copper, gold and silver values, and the immense showings of iron, particularly in Gloucester camp, lend additional interest and value to the whole section.

McKinley.

This valuable property on which a large amount of development work has been done this year has been described before, and space will not permit a detailed description now. The ore consists of chalcopyrite and iron pyrite in a lime gangue mixed with some quartzite, and covered with an iron cap of no great

depth. The work carried on energetically by former managing director, Geo. McLeod, and under the able superintendence of A. D. McPhee, was first in the shape of a number of large open cuts, all in splendid ore carrying good values, and demonstrating surface showings of tremendous extent. Later a tunnel was driven in 216 feet to tap the ore body at depth, and its latter workings are all in ore. One hundred feet in the tunnel the ore-body was cross-cut for 112 feet, all in vein matter of the same character as that on the surface, and verifying the most sanguine hopes of the management, and justifying the class of work done by Superintendent McPhee.

The company has lately taken a bond on behalf of eastern capital for $200,000 for two years, and it is the intention, directly spring opens, to install two, and perhaps three, diamond drills and thoroughly explore the property. The president is B. Lequime; vice-president, H. W. Warrington; secretary, A. B. Mackenzie, of Rossland; and managing director, C. R. Hamilton, of Rossland. The enthusiasm shown by all those who have examined the *McKinley* since development work was done this summer is based on some of the best showings of copper ore ever seen in the Boundary country, and mining men throughout the district are awaiting the further explorations with extraordinary interest.

The Banner. This property was located in 1896 by Frank McFarlane, and several local men are now interested in it. The ore carries gold, silver and copper in a lime-quartz gangue. The first working resulted in finding a vein which carried gold and silver values varying from $20 to $60. A cross-cut tunnel of 230 feet has more recently struck into a vein 32 feet in width, averaging over $7 to the ton, and everything points to the existence of large bodies with continuous and heavy showings of chalcopyrite.

Gloucester Camp. This camp is situated on Gloucester creek and contains many valuable claims, chief of which at present are the *Gloucester*, owned by Thos. Newby, D. Garnett and Lee Mercier, and the *G. H.* On the *Gloucester* a shaft at 55 feet proved at depth to be in magnificent chalcopyrite carrying from 10 to 13 per cent. copper. A tunnel is being driven and is now in 200 feet. If the ore body is struck at depth and proves to be of the same character as that in the shaft, this should be one of the richest properties in the country. On the *G. H.* is a vein of solid magnetite iron fully 40 feet wide and traceable for hundreds of feet, and carrying values in copper and gold.

The *Mineral Hill*, lying to the north-west of the *G. H.*, and owned by Hill and W. Minion, is another property of great promise. The surface showings reveal an iron ore with quartz and chalcopyrite, and the owners have now done 100 feet of tunnelling and are hopeful of striking the ore body at depth shortly.

During the year a large amount of prospecting has been done throughout the whole mineral belt of the upper north fork. It is entirely tributary to the city of Grand Forks, the high divide between it and the Arrow lakes prohibiting any easy access from that direction.

Office Statistics—Grand Forks Mining Division.

Certificates of work issued	364
Locations	207
Conveyances, etc	129
Certificates of improvement	25
Abandonments	2
Filings	49
Water rights	3
Free miners' certificates	290
Companies' certificates	1
Special certificates	3

OSOYOOS MINING DIVISION.

REPORT OF C. A. R. LAMBLY, GOLD COMMISSIONER, FAIRVIEW, B.C.

I have the honour to submit herewith my annual report of the mining operations in the Osoyoos Mining Division for the year 1905.

CAMP FAIRVIEW.

Very little mining work has been carried on in this camp during the past year, the work being confined chiefly to the necessary assessments to keep the claims in good standing. The *Stemwinder* has been shut down during the year, but it is now reported that funds are being raised to continue the development work at an early date.

OLALLA CAMP.

Development work has been extensively carried on in this camp and vicinity during the year, but I regret to say that I have not been able to obtain particulars in detail of the work accomplished. The great need in this, as well as all other mining camps in this district, is transportation facilities. This difficulty will, however, soon be solved as far as the southern portion of this district is concerned, owing to the rapid construction of the Great Northern Railway through the Similkameen valley.

CAMP HEDLEY.

The following work was done on the properties of the Daly Reduction Company, situated in the above camp, during this year:—

On the *Nickel Plate*, 1,500 feet of tunnelling and 50 feet of raising was done. On the *Sunnyside* mineral claim, 500 feet of drifting, 120 feet of raising, and 2,000 feet of diamond drilling was done on the *Nickel Plate*, *Sunnyside* and *Bulldog* claims. Stoping was carried out in the *Nickel Plate* during the year, and open-cut work was carried out on both the *Nickel Plate* and *Sunnyside* properties. Prospecting was done on all other properties owned by the company. A new ore-storage pile and track were provided at the ore-bins. The amount of ore mined and milled during the year was:—*Nickel Plate*, 17,437 tons; *Sunnyside*, 14,994 tons; total, 32,431 tons.

NOTE BY PROVINCIAL MINERALOGIST.—The Yale Mining Company, operating the *Nickel Plate* mine, and the Daly Reduction Company, operating the mill in conjunction therewith, have proved to be among the most successful organisations operating in the Boundary District, and practically the only one operating with a stamp-mill, concentration and cyanide plant combined. The enterprise is considered to be of sufficient importance to justify the reproductions of the plan and section of the mill at Hedley which accompany this Report. The Provincial Mineralogist is indebted to a mining engineer, familiar with the district, for the following description of the mine and plant:—

"The Yale Mining Company operates the mines, and the Daly Reduction Company the mill, water-power, electric railway, and incline tramway, telephones, etc.

"THE MINES.

"The ore occurs as a crushed or brecciated zone of quartzite between andesite eruptives in the *Nickel Plate* claim, and at the south end of the zone the ore is clearly a limestone altered to a very silicious ore. Ore-chutes have been opened up along this ore zone for a distance of over 4,000 feet, and the ore averages 50 feet in width. The gold occurs native in the brecciated quartzite and in the arsenical pyrite in grains from the size of a pea down to microscopic particles. There appears to be more native or free gold in the quartzite ore than in the altered limestone ore, though it is probable the gold is in much finer particles in the latter. Gold also occurs

as a telluride, while andesite, which is the main eruptive rock of the district, appears to be responsible for the ore-bodies. Narrow quartz porphyry dykes, usually vertical or nearly so, occur in the ore-bodies, cutting the quartzite and andesite, and may have played an important part in the mineralisation.

"The ore is mined by the open-cut or 'glory hole' method and stopes, is loaded directly into two-ton cars and hauled by electric locomotives to the head of the gravity tramway, where it is lowered in six-ton skips to the mill. This incline or gravity tramway is about 10,000 feet in length, and drops nearly 4,000 feet between terminals, requiring four men to operate it.

"THE REDUCTION PLANT.

"There are two Farrel-type jaw-crushers, one 10 by 20 inches, and one 6 by 20 inches, discharging by belt conveyor into an ore-bin holding 1,500 tons, then by Challenge suspended feeders to the stamps. The stamps weigh 1,050 pounds, and drop 100 times a minute in narrow 'Homestake' pattern mortars weighing about 8,000 pounds, set on concrete blocks, and crush approximately three tons per stamp, with 30-mesh screen, working 24 hours. This low duty is accounted for by the ore being very hard and tough, and not crushing as freely as straight quartz ore. This duty can be brought up to four tons per stamp by crushing finer with the rock breakers.

"Free gold ranging from 25 to 50% of the assay value is caught on plates 54 inches wide by 16 feet long, and from the plates the pulp goes over Frue vanners (eight vanners have been added since drawing was made), recovering about 30% of the gold contents in concentrates, and the balance goes to the cyanide plant, consisting of twelve settling and leaching tanks 34 feet diameter by six feet deep, four conical-bottom slime tanks, with 10-foot staves and 30 feet diameter, with bottom sloping 20° from horizontal, two gold and two sump tanks 30 feet diameter by 10 feet deep, and the usual zinc precipitating room and cleanup. The original estimate of the ore was based on a gold assay value of $12 per ton, but the extraction has exceeded this amount. The concentrates range from two ounces to 16 ounces per ton. Owing to the isolation of the plant from transportation, it was designed with a view of adding re-grinders, and completing the cyanide plant, after operating the mill the first year.

"The extraction averaged about 89% of the assay value of the ore up to the latter part of 1905.

"With a view of introducing tube mills for re-grinding the tailings from the vanners before cyaniding, the following tests were made by Mr. Brown, the mill superintendent at Hedley, from March to July, 1905:—

"SLIMES TREATED BY CYANIDE.

	Tons of Slimes.	Assay value per ton. Ozs., au.	Gold recovered. Ozs., au.	Tailings value. Ozs., au.	Extraction per cent.
Lot No. 1	100	0.18	16.00	0.020	88.88
" 2	100	0.30	25.30	0.047	84.33
" 3	100	0.17	13.00	0.040	76.47
" 4	100	0.24	21.50	0.035	89.58
" 5	100	0.30	27.00	0.030	90.00
" 6	25	0.25	5.13	0.045	82.00
" 7	100	0.371	47.05	0.040	89.31
Total	667	0.2587	154.98	0.0334	87.10
Or at $20 per oz	.....	$5.17	$3,099.60	$0.668	

"The normal capacity of the mill, with 30-mesh screens, is 3,000 tons per month, and by using 20 or 25-mesh the capacity could be increased to 4,000 tons, and the extraction with re-grinders could be brought up to 95%. As no filter press was available decantation only was used, which gave lower results than could have been obtained with them.

"POWER PLANT.

"This consists of a four by four-foot flume, three miles long, with a grade of 1-10 of one per cent., or 5.28 feet per mile, giving a head of 400 feet at power-house.

"There is a Rand compound air-compressor with air cylinders 17 by 28 inches in diameter by three feet stroke, direct connected to water-wheel, 16 feet diameter.

"There is four miles of 6¼ inches diameter pipe-line, carrying the compressed air at 100 pounds pressure to the mine.

"There is one 100 K.W. A.C. generator, 2,200 volts, three-phase transmission, direct connected to water-wheel, which furnishes power for lights and for the electric railway, where a 50 h.p. motor generator furnishes a 500 D.C. for the road."

On other properties adjoining, owned by private individuals, considerable work has been accomplished, as follows :—

War Cloud.—Development work during the past year on this property consists of 75 feet of tunnel work and 40 feet of upraising. The results have been very satisfactory.

Silversides.—Development work on this property has been actively prosecuted.

Humming Bird Group.—On this fine group of claims, owned by J. J. Marks and associates, work has been performed consisting of an 80-foot tunnel and 40-foot open cut, with 20-foot face; one shaft of 42 feet and another of 30 feet. The ore encountered is of high value, carrying copper and gold.

Snowflake.—On this claim considerable work has been accomplished, consisting of 220 feet of tunnelling and considerable open-cut work.

Golden Zone Group.—This group consists of several claims, on which the values are very satisfactory. The work done during the past year by the owners is as follows:—Shaft, 50 feet; tunnel, 75 feet; open cut, 30 feet, besides considerable surface work.

Windfall Group.—Sixty feet of tunnelling and a large amount of surface work.

Stemwinder.—Two inclined shafts, 20 feet each, and considerable surface work.

Golden Lilly.—On this property a 40-foot tunnel has been driven.

On the *Cottonwood*, *Granite* and *Camp Rest* claims, owned by private individuals, $1,200 of surface work has been done during the past year. This is a fine group of claims.

On the *El Dorado Group* $800 of surface work has been done this year.

The *Two Brothers* claim is situated at 16-Mile creek. Eighty feet of tunnelling has been done on this property during the last year.

On the *Empire*, situated on Ashnola creek, 150 feet of tunnelling has been done during the past year.

On the *Boston* a 60-foot shaft has been sunk and $500 of surface work done.

Greenwood Group.—On this important group of claims considerable work has been carried on during the past year, with gratifying results.

On the *Oregon Group* 40 feet of tunnelling and $1,000 of surface work has been done during the past year. The values so far encountered have been very satisfactory.

The *Kingston Group* of claims is owned by the Kingston Mining Co. A large amount of development work has been carefully performed during the past year.

On the *Rollo* claim 25-foot tunnel and $2,000 surface work has been accomplished during the past year.

Three shafts of 25 feet each have been sunk on the *Horsefly*.

The *Fairy Queen* and *Victoria* are owned by J. Gladden and associates; $1,000 of surface work was done during the past year, exposing the outcrop of the vein, and the value so far encountered has been very encouraging.

OFFICE STATISTICS—OSOYOOS MINING DIVISION.

Free miners' certificates	$1,864 75
Mining receipts, general	2,230 80
Total	$4,095 55
Number of locations	222
" certificates of work	358
" transfers	67
" certificates of improvements	43

VERNON DISTRICT.

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VERNON MINING DIVISION.

REPORT OF L. NORRIS, GOLD COMMISSIONER.

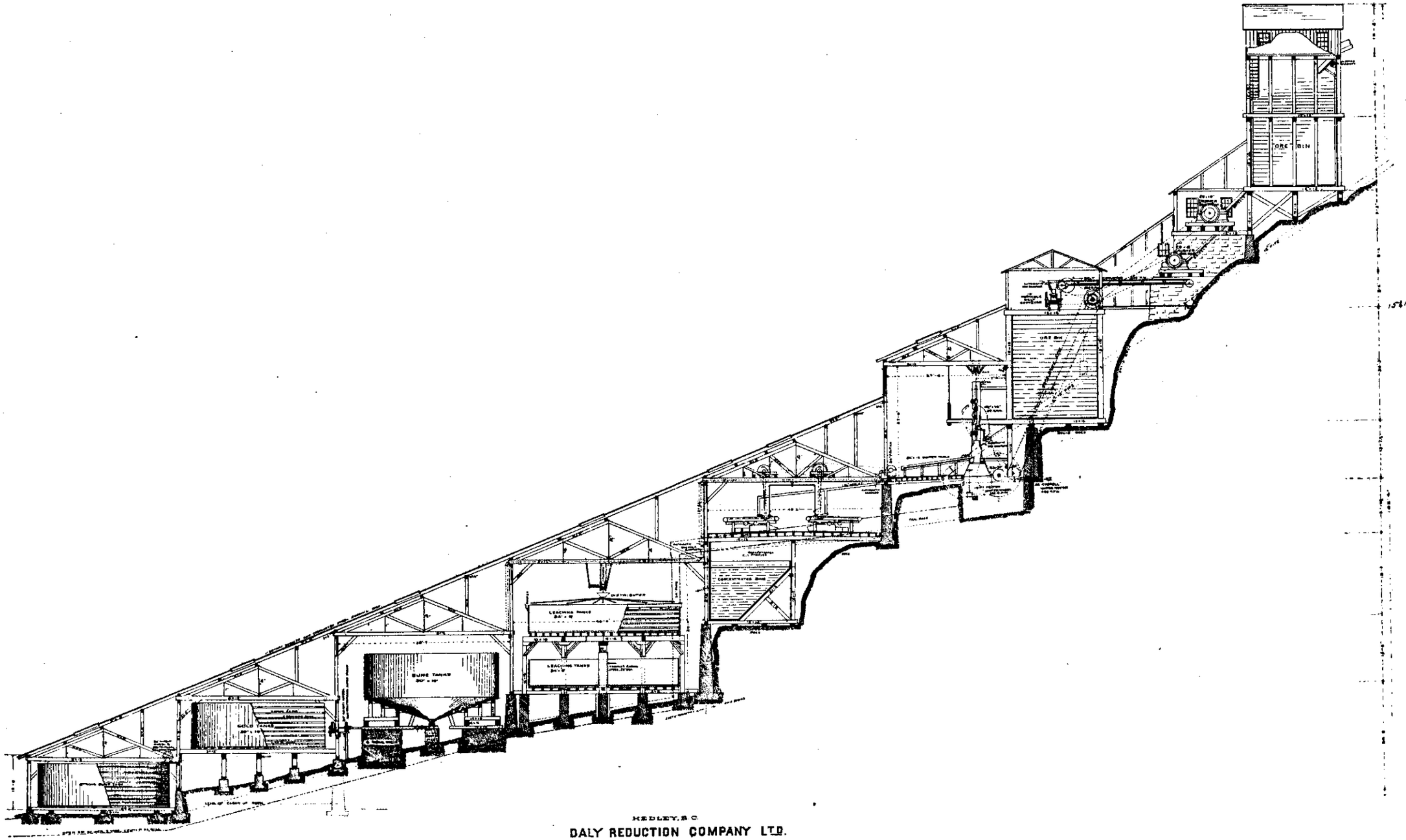
I beg to submit the following report on the mining industry in this Division during the past year :—

The *British Empire Group* consists of the *British Empire, Royal Standard* and *Dominion Fraction* claims, situated about 4½ miles south-west from Vernon. Across the three claims run parallel ledges of 12 inches, 18 inches and 24 inches, distant from each other 90 feet and 200 feet, respectively. Considerable work was done on these claims in 1903, but want of capital caused the work to be suspended, and the mill was shut down. These claims are now being worked by Mr. D. R. Young under bond from the owners, H. Seydel, G. Muller and J. Highman. Since the 1st of September last, some 90 feet of tunnel has been driven, 60 tons of ore crushed, and the whole property has been put in first-class shape for proper and economical working. A run of 20 tons taken as a test across the face of the tunnel on the 24-in. ledge showed the quartz to run about $22 per ton of gold on the plates and the gangue $6. The concentrates, I understand, run about $50 per ton. Since the last run in the mill Mr. Young has taken out some very rich ore. These recent finds and the indications on some of the adjoining claims on which work has been done, would seem to verify the opinion expressed by Mr. Carlyle years ago, viz., that the whole hill will probably be found to be well mineralised, and well warrants thorough and systematic prospecting. Mr. Young has 12 men at work on the property. The mill will resume crushing on the 23rd December.

On an adjoining claim, the *Rex*, Mr. H. Seydel is running a 300-foot tunnel to tap the ledge at 135 feet. There is on the ledge a shaft of 73 feet, with a drift of 20 feet. The principal values are in gold and copper, and some very rich ore has been obtained, but no shipments have been made. These claims are on the shore of Okanagan lake and are easy of access from Vernon.

On the large body of low-grade copper ore on the west side of Okanagan lake, embraced by the *Rossland, Violet, Gale* and *Granville* claims, but little more than the necessary assessment work was done last year. This property, owned by J. Hamilton and A. Birnie, is now in pretty good shape for inspection. About $4,000 has been expended and the work has been done to advantage, the ledge stripped of drift, timber cut out, and the property shown up as well as it can be done without the expenditure of a sufficient sum in sinking shafts, etc., to prove the property. These claims are also on the lake shore and are easy of access by a waggon road.

Last August, F. Williamson and G. Doyle took a working lease on the old *Hidden Treasure* claim on Cherry creek, a silver-lead proposition owned by G. Corbould and others, of New Westminster. This claim is situated among the old placer claims. They stripped the ledge for 50 feet on the north-east side and found indications of good ore, and on the south-east side they ran a tunnel for 50 feet on the ledge. The ore taken out was very rich, but not sufficiently so to warrant them in shipping, as they have a 40-mile haul over a very indifferent waggon road to contend with. They had in the end to desist, through lack of capital.



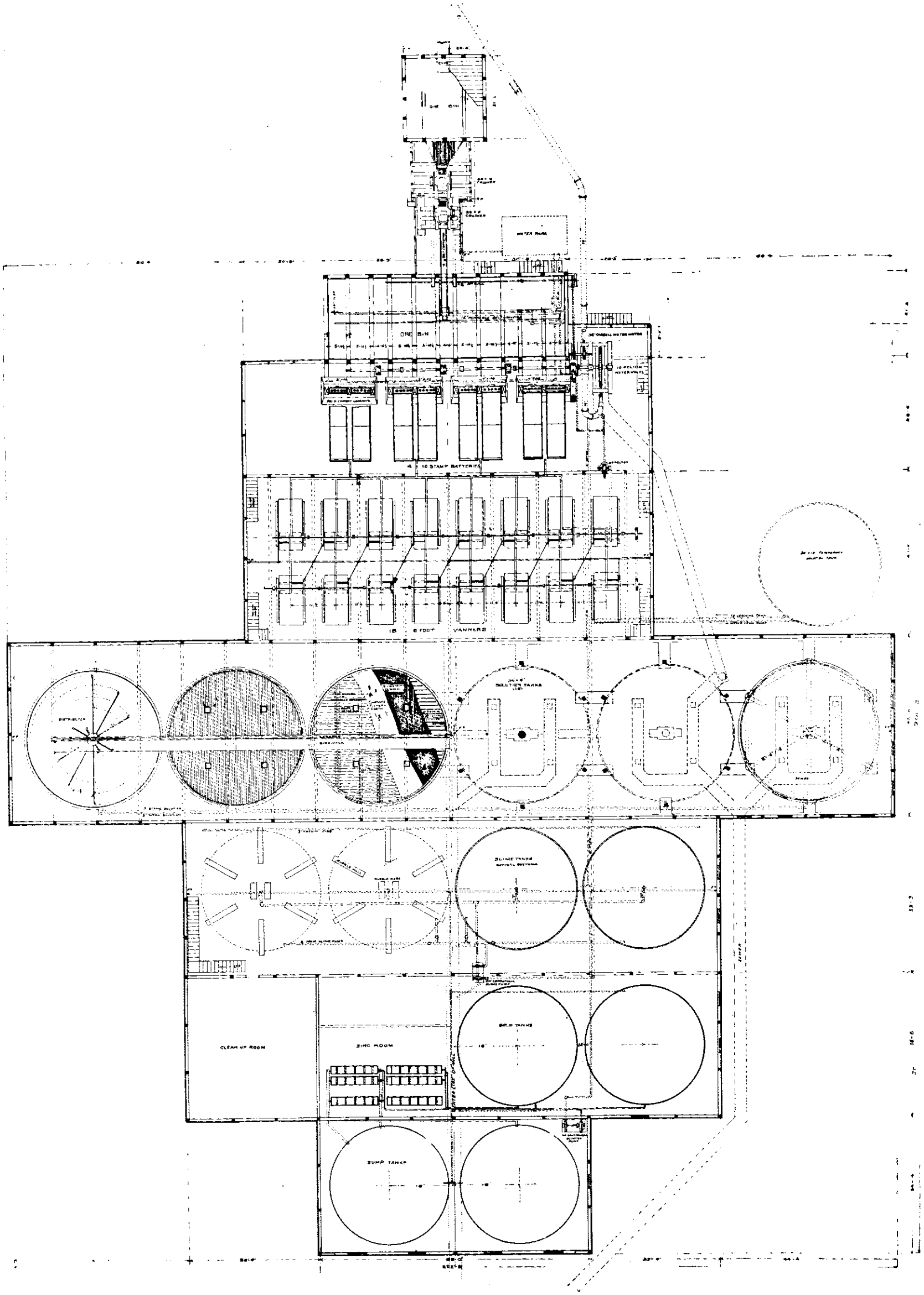
HEDLEY, B.C.

DALY REDUCTION COMPANY LTD.

40 STAMP MILL AND CYANIDE PLANT

Cross Section

SCALE 1-8 INCH PER FOOT


ORE BIN
10 STAMP BATTERIES
18 6 FOOT VANNERS
SLIME TANKS
GOLD TANKS
CLEAN UP ROOM
ZINC ROOM
SUMP TANKS

The *McPhail Group* is on Monashee mountain and includes the *Morgan* claim. Two years ago the Cherry Creek Gold Mining Company was running a 5-stamp mill crushing rock taken from an 18-in. vein which gave $22 of gold per ton on the plates (and only 60 % of the gold was free), but through the failure of a firm in an Eastern city the company was forced into liquidation and work was stopped. Last summer the mill and all its belongings were sold, and now the property is lying idle, although it could be put on a paying basis very easily.

There are two coal locations in the division, one of five claims staked by A. McVittie, of Cranbrook, last June, on the west side of Okanagan lake, near Shorts' Point, and another of a number of claims owned by the Enderby Coal Mining Company, of Enderby, situated on the east side of the Shuswap river about five miles north-east of Enderby. The latter was staked by Mr. G. Weir, of Mara, about 18 months ago. In both cases the coal is, I believe, of a fine coking quality, but in neither case has sufficient development work been done to show the extent and value of the deposits. In both cases the shipping facilities are of the best, the one location lying convenient to the S. & O. Railway, while the other is but a short distance from the shore of Okanagan lake.

The following mining statistics, furnished by Mr. H. F. Wilmot, show the mining business done during the year:—

OFFICE STATISTICS—VERNON MINING DIVISION.

Mining records	25
Free miners' certificates	148
Company " "	1
Transfers	5
Certificates of work recorded	48
Certificates of improvement issued	5
Claims Crown-granted	2

YALE DISTRICT.

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REPORT OF G. C. TUNSTALL, GOLD COMMISSIONER.

I have the honour to enclose the mining reports for the Kamloops, Ashcroft, Yale and Similkameen Mining Divisions, embracing mining operations in those districts during the past year.

KAMLOOPS MINING DIVISION.

In the Kamloops Mining Division the usual amount of prospecting and assessment work has been performed on the different claims, many of which exhibit bodies of ore that may be profitably smelted. It is reported that the directors of the *Iron Mask* mine have in contemplation the erection of a smelter suitable for the smelting of their own ore as well as that of the neighbouring mines.

The rich silver finds in the vicinity of the Big Bend trail is the most important discovery that has been made in this district.

COAL HILL.

Rising Sun. The properties comprising this group are located on the east side of Coal Hill, about 400 yards from the Nicola waggon road, and four miles south of Kamloops. The formation is described in the reports of the Canadian Geological Survey. The group comprises three claims, *Rising Sun No. 1*, *No. 2*, and *No. 3*. They have an altitude of 3,000 feet, and possess favourable conditions for the transportation of ore. The vein consists chiefly of chalcopyrite, and green and blue carbonates and black oxides of copper are abundant in the ledge. A cut 30 feet long has been made where there was an outcrop of ore on the surface. One carload was taken out and shipped to the Ladysmith smelter, and about five carloads have been blocked out for future shipment. The smelter returns of the first lot have not yet been received. The vein is 100 feet wide and capable of producing a large output.

Truth Group. The tunnel begun last year for the purpose of draining the workings has been extended 100 feet farther. An average assay throughout its entire length showed a value of 3.10 per cent. copper, and small values in gold and silver. The best results were obtained from a small zinc vein running diagonally across the ore body, which gave a return of $8 in gold, but was not tested for silver or zinc.

Monte Carlo. The work applied to the *Monte Carlo* during the past year consisted of sinking a shaft to a depth of 24 feet, which showed up some very fine copper-gold ore. A carload on the dump would pay to ship. The lode is 40 feet wide and contains several bands of shipping grade.

Assessment work has been performed on the *Jupiter*, *Ajax* and *Forlorn*, every one of which looks very promising.

On the *Dakota* a shaft was sunk in solid magnetic iron, carrying small values in gold and copper. The output was sold to the *Iron Mask* mine for fluxing purposes.

Evening Star and Bill Nye.

On the *Evening Star* a double-compartment shaft, 4 by 9 feet in the clear and well timbered, was sunk to a depth of 45 feet. On the *Bill Nye*, which is an adjoining claim, the work produced some very nice samples of ore, which were assayed by O'Sullivan, of Vancouver, and yielded returns of $47 in copper and $3 in gold to the ton.

Wheal Tamar.

The *Wheal Tamar Group* is situated in the Jacko lake section, about a mile south of the *Monte Carlo Group*. On the *Wheal Tamar* a shaft was sunk 30 feet, showing a large body of low-grade copper-gold ore.

Night Hawk.

The *Night Hawk* is a fractional claim of about 45 acres, situated five miles south-west of Kamloops, and about half a mile north of the *Iron Mask* mine. The property is at present under bond to Messrs. Gwin, Shaw, Jowell and McGee. A shaft was sunk by the owner, A. Fenton, to a depth of 35 feet on a vein of decomposed ore, carrying 2½ per cent. in copper and fair values in gold and silver. It was abandoned by the bondholders and operations were begun on a vein 23 feet wide, containing ore of sufficient value to pay for shipping. A shaft was sunk on the foot-wall and a small drift driven to the east, following the trend of the ore chute. About 60 tons were sent to the smelter, which averaged 5.39 per cent. copper besides a small quantity of gold and silver. The lode is well defined between walls of limestone and diorite, and can be traced through the entire length of the *Night Hawk*, *Bonny Etta* and *Norman* mineral claims.

Iron Mask.

The *Iron Mask* has been actively worked during the past year, with good results. An average of over 73 men has been employed, and the quantity of ore treated at the smelter and shipped is 14,629 tons. The company has bonded the *Erin* and adjoining claims, on which a large amount of development has been prosecuted, as well as on the *Iron Mask*. The outlook is promising, and the present year will see operations conducted on a much larger scale.

Hill Top.

The *Hill Top* is situated on the north side of the Thompson river, a few miles north of Kamloops. During the past summer a shaft was sunk to a depth of 20 feet. The ore extracted was shipped to the Tyee smelter in two lots; the first quantity yielded $15.28 in gold and silver to the ton, and the second lot returned $9.60 to the ton; which proves that the ore will pay well to mill, as it is oxidised and suitable for milling or being treated by the cyanide process.

Big Bend Trail.

Cotton Belt Mines.

The *Cotton Belt Group* consists of six mineral claims, known as the *Cotton Belt*, *Boyne*, *Harrison*, *Victoria*, *Jessie* and *Wellington*. They are held by the Cotton Belt Mining Co., of which F. N. Daniels is the manager. The vein was found by means of information obtained from an Indian several months before. The mines are situated on Grace mountain, about 10 miles in a straight line north-east of Seymour landing, at the head of the Seymour arm of Big Shuswap lake, and about six miles north of the Big Bend trail. The vein is from four to twenty feet wide, and can be traced for a long distance. The vein-matter contains galena and gray copper, besides zinc to the extent of 5 per cent.. The galena assays $70 to the ton, principally in silver. The ledge runs north-east and south-west, and dips to the west at an angle of 40 degrees. The work performed consists of excavations 20 feet deep. Development is to be actively prosecuted next spring. So far over 40 locations have been recorded. The distance from Sicamous, on the Canadian Pacific Railway, to Seymour landing, by steamer, is about 40 miles. This may be deemed the most important discovery made in the Kamloops Mining Division.

DREDGING.

I regret to state that the dredge at Tranquille creek has been permanently laid up, and is offered for sale. The gold in that portion of the creek last worked became so reduced in quantity as to justify the abandonment of the leases.

OFFICE STATISTICS—KAMLOOPS MINING DIVISION.

Claims recorded	158
Certificates of work	163
Bills of sale	34
Mining leases issued	5

Revenue.

Free miners' certificates	$2,014 25
Mining receipts, general	1,358 85
Tax on Crown-granted mineral claims	370 75
	$3,743 85

NICOLA COAL-BASIN.

(Extract from report of Dr. R. W. Ells, Geological Survey, the full text of which may be found in Summary Report, 1904.)

The areas more particularly under examination during the season are known as the Nicola and Quilchena coal-basins. They lie to the south of the Canadian Pacific Railway and are at present reached by the stage road from Kamloops to Nicola lake and thence out to the railway again at Spence's Bridge station. The eastern or Quilchena basin is about 50 miles from Kamloops, while the lower or Ten-Mile creek basin, which is the western extension of the Nicola basin proper, is 36 miles from Spence's bridge.

The rocks of the area have been described in considerable detail by Dr. G. M. Dawson in his first report on the district, 1877-78, and in his later report, 1894. They are divisible into two groups, volcanic and sedimentary, the former consisting in large part of diabase, porphyrite, rhyolite, andesite, felsite and agglomerate, with which in places large masses of granite of later date occur. The sedimentaries comprise conglomerate, sandstone and grit, shale and beds of coal which are partly a lignite of fair quality as at Similkameen, but in other places pass into the bituminous variety as in the Nicola valley and form important deposits of great value.

The volcanics occupy the greater part of the country between the line of the Canadian Pacific Railway and the Nicola river from Kamloops to Spence's bridge, and extend for some miles south in the direction of Princeton. In places these rocks display a schistose structure, owing to later crustal movements which have also affected the sandstone and associated coals and produced faults of considerable extent, more especially in those portions near the contact with the volcanic rocks.

The name "Nicola series" was given by Dawson to the volcanic portion, and "Coldwater group" to the rocks of the coal basin. To the north and west other volcanics are found which were regarded by Dawson as newer than the rocks of the coal formation, since in places these were found as overflows upon the latter. Of these newer volcanics there is no direct evidence of their presence in the area under discussion.

The statements made in the earlier report (1877-78) as to the age of the volcanic rocks of this district were modified in the later report (1894). Thus, in the map accompanying the first report, part of these rocks are coloured as of Tertiary age and part as Triassic, while in

the map accompanying the later report they are all regarded as of Triassic or Lower Jurassic age. Some confusion has resulted from the statement that certain portions of the volcanic rocks are newer than the sedimentaries, and as a consequence several coal companies, acting on the suggestion made in the earlier report, are working on the hypothesis that by boring through the volcanic rocks which surround the Nicola basin they will reach, at some depth, the sandstone and coals which are there exposed. This contention, however, is not maintained by a careful reading of the text in the reports in question; since, if the volcanics are of Triassic age and the coals and associated strata are of Tertiary age, the latter must of necessity be of later date than the former. Moreover the sandstones are seen to rest upon the volcanics at a number of points around the coal basin.

With the rocks of the Nicola series (volcanics) are associated small areas of limestones which are partially altered, but which have apparently been deposited upon the volcanics.

In the course of the work it was found that the possibly productive coal areas of the district could be arranged roughly into four groups, viz. :—

1. That of the Lower Nicola or Ten-Mile creek basin, about three miles below Coutlee.

2. That of the Coal gully, containing several seams, one of which has been opened up and mined locally for some years.

3. The Coldwater seam about a mile and a half to the east, where one seam is exposed in two outcrops on the bank of the stream at an interval, between the two exposures, of nearly a fourth of a mile. These two are sometimes known as the Garesché-Green area.

4. The Quilchena basin, which is entirely separated from the others, and distant about 10 miles to the east.

The lowest or Ten Mile area has also an outcrop on the south side of the Nicola, on what is known as Lindley creek, where a thin and badly broken outcrop of coal is exposed on the bank at an elevation of about 500 feet above the river flat.

Other areas of supposed coal lands have been taken up on the high ground to the west of the Coldwater, along the road to the McInnis ranch. The rocks in this area are all volcanics of the Nicola series, but upon the surface at several points there are small patches of basal sandstone and grit, practically an arkose. These patches do not, however, represent part of the coal basin proper. Boring operations are now in progress at several points to demonstrate the idea that the coals will be found beneath these volcanic hills.

The length of the main coal basin of the Nicola-Coldwater area, from the foot of Nicola lake to the south limit on the Coldwater, in a south-west direction, is about 10 miles, and the greatest breadth is about three miles. The western portion from the forks of the Coldwater to the volcanics of Ten-Mile creek or Lower Nicola is about five miles, with an extension north and south along the creeks of about 10 miles. The length of the eastern or Quilchena basin is about seven miles from north to south, and the maximum breadth apparently about two and a half miles.

At all these places the sedimentary rocks composing the coal basins rest directly upon the volcanics without indication of any overflows. At several points there are well indicated lines of fracture, which have evidently been caused by movements subsequent to the period of deposition and hardening of the rocks affected, and in several cases the coal seams are broken across abruptly.

The best natural section of the coal-bearing strata is seen in what is called the Coal gully, a small stream and ravine situated about one mile and a half south of the forks of the Coldwater. Other sections are exposed at the big bend of the Coldwater river, where the coals of that stream outcrop along with a considerable thickness of yellowish gray sandstone; on the

upper part of Hamilton creek east of the road crossing from Nicola lake to the Aspen Grove or Princeton road; and in a gully north of Nicola lake post-office, a short distance west of the Mill-stream (also called Clapperton creek). Additional information has been afforded by two boreholes sunk in the Nicola-Coldwater area, one near the Coldwater river and the other about two miles east on the bank of the Nicola river, neither of which, however, reached the base of the formation, but passed through several hundred feet of sandstone and shale with several thin seams of coal in the Coldwater boring, while in the Nicola hole the sandstone was largely replaced by conglomerate. In the former boring a seam of coal was reported at 190 feet, thus :—

	ft.	in.
Slate	1	6
Coal	3	8
Sandstone, gray	0	6
Coal	1	4
Sandstone	0	8
Coal	0	7
Coal	5	7

In the Nicola boring the seam was struck at 137½ feet and was as follows :—

	ft.	in.
Shale	8	6
Coal	0	8
Shale, dark	1	1
Coal	0	6
Slate	0	4
Coal	4	4
Coal	5	6

While the aggregate of coal in each of these borings is about the same, it will be noticed that in the Coldwater boring the thick portion of the coal is at the top, while in the Nicola hole it is at the bottom. Whether this feature is due to change in the character of the seam, both representing one and the same, or whether it indicates two distinct seams of practically the same thickness, is not determined, and it would be very desirable that other borings should be made in the immediate vicinity to settle the question. Unfortunately, of several borings made during the season of 1904, none succeeded in penetrating the drift, and as the underlying rock was not reached no light was afforded as to the structure of this part of the basin, other than that a considerable area has been largely denuded, owing to the action of the two streams already mentioned.

The Coal Gully Rocks.

On the Coal gully proper four seams are displayed, with interstratified beds of grayish sandstone and shale, with some conglomerate. On the side gully there is a contact of the shale with the volcanics ten chains south-west of the junction with the main gully, the rocks in this portion being principally shales, gray, brown or black and carbonaceous.

On the east side of a faulted coal seam about 13 chains south of the mouth of Coal gully, a bed has has been opened up by a drift driven along the coal to a distance of 85 feet, starting at about 15 feet above the bed of the brook. A section of the coal, as measured in the tunnel, gives :

Sandstone forming the slope of the hill above :—

	ft.	in.
Coal	5	0
Shale parting	1	6
Coal	13	6

The coal itself appears to be of good quality, yielding large blocks, and has been mined for several years for local consumption. Its extension eastward cannot be traced at the surface, but it probably underlies the hills to the east, which we may call Coal gully hill. It appears to be the lowest seam in this area, and should underlie to the north-east the flat west of the Coldwater unless it has been removed by denudation, a point which can only be proved by boring in that direction.

About 8 chains south of the tunnel another seam outcrops on the east side of the gully. The roof appears to be of shale and shaly sandstone and the outcrop as measured gave at the top:—

	ft.	in.
Coal	5	5
Shale	4	0
Coal	3	4
Shale		

This may be styled seam No. 2.

Above this point the course of the gully inclines to the south-east, and 4 chains further there is another outcrop of coal on the east bank which appears to measure 17 to 18 feet, capped by gray, marly shales with a dip of S. 55° E. < 20.° This may represent the upper seam of Dawson's section which he gives as 15 feet 5 inches, underlaid by sandstone. Of the details of this seam and its extension nothing can be said, very little work having been done at this place. It may be styled seam No. 3.

Farther south, near the head of the main gully, a fourth seam is exposed on the east side with thin bedded sandstone, showing a thickness at the outcrop of about 3 feet, the lower part being concealed in the bed of the stream. No work has been done at this place, and it is apparently not included in Dawson's section. This part of the gully is shallow and may not have been excavated at the time of his visit. The dip of the seam appears to be slightly to the north of east, and the sandstone a short distance below dips N. E. < 20°. It is possible that a small outcrop along the road to the south-east may represent the extension of this seam, which may be styled seam No. 4.

Samples of coal from the Coal gully (tunnel seam) and from the upper outcrop of the Coldwater were secured as also from the Quilchena basin and have been analysed in this department, the results being as follows:—

G. S. L. No. 272
1904.

Mem. *re* certain coals collected by Dr. R. W. Ells:—

(*a.*) From tunnel on lower seam of Coal gully—

Water	3.04
Volatile combustible matter	37.18
Fixed carbon	52.05
Ash (reddish-white)	7.73
	100.00

Coke, per cent., 59.78. Yields a compact, firm, coherent coke.

(*b.*) From Lot 1,267. One creek running into Quilchena creek—

Water	6.95
Volatile combustible matter	37.21
Fixed carbon	47.95
Ash (pale reddish-brown)	7.89
	100.00

Coke, per cent., 55.84. Yields a firm, coherent coke.

(*c.*) From southerly outcrop of seam on Coldwater river—

Water	3.17
Volatile combustible matter	35.73
Fixed carbon	55.25
Ash (light reddish-brown)	5.85
	100.00

Coke, per cent., 61.10. Yields a firm, coherent coke.

(*d.*) From the Coldwater river, near its junction with the Nicola, near Coutlee. Lower tunnel. C. H. Keefer, Esq.—

Water	1.37
Volatile combustible matter	38.24
Fixed carbon	54.25
Ash (light reddish-brown)	6.14
	100.00

Coke, per cent., 60.39. Yields a compact, firm, coherent coke.

Analyses by fast coking understood.

(Signed) G. C. H.

Generally speaking, it may be said that the borings recently made in the Nicola-Coldwater basin have been of little practical value. From the fact that most of these have failed to reach the underlying rock, they afford no clue as to the actual structure or lie of the coal in this direction.

In order to ascertain the value of the district as a future coal producer, it will be necessary that a number of holes be put down at carefully chosen points, since only in this way can the extension of the seams found on Coal gully and on the Coldwater be determined, owing to the widespread nature of the drift deposits. This will take several years to accomplish, and could be best done by a fusion of the interests of the several companies owning mining areas in the valley.

THE QUILCHENA COAL BASIN.

To the east of the Nicola-Coldwater areas, and about 8 miles from Nicola village, Quilchena creek, formerly known as McDonald's river, enters the south side of Nicola lake. Along this creek there is a considerable area of coal-bearing rocks, comprising sandstone, shale and conglomerate, with several coal seams, forming an important basin.

This area is in large part owned by the Diamond Vale Coal and Iron Mines, Limited. It lies along the course of the creek for some miles, and the first outcrop of the sandstone is seen on the Triangle ranch at a point nearly two miles south of the post-road at Quilchena post-office, where, in a small excavation on the west face of the hill, shales and associated coals with a thickness of about six feet, dip to the south-east. The basin extends southward along the creek from this place for about 8 miles, with a maximum breadth of two and a half miles. On the west side of the creek the volcanics form a series of hills in the direction of the Princeton road, rising to an elevation of 1,000 to 1,500 feet above Nicola lake.

On the east side, sandstone and shale, with seams of coal, rise to an elevation of 800 to 1,000 feet above the creek bottom, the western slope being seamed by numerous gullies. Rock outcrops, with occasional coal seams, are seen in several of these nearly to the top of the ridge.

The highest exposed seam in this area is on a gully near the company's camp, and near the top of the upper bench. The elevation is given at 775 feet above the creek, and 500 feet above the outcrop of the tunnel seam. As exposed in the gully, there is here a thickness of about 15 feet of coal, but at the outcrop this is crushed, owing to the pressure of overlying

beds and their consequent breaking down on the face of the ravine. This seam was also struck in a shaft sunk a short distance to the north-east, which found the coal at a depth of 52 feet, and it was also opened to some extent by a short drift, which had, however, fallen in, and could not be entered. In so far as examined, the coal at this place appears to be, for surface showings, of good quality.

The principal companies owning coal mining areas in the Nicola valley just described are:—

The Nicola Coal Co., Limited, with headquarters at Spokane, Washington, U. S., owning areas on Lindley creek.

The Coutlee Coal and Iron Co., with headquarters at Colfax, Washington, U. S., owning areas in what is known as Midday valley, on the hills west of the Coldwater river, near McInnis' ranch.

The Nicola Coal and Iron Co., with headquarters at Vancouver, owning the Garesché-Green (Coal gully) areas, and the lots along the Coldwater river from the south end of the basin down to Blair's lot, No. 172.

The Nicola, Kamloops and Similkameen Coal and Railway Co., owning areas to the south-east of the Coldwater.

The Canadian Pacific Railway, owning leases of a number of lots in the valley, principally east of the Coldwater river.

The Diamond Vale Coal and Iron Mines, Limited, owning the Quilchena areas.

COPPER CLAIMS OF ASPEN GROVE AND ABERDEEN CAMP.

By Mr. Robert A. A. Johnston, Geological Survey.

Aspen Grove camp is embraced in a ridge of low mountains forming the divide between Quilchena creek, flowing to the north, and Otter creek, flowing to the south. Its northern limit may be set at a point about fifteen miles south of Nicola lake. From there it extends in a southerly direction for about twelve miles and covers, in all, an area of about thirty square miles.

The rock formation of the area includes an extensive development of an old igneous series now represented in the main by breccias and basic schists. These are traversed in various directions by more or less extensive dykes of porphyritic and granitic eruptives, the material of which has often been freely injected into the surrounding rock and is to be found as the paste of much of the breccia.

Extensive alteration of the older rocks has succeeded the invasion of these intrusives, resulting sometimes in the converting of the schists into more or less impure limestones and dolomites. Chalcedony and serpentine are often found filling cavities and crevices. Pale brownish-yellow calcite and yellowish-green epidote are of frequent occurrence as druses in some of the localities. The only minerals of any economic importance so far observed are chalcocite, bornite, chalcopyrite, native copper and specular iron. These seem to be pretty generally distributed through the older rocks, but are nowhere observed concentrated in any very great abundance. Stains of green carbonate of copper are to be met with throughout the area. Iron pyrites occurs very sparingly in a few places.

Numerous claims have been staked in the area during the past five years. In the majority of cases, however, the claims have either been abandoned or such work as has been performed on them has been entirely in the nature of assessment duty. In only a few instances have any of the claims been developed to any appreciable extent.

The following notes refer only to the more important openings that have been made.

Sovereign Claim.—On this property, a dyke several feet in width consisting of a dark gray diabase felsophyre is exposed for some distance. It runs in a direction bearing N. 25° E. To the westward of this dyke the rocks have been shattered and injected with material similar to that of the dyke, forming a somewhat coarse pyroclastic breccia.

To the eastward of the dyke the rocks show evidences of having been subjected to much pressure, so that their true character is much obscured. In general they present a purplish-brown colour, mottled here and there with darker or lighter shades. They are highly feldspathic in their composition, while small prismatic crystals of a dull green pyroxene are abundantly developed. As secondary constituents, small quantities of white calcite, greenish-yellow epidote and yellowish-white serpentine are more or less evenly distributed through the mass.

In a few instances, masses of native copper of several pounds weight have been found occupying fissures, while small grains of the same mineral are often observed clinging to the walls of fractures. Stainings of the green carbonate of copper are abundant; those of the blue carbonate occur more rarely.

Copper Standard Claim.—On this property the rocks are exposed along a bluff for two hundred feet or more in length and sixty to seventy-five feet in height. This bluff has a northerly exposure, and in a recess near its base a shaft has been sunk to a depth of 55 feet, and from the foot of this shaft a drift has been run in for a distance of 45 feet. This shaft was filled with water at the time of my visit, but the character of the material displayed on the dump did not differ essentially from that of the ledge in general.

The rock consists of a fine-grained intermixture of a purplish feldspar and a pale green pyroxene traversed by thin bands of yellowish-white serpentine. Stains of green carbonate of copper are abundant on exposed surfaces of the rock.

The Giant Claim.—A tunnel 60 feet in length has been driven into the north side of the mountain on which this claim is situated. The rock consists throughout of a compact gray diabase, enclosing here and there small masses of pinkish-white calcite and a very little iron pyrites. At the top of the hill, a short distance above the mouth of the tunnel, the iron pyrites becomes more abundant and stains of blue and green carbonates of copper are common.

Copper Chief Claim.—Two openings on the south side of the hill on this claim show abundant stains of blue and green carbonates of copper in a shattered mixture of diabasic and chloritic rocks.

Big Kid Claim.—A small excavation on this claim discloses small quantities of bornite and chalcopyrite in a gangue composed of a shattered mixture of diabase and chlorite schists with small quantities of epidote.

The Hub Claim.—At this claim occasional stains of green carbonate of copper are to be observed distributed over a dark brown brecciated andesite.

The Golden Gate Claim.—At this claim a green diabase schist dipping about N. 60° E. holds trifling amounts of chalcocite.

The Georgia Claim.—A shaft has been sunk on this claim to a depth of 35 feet. The material shown on the dump consists of a dark brownish-red andesite stained with green carbonate of copper.

Copper Belle and Bluebird Claims.—The material of these two claims is precisely similar in character to that of the *Georgia* claim, and consists of a gray, fine-grained andesite stained with green carbonate of copper.

Bachelor, Nicola and Highland Claims.—The material of these claims consists of a shattered, coarse-grained andesite traversed by small stringers of calcite. Occasional small grains of native copper are to be found disposed along the walls of cavities.

Big Sioux Claim.—At this claim thick bands of green diabase alternate with similar bands of a rather coarse-grained augite-syenite, dipping about N. 70° W. at a high angle. The syenite shows no evidences of alteration from pressure and may be intrusive in the diabase, which is, in some parts, brecciated and generally much fractured; alteration products of an epidotic or chloritic character are likewise more or less abundantly distributed through the diabase. In some portions small quantities of chalcocite and bornite are observable. Stains and coatings of green carbonate of copper are abundant.

A shaft has been sunk on this property to a depth of 28 feet and a considerable quantity of low-grade ore has been raised.

The Maggie Claim.—A shaft has been sunk on this location to a depth of about 50 feet in a greenish-gray fractured and fissured diabase.

The fissures are sometimes filled or lined with a yellowish white serpentine and in a large fissure a short distance east of the shaft fine specimens of white stalactitic chalcedony have been found. Copper pyrites occurs sparingly on this claim. To the eastward of the shaft the district is traversed by a zone of rusty weathering silicious dolomitic schists dipping S. 50° W. at a high angle.

The Cincinnati Claim.—A tunnel has been driven into the side of the mountain for a distance of about 280 feet. The rock is a moderately coarse-grained andesite, holding small quantities of iron pyrites and showing frequent stains of green carbonate of copper.

The Portland Group.—This ground comprises the *Portland, Covington, Vicksburg* and *Quebec* claims. A shaft, said to be 110 feet deep, has been sunk on this property. At the time of my visit, however, it was partially filled with water. Somewhat extensive strippings have also been made on the property. The rock, as revealed by these strippings as well as by an examination of the material of the dump, is shown to be in general a quartz-andesite. Much of it has been fractured and recemented with infiltrated silica and green serpentine. It shows occasionally small quantities of chalcocite and specular iron, while stains of green carbonate of copper are more or less abundant. Narrow dykes of a gray diabasic felsophyre cut through the andesite in a direction bearing N. 10° E.

Vancouver and Westminster Claims.—In its central portion Mount Maria is traversed by a heavy dyke of intrusive granite, following a course approximately N. 85° W. At the summit of the mountain the dike presents on its southern margin a sheer wall of from 25 to 100 feet in height and upwards of 600 feet in length. In composition it consists of a fine-grained admixture of a light gray feldspar with comparatively minor amounts of white quartz and brown mica.

To the south of this dyke, material of similar composition is seen to form the paste of a pyroclastic breccia derived from the andesite of the region. In some portions of this breccia stains of green carbonate of copper are abundant and in the case of the *Westminster* and *Vancouver* claims, which occupy adjacent positions on an elevated bench on the southern slope of the mountain, small quantities of chalcocite are also to be found. On the latter of these two claims a shaft has been sunk to a depth of 25 feet, but so far as could be observed the results did not seem to be very encouraging.

Buckhorn Claim.—This claim is situated on the summit of Bear mountain, at the southern end of Aspen Grove camp. Some small openings have been made on it, disclosing abundant stains of green carbonate of copper on a moderately fine-grained reddish gray to dark gray andesite.

ABERDEEN CAMP.

Aberdeen Camp is composed of a number of claims in or about the district drained by the Brom creek and its branches. Brom creek is a small, rapid stream flowing down through a deep ravine from the hills to the westward of Ten-Mile or Guichon creek and emptying into the latter stream at a point about 10 miles from its confluence with the Nicola river.

Heavy deposits of drift material conceal, to a large extent, the underlying rocks, but where these latter are exposed they are seen to consist of a series of granitic eruptives enclosing remnants of an old greenstone series and at times forming the cementing material of breccias made up of fragments of the latter.

These granitic eruptives are largely made up of a moderately fine-grained syenite consisting almost wholly of a mixture of a light gray feldspar and black hornblende. At different points, however, they are seen to merge gradually into a type in which white quartz becomes abundant and the hornblende is replaced by a dark brown mica. Small crystals of a pale red garnet are of frequent occurrence in this latter type. Sometimes, as a result of local disturbance, the rocks are observed to exhibit a decided schistosity and some very thin bands consist of a rather coarse-grained, light reddish feldspar to the almost entire exclusion of other minerals. Small stringers and masses of white quartz and white calcite with specular iron frequently occur.

The character of the greenstones previously mentioned has been greatly obscured by the changes produced during the intrusion of the granites. In some of the less altered portions they are seen to be highly augitic but for the most part they have undergone such complete changes that their original constitution is nearly or quite obliterated. Drusy cavities lined with white or reddish-white quartz are abundant. Chalcocite and specular iron are distributed through it to some extent but the quantity does not seem to be large. Stains of green carbonate of copper are frequently seen.

Only two of the claims have been opened up to any very appreciable extent. These are the *Aberdeen* and the *I. X. L.* The former of these claims is situated on Brom creek at a point about a mile from the mouth of the creek, where a large mass of the greenstone is enclosed between two coarse joint-planes in the granite, striking about N. 85° W. (mag.). A tunnel has been driven for considerably over 100 feet along the strike. The greenstone, coated with green carbonate of copper and carrying small quantities of chalcocite and specular iron is met at various intervals along the entire length of the tunnel, the intervening spaces being occupied by either greenstone breccia or granite. Some low-grade ore has been taken out but work for the present has been discontinued.

The *I. X. L.* claim is situated on a small creek of the same name, a branch of Brom creek, and lies nearly a mile and a half in a north-westerly direction from the *Aberdeen* claim. In addition to some small openings a shaft has been sunk on this property to a depth of 100 feet. The rocks consist of a breccia made up of fragments of the old greenstones cemented in a paste of the eruptive granites. A coarse-jointed structure with a dip S. 55° E. $< 45°$ is distinctly visible. The material holds small quantities of specular iron; stains of green carbonate of copper are found.

Examinations were also made of the *King Solomon* and *Midnight* claims which respectively occupy opposite positions on the right and left banks of Ten-Mile creek a little more than half a mile above the mouth of Brom creek. At the former of these two claims is seen a heavy exposure of a gray, granitic gneiss dipping S. 20° W. nearly vertical. On the opposite bank of the creek at the *Midnight* claim the same rock is seen dipping E. $< 60°$. It includes scanty remains of the old greenstones and thin bands of red feldspar are to be seen intercalated with it. Small quantities of chalcocite, specular iron and green carbonate of copper are found associated with the greenstone portions but in no instance could these minerals be found traceable to the granites.

IRON MOUNTAIN.

A number of claims have been staked on or about the summit of Iron mountain and in a few instances a small amount of development work has been done. The occurrences, so far as could be observed, however, do not appear to be of any importance economically. The summit of the mountain is comprised in a series of alternating ridges with shallow valleys between. These ridges conform in direction with the strike of the rocks, which varies from N. to N. 55° W. with a dip to the west or south-west. The rock formation embraces a series of interbedded jaspery quartzites, felsophyres and brownish-coloured rhyolites. The latter are also often found as the paste of a dark brown feldspar breccia. These are all frequently traversed by veins of white quartz either parallel with the strike or cutting it at various angles. These veins are sometimes seen to carry trifling amounts of specular iron, chalcopyrite and pyrite; green carbonate of copper or malachite is often observed either as an earthy coating or in fine radiating groups of small acicular crystals. In no instance, however, were any of these minerals noted in any appreciable amount.

ASHCROFT MINING DIVISION.

REPORT OF H. P. CHRISTIE, MINING RECORDER.

I have the honour to submit my annual mining report for the Ashcroft Mining Division for the year 1905.

There has been little definite change in the mining situation here since last year. A certain amount of activity has been shown in the work being done, &c., in the Highland Valley, and a company has a bond on, and is at present working, the *Transvaal Group*, with encouraging results. There is also an increase all round in the office statistics.

The Fraser River Gold Dredging Co. was closed down for the greater part of the year, but resumed work recently, and is doing well at present, the returns for the quarter ending on December 31st being 80 ozs.

OFFICE STATISTICS—ASHCROFT MINING DIVISION.

Free miners' certificates	92
Certificates of work	64
Mineral claims recorded	58
Placer "	15
Certificates of improvements	6
Conveyances, &c	24

YALE MINING DIVISION.

REPORT OF WILLIAM DODD, MINING RECORDER.

I have the honour to submit herewith my annual report and office statistics for the year ending December 31st, 1905.

There is practically nothing new of importance to report regarding this mining district, although the revenue derived from mining for 1905 is only some $400 less than for 1894, the returns for which year still remain the highest during my tenure of office as Mining Recorder.

PLACER MINING.

The Yale Hydraulic Mining Company has piped intermittently during the past season up to about the 1st December, but I am not in receipt of any authentic information as to the results obtained. The operations are under the management of Mr. Stanislawsky.

The North-West Pacific Company has been engaged in laying sluice-boxes and in ground-sluicing; no pipe work has so far been undertaken.

Two or three Chinamen at Cat landing, at Emory bar, and three or four at MacRae bar, represent the once numerous hand placer miners of this division.

The amount of placer gold recovered during the past season may probably run to about $2,000.

DREDGING.

Fifteen miles of the main Fraser river channel, from Yale down, have been leased by a New Zealand syndicate, of which Mr. I. Stevenson is the director and Mr. W. Williamson the local representative, who contemplate, I believe, building a dredge in this vicinity during the coming summer. As this syndicate has been profitably engaged in dredging in New Zealand for some time past, and as the machinery will be imported from that country, it will be a matter of interest to note the results of New Zealand methods and machinery, as compared with past experiments in Fraser river dredging.

I might add that there are numerous dry bars and terraces along the river which should also pay, if worked on a sufficiently large scale. A late U. S. Geological Survey Bulletin (No. 263) states that "eight cents per cubic yard is believed to be a safe estimate for the present total cost of gold dredging at Oroville, Cal."

MINERAL CLAIMS.

The International Gold Mining Company's mill, on Siwash creek, was operated from about the beginning of the year until the middle of May, since when a new company has been organised by Mr. Stenger, which has done some prospecting.

The Mount Baker and Yale Mining Company has done the usual assessment work.

On the *Bonanza* location, near Hope, owned by Messrs. Wardle and Burton, a 45-foot tunnel cross-cut the gold-bearing mispickel at a depth of some 60 feet.

Other parts of the district remain dormant, but with the eventual construction of the V. V. & E. Railway a certain amount of prospecting and work may be expected in the country bordering the line of construction. For example, the road, if built down the Coquihalla valley, as at present surveyed, will halve the present trail mileage to the promising silver-lead camp of Summit City.

OFFICE STATISTICS—YALE MINING DIVISION.

Free miners' certificates issued	68
Mineral and placer claims recorded	59
Leases recorded	6
Certificates of work	28
Affidavits, notices and permits	27
Powers of attorney	5
Leases in force	32
Free miners' certificates, companies	3
" " special	3

Revenue.

Free miners' certificates	$ 494 25
Mining receipts	2,714 50
Sundry receipts	572 00
	$3,780 75

SIMILKAMEEN MINING DIVISION.

Report of Hugh Hunter, Mining Recorder.

I have the honour to forward the annual mining report for the Similkameen Mining Division for the year 1905:—

Very little placer mining has been done this year. A few Chinese were working on Granite creek and on the Tulameen river, near the mouth of Bear creek. The number of Chinese residing in this district continues to get smaller every year.

There has not been much development work done on mineral claims during the past season, but considerable assessment work has been performed.

On Copper mountain the South Yale Mining Company took a bond on the *Sunset* mineral claim and put in a cross-cut tunnel 434 feet. Other claims bonded by same company are being prospected with a diamond drill, and at present work on the *Princes May* is in progress.

On One-Mile creek, north of Princeton and Allison, the United Empire Company has nine mineral claims in a group, on which it is doing considerable work, at present developing the property by a tunnel into the mountain. Assays from these properties show high-grade copper and gold.

The Boulder Mining Company, on Boulder mountain, extended its tunnel 50 feet on the *Cousin Jack* mineral claim.

On Bear creek assessment work has been done on most of the claims, and in many cases large bodies of ore have been exposed.

A waggon road, some 15 miles in length, is being constructed to connect with the Tulameen Townsite, so as to enable claim owners to bring in machinery to develop the properties.

On Roche river, Kennedy mountain and Summit camp, assessment work has been performed on most of the claims.

As I have not had the opportunity of visiting any of the properties, I am unable to do them that justice they deserve.

Office Statistics—Similkameen Mining Division.

Free miners' certificates	196
Location records	429
Certificates of work	506
Conveyances	118
Certificates of improvements	64

Revenue.

Free miners' certificates	$1,201 00
Mining receipts, general	3,059 55
Mineral tax	859 75
	$5,120 30

LILLOOET DISTRICT.

———:o:———

LILLOOET MINING DIVISION.

REPORT OF C. PHAIR, GOLD COMMISSIONER.

I have the honour to submit my annual report on the progress of mining in Lillooet Mining Division during the year 1905:—

MINERAL CLAIMS.

Very little development work, other than the usual assessments, has been done on the many quartz veins in the district, with the exception of the *Lorne* mine at Cadwallader creek, where four men were engaged extending the tunnel 24 feet and crushing 133 tons of ore, in an arrastra, which yielded $2,000.

Another arrastra was completed late in the season for the *Pioneer* claim, also situated at Cadwallader creek. The manager had only time to crush three tons of ore, which, he states, yielded $150, before being compelled to stop operations on account of frost.

PLACER CLAIMS.

Cayoosh Creek.

The Spokane Company, operating the *Jesperson* lease, resumed active work early in the season and continued until December. During that time an average force of eight men at $3.50 per day was employed. The principal work consists of blasting an open cut through the falls which form a dam across the creek. This cut is 20 feet in width, 35 feet in depth, and 120 feet in length, and is intended to drain the creek to obtain the gold on the bed. A flume, 13 feet by 6 feet and 100 feet in length, substantially constructed, is laid in the cut. To enable this work to be done, it was necessary to have built a dam, 150 feet long and 12 feet wide, with gates, and to clean out an old tunnel, through which the water was turned while the work was in progress. Five hundred feet of water ditch has been built also and $12,250 expended for wages and purchase of supplies.

A short distance above this company's property, Will Haylmore was engaged on his lease driving a tunnel through wash gravel, skirting the creek, with the object of striking an old channel, the course of which he believes to be parallel with the creek. The tunnel is now in 100 feet, but is not of sufficient length to prove whether the old channel exists. He has obtained good prospects on the bedrock—in one pan $4.

J. N. Jensen and Duncan Fraser have also been driving a tunnel, opposite Cottonwood creek, to strike this back channel. Their tunnel is in 70 feet, but they do not expect to strike the channel until they extend it another 70 feet.

Bridge River.

Four men were engaged the whole season on Osmund Fergusson's lease on Alexander creek. A derrick and a saw-mill were installed and a cut made along bedrock. The results are satisfactory.

LOOKING UP GOAT CREEK, TELKWA--TO BASIN.

The Bridge River and Lillooet Gold Mining Company, whose leases, near the north fork were bonded for some years to the Bridge River Developing Company, resumed operations with a force of five men. Most of the season was taken up in cutting a channel at Horse-Shoe Bend, parallel with the river, to divert the water from the present channel, in order to mine about half a mile of the river around the Bend. No solid rock was encountered and the excavating was done by hydraulicing. The cut will be about 200 yards in length, and, as far as advanced, is about 200 feet wide and 100 feet deep. It is well known that the bed of this river is rich in coarse gold, but it is difficult to mine it by wing-damming, as freshets are of frequent occurrence.

Fraser River.

The *Lillooet* hydraulic lease was mined, as usual, by five Chinese.

The Last Chance Hydraulic Company, at Foster's Bar, worked three men and constructed a cable bridge across the river, on which water is conveyed in pipes to the mine from a creek on the right bank. The season was almost all spent in development work, but the property is now opened up, so that it can commence producing early next season.

The Trustees Dredging Company (formerly the Iowa-Lillooet Gold Mining Company, Limited,) worked a force of eight men during the season on its lease. When the new management took possession seven weeks was spent repairing the dredge, after which it worked most satisfactorily for some time. Afterwards, owing to financial difficulties, the dredge had been in such a bad condition that it was able to work only a short portion of the time, due to continual break-downs. During the time it was in operation it paid very well and very little difficulty was experienced from boulders.

No other dredging leases have been worked.

The estimated value of yield of placer gold is $24,000.

Office Statistics—Lillooet Mining Division.

Mineral claims recorded	12
Placer claims recorded	1
Placer claims re-recorded	8
Conveyances recorded	21
Certificates of work recorded	49
Certificates of improvements	3
Free miners' certificates issued	105
Dredging leases in force	7
Mining leases in force	37

CLINTON MINING DIVISION.

Report of F. Soues, Gold Commissioner.

I have the honour to submit herewith my annual report on mining in the Clinton Mining Division of Lillooet District for the year ending December 31st, 1905:—

Mining in all its branches in the division has been at the lowest point since mining has been an industry. The total yield of gold, in so far as I can ascertain, is under $1,000.

In the early part of the year there was a certain amount of activity on the mineral claims on the Bonaparte river, and which were then under a prospecting bond. That bond, however, was thrown up last autumn, and the works closed down. Late in the year four mineral claims were recorded on Mahood lake, but there has been no work on them.

On other recorded claims in the division sufficient work has been done to hold them.

Placer mining, with the exception of two hydraulic claims, has been confined to the itinerant Chinaman.

OFFICE STATISTICS—CLINTON MINING DIVISION.

Mineral claims recorded	40
Placer claims recorded	3
Placer claims re-recorded	2
Certificates of work	11
Mining leases in force	2
Dredging leases in force	11
Conveyances recorded	5

Revenue Collected.

Free miners' certificates	$106 50
Mining receipts, general	470 30
	$576 80

VANCOUVER ISLAND AND COAST.

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ALBERNI DISTRICT.

ALBERNI MINING DIVISION.

Report of A. L. Smith, Gold Commissioner.

I have the honour to submit my annual report on the progress of mining in the Alberni Mining Division during the year ending December 31st, 1905:—

The past year has been very dull, as far as mining in this division is concerned, nothing but assessment work having been performed, excepting on the following properties:—

On the *Gladys* claim work was carried on steadily for four months, with a force of eight men, and at the present date the showing of copper ore at the face of the work is good.

The *Happy John Group* has been under bond to American capitalists since May last. Considerable tunnel work has been done, eight men employed and about 150 tons of high-grade copper ore is on the dump.

On the *Happy John No. 2* a prospect shaft has been sunk 15 feet and good copper ore has been encountered. Another tunnel is being driven 200 feet lower down on the mountain.

The *Red Rover* mineral claim is situated on Lucky creek, near Toquart harbour, Barkley sound, about two miles inland from salt water; owners, Thos. M. Graham and William Pooley. A good trail has been cut out to the claim. I have to report very encouraging results having been obtained from the work done so far. The vein can be traced 700 feet, and a considerable amount of stripping has been done. A shaft is down 10 feet, the actual vein being three feet wide at the bottom of the shaft. The quartz carries gold, about 40 assays having been made, many averaging $14 per ton in gold.

On the *Big Interior Group*, in the Great Central lake country, assessment work was performed on seven claims during the year. An attempt was made by a party too late in the season to get into the claims with the intention of bonding them.

Office Statistics—Alberni Mining Division.

Free miners' certificates issued	51
Free miners' certificates, special	1
Claims recorded	20
Certificates of work recorded	50
Transfers, etc., recorded	8
Certificates of improvements recorded	11
Crown-granted claims on tax roll	151

Revenue.

Free miners' certificates	$ 348 25
Mining receipts	489 05
Acreage tax Crown-granted claims	1,050 75
	$1,888 05

CLAYOQUOT MINING DIVISION.

REPORT OF W. T. DAWLEY, MINING RECORDER.

I have the honour to submit my annual report of the mining operations in the Clayoquot Mining Division for the year ending December 31st, 1905.

The expected improvement in the mining industry of this district during 1905 has not taken place, and I regret to say that this has been the dullest year in mining business since this office was instituted in 1898. Work on a large scale, which was to have been done on several claims during the year, for some reason or other has not been performed, holders being satisfied with doing their annual assessment work. Only two properties have had any great amount of work done on them, viz.: On the *Hetty Green Group*, situated on Deer creek, a force of men worked from April to September, and a good waggon road was built from salt water to the property. Some three or four shipments were made to the Ladysmith smelter, about 215 tons of ore being treated with very satisfactory results. This property is owned by Mr. James Thomson, of Alberni.

The *Good Hope Group*, owned by the Helga Gold and Copper Co., of Seattle, consists of five claims and has been worked for the last ten months continuously, under the foremanship of Mr. B. F. McCurdy. Work is still being continued and prospects of its still working are good. No shipments have yet been made.

As it is of little use describing a large number of properties which have had little or no work done on them, I will not do so, but trust that this time next year my report may be at greater length, and at the same time of a more cheerful and encouraging tone.

OFFICIAL STATISTICS—CLAYOQUOT MINING DIVISION.

Free miners' certificates issued	38
Mineral claims recorded	13
Certificates of work recorded	58
Bills of sale, bonds, etc., recorded	28

Revenue.

Free miners' certificates	$156 50
Mining receipts, general	253 10
	$409 60

QUATSINO MINING DIVISION.

REPORT OF B. W. LEESON, MINING RECORDER.

I have the honour to submit herewith my annual report on the mining industry in the Quatsino Mining Division for the year ending December 31st, 1905.

There has not been much development work done on the mineral claims, the owners satisfying themselves with doing sufficient to hold them. Very few new claims have been recorded, the principal new locations being of bog iron, adjacent to iron property on the West arm of Quatsino sound.

Hematite Iron.

The original 22 claims of this property on the West arm were sold to J. Moore, of Seattle, and a number of men have been employed during the season uncovering the deposits to determine the extent of the ore. A large number of open trenches have been dug systematically across the property, and every trench visited by the writer showed the solid ore right to the bottom of each. Some remarkable specimens of iron oxide replacing wood have been found, pieces of trees and limbs complete

with the bark on; one unique specimen is an Indian wooden wedge used for splitting wood, with the binding on one end, all complete, turned to iron. The owners of this property are completely satisfied, and they have just acquired the balance of the new locations made this year, numbering some 14 claims. The most notable of the new discoveries of iron ore was the *Iron Chink*, by Albert Lund. About 50 yards from the beach a number of windfalls were noticed, and it was found that all the trees were turned up by the roots, and under all of them was the solid iron ore, showing many thousand tons already in sight.

June Group.

A tunnel is being run on this property that will reach, at a distance of about 400 feet, the large surface showing giving a depth of about 150 feet. The tunnel has now reached 200 feet. There are 8 men working. Mr. Harold Grant is in charge of the work.

The *Yreka* is still lying idle, nothing having been done in the way of mining during the year.

Teta River.

The *Paystreak Group*, at the mouth of the river, has received the usual assessment work this season, Mr. Fred. Pollock, one of the owners, being nearly killed during the work by the falling of a rock.

The *White Quartz* claims, farther up the river, are looking remarkably well. The pay ore carrying the gold values has widened out to five feet, and some very fine samples have been brought down to the office.

Zinc.

The *Peerless* claim has been visited by Mr. Retallack, of Kaslo. It is hoped the visit will result in the further development of the claim.

Coal.

Mr. Pearson, of Vancouver, is steadily at work on the West arm, employing three to five men running tunnels and drilling for the coal, but with what result is not yet known.

Office Statistics—Quatsino Mining Division.

Free miners' certificates issued	38
Mineral claims recorded	37
Certificates of work recorded	48
Transfers, bonds, etc., recorded	11

Receipts.

Free miners' certificates	$186 50
Mining receipts, general	283 25
	$469 75

NANAIMO DISTRICT.

NANAIMO MINING DIVISION.

REPORT OF MARSHAL BRAY, GOLD COMMISSIONER.

SIR,—I have the honour to submit herewith my annual report on the mining operations in the Nanaimo Mining Division for the year ending the 31st of December, 1905. Outside of Texada island but little development work has been done other than the necessary annual assessment work to keep the claims in good standing. There were 463 mineral claims in good standing on the 31st of December, 1905, and while less locations were recorded than in previous years, the outlook is very promising for 1906.

The returns for the year's work from the Tyee smelter at Ladysmith, although not as large as in 1904, made a very good showing considering the small number of days the smelter was in blast for the year, which the following record of the work shows, viz.:—

Smelter in blast 164 days of 24 hours each.

Tyee ore smelted	32,400	tons.
Custom ore smelted (exclusive of flux ore)	3,860	"
Ore from United States smelted	2,700	"
Total smelted	38,960	"

Total value of the ore smelted, less refining charges, was $506,600.

The Crofton smelter blew in on the 6th of January, 1906, and if ore can be mined and shipped from the *Britannia* and other coast mines to keep the furnace in blast for the year, they should make a good record for 1906.

TEXADA ISLAND.

The *Marble Bay* mines, belonging to the Tacoma Steel Co., under the management of A. Grant, mined and shipped to the Tacoma smelter during the year 12,006 tons. The development work done on the properties consists of sinking the main shaft 100 feet, 430 feet of driftings and 200 feet of winze sinking. The lowest level is now 671 feet below the surface and about 620 feet below the sea-level. They have brought water by a pipe line of 2,200 yards, from the creek between Priest and Turtle lakes and from Priest lake, at a cost of $4,000. The average number of men employed for the year was 50 white men and 12 Chinese ore sorters. The gold values are fully maintained and the copper values are increasing with depth.

The *Van Anda* properties have been idle most of the year; but the *Copper Queen*, under the management of Mr. Wilde, is getting ready to ship ore, and a new body of ore having been found, will, no doubt, very soon be shipping again.

The *Cornell* has been leased to the Cordillero Mining Co., which had been pumping the water out of the old workings, and will open up the mine when dry, by sinking the main shaft.

The *Cordillero Group* of claims has done considerable development work during the year, in running 120 feet of tunnel, 30 feet of level and 30 feet of winze, and had about 100 tons of ore ready for shipment at the end of the year. The average number of men employed was 12 whites and 2 Chinese.

The Loyal Lease, Limited, Co. is working the *Loyal Group* of seven claims, under a lease and bond from Mr. Treat, and the development work done during the year has opened up a fine body of ore, proving the properties to be very valuable.

The Puget Sound Iron Co. has not done much development work this season, but is preparing to ship large quantities of iron ore to Tacoma during the coming year.

There has been a great deal of prospecting done on the island during the past year, and some very fine showings of copper ore have been uncovered. The owners of many of these claims are handicapped by not having the means to develop their properties as the showings warrant, but all indications point to a bright future for Texada island.

During the past year very little work other than assessment work was done on the mineral claims situate on Phillips and Frederick arms, Thurlow, Valdes and other islands and inlets to the north.

Dunsmuir District.

The Nanaimo Jubilee Mining Co. has done considerable development during the year on the *Delphi Group* of claims, situated at the head of the south fork of Nanaimo river, having sunk the shaft 30 feet deeper and driven a tunnel into the mountain to tap the ledge, which is from 10 to 15 feet wide, and shows good values in copper. These claims and the *Jubilee Group* of 16 claims would be producers if a short line from the E. & N. Railway (about 15 miles) were put in, so that the ore could be shipped out to the smelters, and this would also open up a rich mineral country around Green mountain and Mount Mystery.

Oyster District.

The Vancouver Island Exploration & Development Co. has not been doing much work on its group of claims during the year, as Mr. Cecil, the manager, has been in England all summer raising the necessary funds for the development of the properties.

Office Statistics—Nanaimo Mining Division.

Free miners' certificates issued (individual)	288
" " " companies	4
Mineral claims recorded	124
Placer claims recorded	1
Certificates of work recorded	149
Certificates of improvements recorded	3
Crown grants applied for and issued	3
Bills of sale recorded	9
Permissions given to re-locate	4
Rental mining lease	1

The revenue collected for the above free miners' certificates and mining receipts generally for the year ending the 31st of December, 1905, was $2,863, being about the same as for the year 1904.

VICTORIA DISTRICT.

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VICTORIA MINING DIVISION.

REPORT OF N. F. MCKAY, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on mining in this division during 1905.

While there has been no remarkable development in the mining industry during the year, work has been steadily prosecuted in the various camps and considerable prospecting has been done.

MOUNT SICKER.

The following notes on the *Tyee* mine have been supplied by Mr. Clermont Livingston, the General Manager of the Tyee Copper Company:—

"During the past year ore shipments from the *Tyee* mine have amounted to 31,900 tons, containing 2,688,945 pounds of copper, 87,028 ounces silver, and 5,003 ounces gold, the value of which, after deducting freight and refining charges, is $526,000. Heavy development work has been carried on throughout the year and the main shaft has been sunk to the 1,000-foot level. Since the commencement of the present year a cross-cut has been driven south from the shaft at the 1,000-foot level, and at the end of January about three feet of mineralised rock, carrying sulphate of barium and also values in copper, gold and silver, was intersected at a point 208 feet south of the shaft. As the cross-cut passed through what is apparently the apex of a lode, it augurs well for the future developments at greater depths.

"Heavy exploratory work has also been carried on at the *X. L.* The shaft has been sunk to a depth of 350 feet and a drift east is being driven from that level. At a point about 300 feet east of the shaft a strong selvage or gouge has been found, similar to that encountered to the south at the 1,000-foot level of the *Tyee.*"

The Vancouver Island Mining and Development Company has Crown-granted a number of claims on Mount Sicker and has done extensive prospecting work. Work on the *Richard III.* mine has been confined to development on a small scale, and operations have been resumed on the *Copper Canyon.*

The *King Solomon* made a small shipment with very encouraging returns.

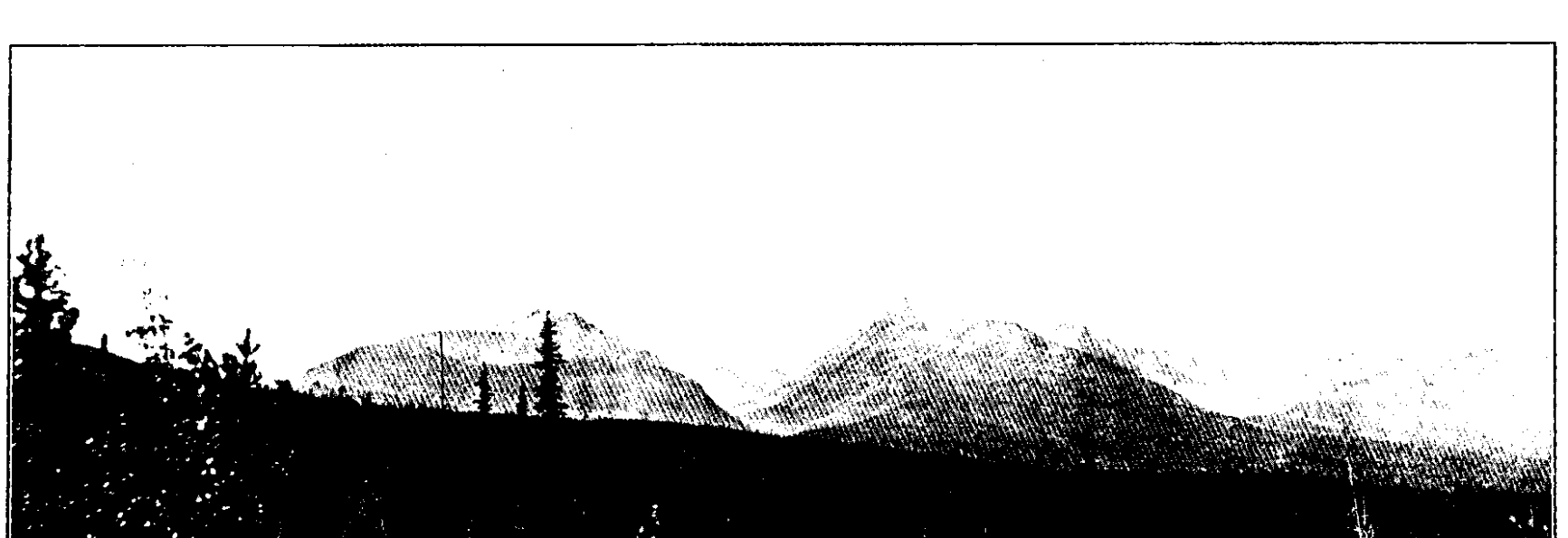
On Koksilah river a large amount of surface work has been done in uncovering bodies of copper ore. This work has been done under the superintendence of Mr. Clermont Livingston for the Vancouver Island Mining and Development Co.

RENFREW DISTRICT.

Mr. J. J. Baird, of Port Renfrew, has kindly furnished the following notes on the San Juan district:—

"Mr. H. E. Newton, for his company, has kept a gang of men employed opening up a large iron deposit, and the iron property on Bugaboo creek has been bonded for a large figure, of which the first instalment has been paid.

"During the year the San Juan Mining and Manufacturing Company, Ltd., has been incorporated, * * * * and the assessment work on the several mineral claims of the company will be continued."



GOAT CREEK, TELKWA—LOOKING SOUTH.—HUNTER'S BASIN ON RIGHT, HANKIN'S BASIN ON LEFT.

The following statistics have been supplied by Mr. Cuppage, Mining Recorder for Victoria Division :—

Office Statistics—Victoria Mining Division.

	1904.	1905.
Free miners' certificates issued	561	450
Free miners' certificates (special) issued	9	8
Mining claims recorded	125	83
Certificates of work issued	235	219
Certificates of improvement issued	28	58
Grants of water rights for mining	1	2
Conveyances recorded	62	78
Abandonments recorded	1	..
Placer leases issued	1	3
Permits recorded	1	2

Revenue.

	1904.	1905.
Free miners' certificates	$4,821 95	$4,166 02
Mining receipts	1,526 75	2,320 70
	$6,348 70	$6,486 72

NEW WESTMINSTER MINING DIVISION.

Report by C. C. Fisher, Mining Recorder.

I have the honour to submit the following report of mining operations in the New Westminster Mining Division for the year 1905 :—

The claims recorded during the year were distributed as follows :—Howe sound and vicinity, 33; Bowen island, 13; Gambier island, 2; Capilano, Lynn and Seymour creeks, 42; Pitt lake, 4; Agassiz and vicinity, 4; Harrison lake and vicinity, 4; Chilliwack and vicinity, 3; Nelson island, 1; Squamish, 1. The number of claims recorded shows a slight falling off, while the development work recorded shows a slight increase over the previous year.

There have been no new developments in the district worthy of special report. Very little has been done beyond the ordinary assessment work, and no new discoveries or developments of importance have been made during the year, and I have nothing, therefore, of public interest to report. From the office statistics it will be seen that there has been a slight increase over the year 1904.

Office Statistics—New Westminster Mining Division.

	1904.	1905.
Free miners' certificates issued	673	738
Quartz claims recorded	134	107
Certificates of work recorded	184	191
Certificates of improvements recorded	7	13
Conveyances recorded	33	46

Revenue.

	1904.	1905.
Free miners' certificates	$4,431 85	$4,606 65
Mining receipts, general	1,664 05	1,810 40
Total	$6,095 90	$6,417 05

INSPECTION OF METALLIFEROUS MINES.

REPORT OF JAMES McGREGOR, INSPECTOR, WEST KOOTENAY AND BOUNDARY DISTRICTS.

I have the honour to submit my annual report for the year 1904, with respect to the condition of the metalliferous mines in my district.

SIMILKAMEEN DISTRICT.

In this district there are not many mines in operation, but those that are working have made rapid progress in every respect during the year. Many are in the development state at present, with every prospect of being shippers in the near future.

KAMLOOPS DISTRICT.

There has been but little increase in the number of mines operating in this district since my last report. Those that are operating have done so continuously during the year, and I have always found them in a safe condition, the Act being carefully adhered to.

BOUNDARY DISTRICT.

In this district rapid progress has been made during the year, both as to the number of mines in operation and the method of mining. In nearly every instance they have worked continuously during the year. I have found upon inspection that care has been exercised in every department for the safety of the workmen. The large ore quarries have been operated as usual with much success. In these I found special attention being paid to the thawing and handling of powder, there being large quantities used in these works. To all other requirements of the Act special attention is paid.

NELSON DISTRICT.

There has not been any change of importance in this district. The shipping mines I found, upon inspection, to be carried on in compliance with the Act.

SLOCAN DISTRICT.

In this district there are more mines in operation than there were the year previous, and many prospects developing. I found upon inspection that careful attention had been paid to timbering and to handling of powder. Where shafts are in operation the machinery and other equipments are in good condition.

LARDEAU DISTRICT.

I found, upon inspection, the mines of this district to be well equipped with all safety appliances required by the Act.

TRAIL DISTRICT.

In several instances the already deep mines have been increased in depth in this district. In doing so, all care has been exercised. The ventilation has been improved in many respects in the deeper levels of the larger mines, by connecting them by drifts. The machinery, shafts, ropes, catches, guides and ladderways are kept in good condition. The powder is stored and thawed on the surface. I might further say that in nearly every case I found the mines of this district in a state of efficiency.

YMIR DISTRICT.

In this district a great amount of development work has been accomplished during the year. The usual number of mines have continued shipping, in all of which I found the requirements of the Act have been complied with.

AINSWORTH DISTRICT.

There has been some increase in the number of mines working in this district over the preceding year. Upon inspection of the different mines, I found the Act being complied with in all cases.

I beg to state, *re* bunk and cook-houses, that I have had no complaint made to me and I have found them, to all appearances, in a healthy condition.

Appended is a list of accidents which occurred during the year 1905.

REPORT OF THOS. MORGAN, INSPECTOR OF EAST KOOTENAY DISTRICT.

I have the honour, as Inspector of Metalliferous Mines for the East Kootenay District, to submit my annual report for the year 1905.

During the year extensive work has been carried on at the mines, with very gratifying results. I have visited these mines at every opportunity, and have always found them in a very satisfactory condition. Great precaution is always taken in regard to the safety of the men employed, which accounts for the limited number of accidents.

The following mines have been in operation during the year:—The *Alice* mine, operated by the Alice Broughton Mining Co., Ltd.; the *Sullivan* mine, operated by the Sullivan Group Mining Co., Ltd.; the *St. Eugene* mine, operated by the St. Eugene Consolidated Mining Co., Ltd.; the *North Star* mine, operated by the North Star Mining Co.

Sullivan Mine. My last inspection of this mine was made on August 30th. This mine is situated about 2½ miles from Kimberley, and is ventilated by natural ventilation and compressed air. An aerial tramway, 1¼ miles long, runs from the mine to the railway near Kimberley, carrying the ore to the bunkers there which have a capacity of 500 tons. At the mine there are also bunkers of 125 tons capacity. The latest and best machinery has been installed for the purpose of carrying on the work. The mine is under the management of Mr. James Finlay.

Alice Broughton Mine. This mine is situated about 4 miles from Creston and was inspected by me on October 26th. Ventilation good and natural. A 50-ton concentrator is installed and an aerial tramway, 5,500 feet long, runs from this to the Crow's Nest Pass Railway. Mr. John Hampson is the superintendent.

St. Eugene Mine. This mine is situated at Moyie, and my last inspection was made November 29th. I found everything satisfactory. A fire occurred on October 6th, which destroyed the shaft-house and adjoining buildings, but new buildings have been erected and the mine is now working as before. The mine is ventilated by natural ventilation and compressed air. An aerial tramway carries the ore from the upper mine to the concentrator. Mr. James Cronin is the manager.

The *North Star* mine has not shipped any ore during the year, but considerable prospecting has been done.

PROSECUTIONS.

On the 25th day of April, the following pleaded guilty to infraction of the 8-hour law and were fined accordingly:—F. Kelly, fined $2.50; Frank Egi, fined $2.50; Pat Hartigan, fined $2.50; Chas. Helhing, fined $2.50; Otto Wester, fined $2.50.

REPORT OF ARCHIBALD DICK, INSPECTOR OF COAST DISTRICT.

I have the honour, as Inspector of Metalliferous mines for the Vancouver Island and Coast District, to submit my annual report for the year 1905:—

During part of the year I saw that the following mines were being worked:—*Nahmint* mine, in Alberni District; *Britannia* mine, New Westminster District; *Marble Bay* mine and *Copper Queen* mine, on Texada island.

Nahmint.

A. C. Cabel is superintendent of this mine, which is on the mountain on the west side of the Alberni canal, at an altitude of 1,500 feet, but what are known as No. 1 and 2 tunnels are much higher. Work at the above tunnels was discontinued when I was there, and was being carried on in No. 3 tunnel. This tunnel is 1,200 feet long. There had not been any stoping done, except in one place, with only a few men working. Timbering is very good.

Ventilation good; air conducted to the face by pipes from the compressor. There is an aerial tramway and all other machinery for working an extensive mine. There is also a very excellent wharf for shipping.

Britannia.

G. H. Robinson, managing director and superintendent. This mine is located on Britannia mountain at an altitude of 3,500 feet, with communication to the sea beach by an aerial tramway of 3½ miles. This company has two mine-openings, one of which is known as the *Jane* tunnel. This tunnel was in 179 feet, with a drift to the west 70 feet. All the works and timbering are well put in, and this was done by some person that understood how to put in timber.

In an easterly direction, and fully 1,000 feet from the *Jane* tunnel, there is what is known as the *Bluff* tunnel, or mine. This tunnel was in 183 feet without any timber. From the entrance to the face the tunnel is in ore. The foot or hanging walls have not yet been seen in either of the above mines. Up on this mountain there are electric plant, air-compressor, ore-breaker to make the ore suitable for handling, and other appliances for the working and conducting of an extensive mine. From the *Jane* there is a self-acting incline, with a gentle grade to the ore-pockets. To the *Bluff* mine there is a tramway 800 feet long on which they employ a locomotive run by gasoline, which hauls the ore and dumps into the above pocket, this being the upper end of the aerial tramway.

This tramway goes in behind a high part of the mountain and is known as the upper and lower sections. The upper section is 5,800 feet, and the lower section 11,100 feet long; total length, 16,900 feet from the ore breaker to the mill at Britannia beach. At the place where the upper and lower sections of the tramway come together they have built pockets capable of holding several thousand tons of ore. At Britannia beach the concentrating plant is erected.

Marble Bay.

A. Grant, superintendent. This mine is located on Texada island. I went down the mine to the 600-foot level and went into all the works, then went through all slope workings, all of which I saw were in very good order and well timbered. Ventilation good; all the machinery working well. There were 25 men working below and 20 above ground. The ore is hauled on a tramway to the wharf and shipped.

Van Anda and Copper Queen.

H. F. Wild, superintendent. This mine is 182 feet above sea-level at the entrance. I went down here on the cage to the 500-foot level. I then went by a ladder to the 600-foot level, where I was still 60 feet from the bottom. The mine had only recently changed owners. The new company started repairs at the entrance to the shaft, and this work was being continued when I was there. The new company was not named when I was there, but Mr. Wild told me that it would soon be registered under the new name. The mine has been at a standstill for quite a time. Except being somewhat wet there was nothing wrong in the workings.

The *Cornell* mine, Texada, Alfred Raper, manager, was filled with water when I was there.

There was only one accident reported for 1905. On August 3rd, Kenneth McCauley, miner, in *Britannia* mine, had one arm broken and was otherwise seriously injured by a fall of ore in the *Jane* tunnel.

LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1905.

No.	Mine.	Date.	Name.	Occupation.	Details.
1	Centre Star, Rossland..	Feb. 15	Henry Tulppo.	Miner	Killed by fall of rock.
2	" " ..	" 15	S. Stephenson.	Shoveller ...	" "
3	" " ..	" 15	Samuel Joki...	Miner	" "
4	No. 2 Knob Hill, Phoenix	" 23	Vernon Hill...	Brakeman ..	Killed by an ore train on surface.
5	Old Ironsides, "	Mar. 21	Jno. Rundquist	Mucker-boss.	Leg crushed by bumper of locomotive.
6	" "	April 3	N. McRitchie..	"	Killed in chute by loose ore.
7	Le Roi, Rossland	" 10	R. A. Tees....	Timberman .	Slightly cut on head by falling rock.
8	" "	" 14	Joe Colistro...	Shoveller .-.	Back slightly bruised by falling rock.
9	" "	" 17	Fred Girard...	Machine-man	Feet badly bruised by falling timber.
10	" "	" 27	John Duncan..	Miner	Finger cut off in cogs of hoist.
11	Josie No. 2, Rossland...	May 23	H. F. Bennett.	Machine-man	Falling off ladder.
12	Le Roi, " ..	" 24	J. Shominski..	Miner	Leg broken by powder exploding in the muck.
13	" " ..	" 24	Stephen Walsh	Shoveller....	Killed by picking into unexploded powder in the muck.
14	" " ..	" 24	Leo Handabeck	"	Leg crushed by rock in chute.
15	Old Ironsides, Phoenix..	June 27	Frank Loster..	Miner	Killed by fall of rock.
16	" " . .	July 17	Jas. McGregor.	Mucker	Killed in chute by fall of loose ore.
17	Eva, Camborne	Aug. 6	James Little ..	Assistant [timberman	Killed in raise by fall of rock.
18	Le Roi, Rossland	" 19	A. McCleland .	Miner	Leg broken by fall of machine.
19	" "	" 19	R. Buchanan..	Miner	Wind-pipe ruptured by falling machine
20	War Eagle, "	Sept. 2	Michael Kirby.	Timberman..	Leg broken by falling rock.
21	Centre Star, "	" 21	Walter Preston	Pumpman ..	Thigh injured by falling down ladder.
22	Nickel Plate, Hedley...	Nov. 17	Jas. McCauly..	Miner	Killed on top of chute, on surface, by log rolling down mountain side.
23	War Eagle, Rossland...	Dec. 2	L. Gimeqliano.	Trammer...	Small bone of ankle broken by piece of loose ore rolling down muck pile.
24	" " ...	" 14	Antoni Ritelli .	Skip-tender .	Killed in shaft.
25	Centre Star, " ...	" 16	J. S. Ingram ..	Powder-ten- [der	Killed by explosion in thawer.
26	St Eugene, Moyie	May 25	William Tope .	Shoveller ...	Leg broken by falling into chute.
27	" "	" 28	Cormac Fox...	Mucker.....	Thigh broken by boulder rolling down muck pile.
28	" "	July 5	John Shea.....	Miner	Leg broken below the knee while picking down loose rock.

No.	Mine.	Date.	Name.	Occupation.	Details.
29	St. Eugene, Moyie.....	Aug. 11	F. W. Smith..	Mucker.....	Killed in trying to free muck lodged at mouth of chute. Carried down chute and skull fractured.
30	" "	Dec. 16	William Tyre.	Miner	Leg broken.
31	Britannia Mine (New Westminster).....	Aug. 3	K. McCauley..	"	Arm broken and otherwise seriously injured by fall of ore in tunnel.

Tabulated List of Accidents in Metalliferous Mines, 1905.

	Cause of Accident.	Extent of Injury.			Total.
		Fatal.	Serious.	Slight.	
A	Blasting	0	0	0	0
B	Defective powder	0	0	0	0
C	Drilling into old holes containing powder	0	0	0	0
D	Powder in muck	1	1	0	2
E	Shafts and cages, accidents connected with	0	0	0	0
F	Falling down shafts or winzes	2	0	1	3
G	Falling down chutes	1	0	1	2
H	Mine cars	0	0	0	0
I	Rock falling in stopes, levels, etc	5	2	2	9
J	Rock falling down chutes or openings	2	2	1	5
K	Timbering	0	1	1	2
L	Miscellaneous, underground	0	2	2	4
M	Surface	3	1	0	4
	Totals	14	9	8	31
Accidents for each 100,000 tons ore mined		0.82	0.53	0.47	1.82
Accidents for each 1,000 men employed		3.89	2.50	2.22	8.61

COAL MINING IN BRITISH COLUMBIA.

Although coal exists in a number of places widely scattered over the Province of British Columbia, the only coal fields actually under operation and producing coal are collieries on Vancouver Island, operated by the Western Fuel Co. and the Wellington Colliery Co., and in the extreme south-eastern part of the Province three collieries, all owned and operated by the Crow's Nest Pass Coal Co. The Vancouver Island Collieries, even with their present development, are more than able to supply the markets at present available, their output being thus limited. On the other hand, the Crow's Nest Pass Collieries appear to have a constantly increasing market, the limiting factors in their output being the present development of the properties, inadequate railway facilities and the competition of similar mines just across the British Columbia boundary in Alberta.

The gross amount of coal mined in the Province during the year 1905 was 1,825,832 tons (2,240 lbs.), an increase over the preceding year of 140,134 tons. A portion of this coal was manufactured into coke, of which there was some 271,785 tons produced.

The distribution of this output of coal and coke is shown in the following table:—

COAL AND COKE PRODUCED, EXPORTED, ETC., BY PROVINCE, 1905.

SALES AND OUTPUT FOR YEAR.	COAL.				COKE.			
(Tons of 2,240 lbs.)	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
Sold for consumption in Canada	529,271				150,454			
" export to U. S.	673,700				117,637			
" " to other countries								
Total sales			1,202,971				268,091	
Used in making Coke	441,520							
Used under colliery boilers, etc.	178,334							
Total for colliery use			619,854					
Retailed locally			3,321					
			1,826,146					
Stocks on hand first of year	3,528				9,534			
" last of year	3,214				13,228			
Difference taken from stock during year			314		added to		3,694	
Output of collieries for year			1,825,832				271,785	

Number of Hands Employed, Daily Wages Paid, &c.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.
Supervision and clerical assistance	83	$7 62	57	$4 50	140	$6 06
Whites—Miners	1,445	4 70	.....	.....	1,445	4 70
Miners' helpers	507	2 25	.....	.....	507	2 25
Labourers	624	2 75	368	2 60	992	2 67
Mechanics and skilled labour	75	2 87	311	3 60	386	3 23
Boys	140	1 50	53	1 40	193	1 45
Japanese	102	1 37	18	1 12	120	1 24
Chinese	151	1 37	473	1 60	624	1 48
Totals	3,127	.....	1,280	.....	4,407	.....

Of the coal fields under development and awaiting the advent of railway connections, the Nicola coal field has received the most attention and development, probably due largely to the fact that the railway from Spence's Bridge into the coal field—a branch of the Canadian Pacific Railway—is almost an accomplished fact. This coal field was examined by Dr. R. W. Ells, of the Canadian Geological Survey, who has for many years been entrusted with the investigation of coal formations for the survey. Dr. Ells' report was published in the Summary Report of the Geological Survey for 1904, from which report copious extracts are reprinted in this Report on pages 196 *et seq.*

The Princeton coal deposits, which are more lignitic in character, have received some investigation, but no material development.

No further development has been heard of in the coal fields of the Upper Thompson river, or that in the vicinity of Kamloops.

In the Flathead District of South-East Kootenay prospecting for both coal and coal-oil has been carried on, but with what success is not known.

On the Elk river, above Michel creek, and on the tributaries of the former, extensive coal fields, with excellent coal, have been proved, and have this past year been further explored, but as yet no steps have been taken for the commercial opening up of these fields, chiefly for the reason that there exists, nearer present lines of communication, such abundant supplies of coal as to supply all present demands.

The Crow's Nest Pass Coal Co. about the end of the year discontinued mining operations at its Carbonado colliery, considering it more profitable to confine its work to the mines at Coal Creek and Michel.

The coal exposures on the Telkwa, a tributary of the Bulkley, some 70 miles east of Hazelton, on the Skeena river, will be found described by the Provincial Mineralogist on pages 117 *et seq.* of this Report.

The coal fields of the Upper Skeena, about 150 miles above Hazelton were surveyed this past season, but no development was accomplished. This coal is reported by Mr. McEvoy, late of the Geological Survey and now with the Crow's Nest Pass Coal Co., as being semi-anthracite, existing in large horizontal beds.

The coal areas known to exist in the valley of the Peace river to the east of the Rockies, but in British Columbia, are still covered by a "reserve" existing since Confederation, and this is a bar to any prospecting or development of the field.

VANCOUVER ISLAND COLLIERIES.

The gross output of the Vancouver Island Collieries for the year 1905 was 993,899 tons of coal mined and 314 tons taken from stock, making in all 994,213 tons (2,240 lbs.). Of this gross amount, 880,030 tons were sold as coal, 142,491 tons were used under Co.'s boilers, etc., while 43,692 tons were used for making coke, of which there was produced 15,660 tons (2,240 lbs.). Of this coke produced, 9,710 tons were sold and 5,950 tons were added to stock. While the gross output of coal is this year some 29,114 tons less than it was in 1904, the amount of coal sold in 1905 is 23,861 tons greater than in the preceding year. The California market still absorbs over 50 % of the coal output of our Coast Collieries, while the establishment of copper-smelting works in Alaska has opened up a new market for the coke product.

The following table gives an aggregate summary of the output, etc., for the Vancouver Island and Coast Inspection District, as is permitted by section 3 of "Coal Mines Regulation Act." The returns for the individual mines, however, cannot be given without the permission of the individual, as such is prohibited by the same section, and this permission has been refused by both the producing companies.

AGGREGATE SUMMARY OF RETURNS FROM VANCOUVER ISLAND COLLIERIES FOR THE YEAR 1905.

	Coal.		Coke.	
	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	380,332		5,410	
" export to United States	427,698		4,300	
" " other Countries				
Total sales		808,030		9,710
Used in making Coke	43,692			
" under Colliery boilers	142,491			
Total for Colliery use		186,183		
		994,213		
Stock on hand first of year	3,528		7,278	
" last of year	3,214		13,228	
Difference taken from stock during year		314	added to	5,950
Output of Collieries for year 1905		993,899		15,660

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC., VANCOUVER ISLAND.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.
Supervision and Clerical Assistance	46	$7 62	39	$4 50	85	$6 06
Whites—Miners	910	4 70			910	4 70
Miners' helpers	349	2 25			349	2 25
Labourers	411	2 75	67	2 60	478	2 67
Mechanics and skilled labour	24	2 87	188	3 60	212	3 23
Boys	119	1 50	40	1 40	159	1 45
Japanese	102	1 37	18	1 12	120	1 24
Chinese	151	1 37	453	1 60	604	1 48
Indians	1				1	
Totals	2,113		805		2,918	

INSPECTION OF COAL MINES, 1905.

VANCOUVER ISLAND AND COAST INSPECTION DISTRICT.

Report of Arch. Dick, Inspector.

The collieries operating during the year were :—

Nanaimo : Western Fuel Company—No. 1 shaft, Protection Island shaft, No. 4 Northfield mine.

Extension : Wellington Colliery Company—Nos. 1, 2 and 3 mines, all worked from what is known as the No. 1 tunnel.

Cumberland : Nos. 4 and 7 slopes and Nos. 5 and 6 shafts.

Western Fuel Company.

(This Company has refused permission to publish its Official Returns.)

The Western Fuel Company has been working the following mines during the year, during the first half of the year, under the superintendency of Mr. Thomas Russell, and during the latter half under that of Mr. Thos. R. Stockett as general manager and Mr. Thos. Graham as superintendent.

No. 1 Shaft, Esplanade, Nanaimo.

Mr. Thomas Mills, Manager.

The most productive district in this mine is known as No. 1 North Level. Work is mostly confined to the extraction of pillars from the upper sections of what is known as Kileen, Spear's and Lamb's inclines. The 0 and No. 2 inclines districts are worked on the pillar and stall system. To the south of the main slope, known as the Diagonal slope, and No. 7 South Level, no coal has been mined since the 30th June. This was a district which gave employment to a great number of men and produced a large output of coal. The manager is working a large number of men in this division, putting it in good shape, and it will soon be in order to take out coal. In connection with the above No. 1 North Level there is a rock tunnel into the lower seam, which is 60 feet lower than the seam in the level above referred to. The coal in this lower seam is very hard and of very good quality, but is somewhat thinner than the company would like it to have been. This is being worked on the long-wall system.

Protection Island Mine.

Mr. Thomas Mills, Manager; Mr. Charles Graham, Overman.

This is now a continuation of No. 1 Mine, all the coal going out at No. 1 shaft, but since the 1st October all the men working in what is known as Protection are let down and hoisted up Protection shaft.

The operations here are confined to the extraction of pillars in the upper seam. The lower seam is being very extensively opened out on the long-wall system, for which it seems to be well adapted. This district is connected by a rock tunnel from No. 3 level, which is the

highest point of the working, and also by a rock tunnel from No. 5 Level. The air going down the slope in the upper seam to No. 5 Level goes in here and passes up through all the working face of the long-wall. This seam produces splendid coal of very superior quality.

No. 4 Northfield Mine (Nanaimo Colliery).

Manager, Mr. George Wilkinson.

Reference has been made to this mine in a previous report, and as it is a new mine, and likely to be very productive, I think it will not be out of place to give a full account of what has been done here.

The mine is opened out by two slopes driven parallel to each other, the one being the travelling road, where all the workmen and animals go in and come out, and the other, known as the main slope, being where all the coal comes up. At the top of this slope there is a shaft 60 feet deep from the surface, at the bottom of which there is a very extensive landing for the cars coming up the slope, where they are put on to the cages and hoisted to the surface. This slope is now down 1,400 yards from the shaft bottom, with six levels or landings, three to each side. The first turns off to the right, 2,000 feet down. In this district there are twelve places 36 feet wide, all of which are worked on one straight face, long-wall. The 2nd level to the right turns off 2,500 feet from the shaft. Here there are six places working 36 feet wide. This also is a straight long-wall face. No. 3, to the right, is turned off from the slope 3,000 feet from the shaft, this being the bottom, where the endless rope turns. In this division there are eleven places 36 feet wide, all of which are on one face, worked on the long-wall system. On the left side the works are similar to those described on the right of the slope, with sidings at each landing for holding cars for the operation of the endless rope. This slope is 1,000 feet in length from the shaft to the bull-wheel, and is laid with two tracks, three feet gauge with three feet between the tracks, and rails of 40 lbs. to the yard. The cars are attached to the rope about 70 feet apart by Smallman patent grips, loaded cars going up when the empty cars are coming down. Safety blocks are on the "full" track 30 feet apart, but where the grade gets somewhat heavy they have been put in 10 feet apart. The "empty" track is fitted with a runaway switch 50 feet from the top, so that if the gripper misses the grip on the car the man on top pulls the lever, which prevents the car from going down the slope. This slope is well timbered, and in places where there would not be sufficient height by putting in timber heavy steel rails are used.

This shaft bottom is lighted up by eighteen 16-candle-power electric lights. Taking the slope as a whole there is a 16-candle-power light every 30 feet, with six extra lights on every landing.

The ventilation is good. The motive power is a "Murphy" fan 12 inches in diameter, running about 125 revolutions a minute, and passing on an average 36,000 cubic feet of air a minute. The return airway is the travelling road, which is also lighted for a long distance with electricity.

The coal mined here is very good, hard and bright, similar to that mentioned as the lower seam in No. 1 Shaft and Protection mines. It varies in thickness from 2 to 3½ feet, and is worked on the long-wall system.

The coal is here nearly all undermined by coal cutting machines, of which there are 11 in all, 2 "Rigg-Meiklejohn" circular disc machines, and 9 "Champion" coal cutters, operated by compressed air. The circular machines have a cutting capacity of about 600 square feet a day of 8 hours. The coal cutters have each a capacity of about 200 square feet a day of 8 hours.

This mine is now connected with the old Fitzwilliam slope, and has been cleaned and timbered, making another excellent way of exit. Here, in the upper seam, they have only recently struck fine coal, and a series of bores put down on Newcastle island showed good prospects.

On the surface there is an excellent up-to-date plant. The pithead is about 70 feet high, and after the coal is hoisted to the surface it leaves the cage and runs on a 1 per cent. grade to the tipple building, where there is a large 3-car tipple. After being dumped it runs on a 2 per cent. grade to a back switch, and then runs to an elevator which hoists it to a point where the track has a grade down to the cage of 1 per cent. Once the car is liberated it runs back to the cage. Practically speaking, the car is taken off the cage, dumped, and returned again to the cage without manual labour, with the exception of the man at the shaft top and the one at the tipple.

The coal, after being dumped, passes on to a shaking screen, which screens out the smaller size, and thence to a travelling table where rock and other impurities are picked out. From the tables the coal is carried up by a system of conveyors to the bunkers, which have a capacity of 3,000 tons each. There are two conveyors running to the loading wharf, one from the tipple and another from the end of the bunkers, so that ships may be loaded in the least possible time and to avoid breakage of the coal by handling.

There is a large coal-washing plant with a capacity of 40 tons of small coal an hour. Power for the coal-cutting machines and pumps is furnished by two double air-compressors.

All this machinery is worked by three sets of twin engines, with four large boilers, and was supplied by the Chicago Link Belt Company. There are also in operation hoisting machinery, endless rope, and electric plant.

Wellington Colliery Company, Limited.

(This Company has refused authority to publish its Official Returns.)

The Wellington Colliery Company, Limited, has been operating the following mines during the year 1905, under the general management of F. D. Little, M. E. :—

The Wellington Colliery, in Cranberry District (Extension); Andrew Bryden, Manager.

The Wellington Colliery, in Comox District; John Matthews, Manager.

Extension.

No. 1 or Tunnel Mine.

Mr. William Jones, Overman.

The developing drivages in this mine have, during the past year, been confined to the slope and to the dip of the east level or motor road, with two levels to the east off this slope.

The new motor mentioned in a previous report is not yet complete, as there were unexpected obstacles which had to be overcome. In the original working of this mine, only about one-third of the coal was taken out, two-thirds being left in pillars and top coal (except in the long wall). Now they are extracting those pillars, with a regular system, so that none of the coal may be lost. In connection with this mine there are four openings out to the surface, three of which are used every day, and by which men and mules go in and out, as well as all the coal. The fourth opening is the fan shaft or return airway.

No. 2 Mine.

Mr. Alexander Shaw, Overman.

This mine is now being worked to the dip of No. 4 level by what is known as the slope, and in the east side by what is known as the new slope. Both of the above sections are developing new ground, which has every prospect of being a very extensive coal district. At one time this district gave off considerable inflammable gas, but now there is very little seen, although the same precautions are used as before. This mine has also got four direct ways out, three of which are used all the time, both for coming in and going out of the mine. The fourth is the fan shaft.

No. 3 Mine.

Mr. James Sharp, Overman.

This is the most westerly mine of the Wellington Colliery Company, and is very extensive. The winning drivages are confined at present to the No. 1 level, and levels off No. 3 slope. Both stall-work and extraction or pillars are in operation. This mine has also four roadways to the outside, three of which are always open for both men and mules to go in and come out. By one of the above roads much of the timber used in the upper workings is brought in. The fourth outlet is the fan shaft.

The above three mines are all connected, and the coal all comes out at the same outlet, known as No. 1 tunnel. Below the level, however, or to the dip of the above tunnel, all the mines are worked separately, with a large barrier between them, so that in case of a fire, and the mines having to be filled with water, only the one division or mine would be affected. The three mines, collectively, are under the supervision of Mr. Andrew Bryden, the certificated manager, and all are well ventilated and timbered.

UNION.

No. 4 Mine, No. 1 Slope.

Richard Short, Overman, (and later) David Nellist, Overman.

This slope is down 2,500 yards, with drivage into new ground to both the east and west sides. To the east side of this slope there is what is known as the Diagonal slope. During the past year much of the work has been extracting pillars from the 11, 12 and 13 east levels. In this slope they have now got the water pumped out and are working at the face of the 15 east level, and in all the working stalls off the same.

On the west side of this slope the most of the mining is off No. 11 west level, with No. 9 level the return airway and travelling road. In addition to the above, they have now got to work in the No. 15 west level, and from all appearances, 12 and 13 west levels will soon be in working order.

The ventilation is good. On the return airway, air velocity, $750 \times 50 = 37{,}500$ cubic feet of air, in which current of air no trace of gas can be detected, and gas has not been reported in the above district during the past year.

No. 2. Slope.

This slope turns off No. 1 a short distance down, after it goes under cover, and is, at the face, the lowest workings in No. 4 mine. It is badly caved and there is still much water to pump. The caved rock interferes with the getting in of timber, and the water renders difficult the handling of the rock, so that between the two it is hard to make headway.

From the east side of this slope they are working in 8, 9, 10 and 11 levels, most of which work is at pillars. On the west side a few men are working in 8, 9 and 10 levels; all of them are extracting pillars. Ventilation very good.

No. 3. Slope.

There has been very little mining done here during the past year, but there is a large district of pillars yet to be extracted from No. 6 level up. This work is being reserved for some other time.

Ventilation of this mine is summed up as follows:—

Intake, main slope, velocity,	$850 \times 84 = 71,400$	cubic feet.
" travelling road, "	$850 \times 50 = 42,500$	"
Total.....	113,500	"

Airway return from both sides—

East side; air velocity,.....	$700 \times 90 = 63,000$	cubic feet.
West side; "	$750 \times 50 = 37,500$	"
Total.....	100,500	"

No. 5 Shaft.

John Kesley, Overman.

The working of this mine has been on the long-wall system. It has been found impossible, on account of "faults," to keep the working faces in line, and there is thick rock between two layers of coal. Much of the rock and débris has to be sent out, as it was in such quantity as to make it impossible to "gob" it in all the old works. The districts in this shaft, lower seam, are known as No. 1 and No. 2 inclines. There is here a long slope to the dip, to prospect for more regular coal.

The ventilation is very good—

East side; air velocity.....	$390 \times 50 = 19,500$	cubic feet.
West side; "	$260 \times 65 = 16,900$	"

There are only 40 men employed here.

No. 5 Shaft, Upper Seam.

This seam is about 240 feet from the surface and 350 from the bottom of the shaft, and is worked on the pillar and stall system. The workings are fully 6 feet between the roof and floor, and the coal is mixed with considerable rock. The roof is a very hard sandstone. The ventilation is very good. Air velocity, $190 \times 50 = 9,500$ cubic feet a minute. There are only 18 men employed here, as the number is restricted to 20 under section 28 of the "Coal Mines Regulation Act."

No. 6 Shaft, Upper Seam.

This shaft is about one mile from No. 5 in a southerly direction. All the mining here is on the pillar and stall system. This is the continuation of the same seam as the upper seam in No. 5. The coal is very hard and has almost all to be blasted without being undermined. Here, as in some parts of Nanaimo Colliery, mining machines have been used with satisfactory results; making more lump coal and less slack, while less powder is required, and I am told that the cost of mining is reduced. Ventilation is very good. Air velocity at regulator $950 \times 27 = 25,650$ cubic feet a minute. In this mine there were 19 men and 3 mules. This mine is also restricted by section 28 of the "Coal Mines Regulation Act." The mine is connected by pipes with the Cumberland Water Company's system, and the water is used at any time that it is thought necessary to damp the mine.

This upper seam is worked from an open shaft, the coal being 352 feet from the bottom, but there are a high iron gate, safety-bar and safety-catch, which, if properly used, render accidents impossible. In addition to the above, there is a good road from the one side of the shaft to the other, so that when passing to and fro it is not necessary to go near the shaft.

No. 6, Lower Seam.

There was some work done here in the early part of the year, but nothing is now being done except pumping the water and keeping the roadway between Nos. 5 and 6 shafts in good order.

No. 7 Slope.

David Walker, Overman.

This mine is about four miles in a north-westerly direction from No. 1 shaft and about two miles from No. 4 mine. A standard gauge side-track from the company's railway system passes a short distance north of No. 5 mine. This slope is now down 800 yards on a gentle incline. Anthracite coal was reported to have been found here. The coal is of very good quality and almost free from impurities. The faulting of the seams has proved an obstacle, and at present the output of coal is not large, considering the depth of the workings. On both sides of the slope, however, work is being extensively pushed, and a greater output may be confidently expected in the future.

Ventilation is very good. Air velocity, $240 \times 84 = 20{,}160$ cubic feet a minute, for an average number of 31 men and 2 mules.

No 2 slope is only a short distance from No. 1, and leaves at an angle which widens out as it goes down. There has as yet been no coal taken out here.

Between the two slopes there is an upcast shaft where a foundation is now being put in for a large ventilating fan. From prospects obtained from three bore-holes put down lately in this district, a large output for this mine is predicted.

Here the company has put in a tippling plant and picking table, so that any rock in the coal can be taken out.

PROSECUTIONS.

I have to report that on the 5th day of April I had the following cases tried at Ladysmith by George Thomson, Esq., Magistrate, viz. :—

Andrew Bryden, manager of Extension mines of the Wellington Colliery Company, for the violation of section 31, sub-section (2), of the "Coal Mines Regulation Act," in that he did employ one William Jones as overman, who acted in the above official capacity, not having a certificate as called for under the above Act. The case was proven, when Mr. Bryden was fined.

William Jones, for working and acting as overman, not having a certificate as required by the above sections of the "Coal Mines Regulation Act," was also fined.

On June 7th Andrew Bryden, manager of Extension mine, of the Wellington Colliery Company, was up before Robert Allan and Murdoch Matheson, J. P.'s., at Ladysmith, in that he did violate section 23B of the "Coal Mines Regulation Act," by allowing Harry Carrol to remain underground in the Extension tunnel of the Wellington Colliery for a period of longer than eight hours, thereby violating the aforesaid section 23B of the "Coal Mines Regulation Act." H. Carrol was also brought up for being longer in the Extension tunnel than eight hours, being a violation of section 23B. Both cases were dismissed, the Court not having jurisdiction.

On October 24th I gave information before James Abrams, Stipendiary Magistrate at Cumberland, against Thomas Bickle, John Zanini, and Anthon Micola, in that the above three men did violate section 23B of the "Coal Mines Regulation Act," by remaining underground for a longer period than eight hours in one day in the No. 4 mine, Union, of the Wellington Colliery Company. Information was sworn against John Matthew in each of the above cases, in that he, being manager, did allow the above men to be in No. 4 mine as above for a longer period than eight hours, being a violation of section 23B of the "Coal Mines Regulation Act." The cases against Bickle and Micola, and the corresponding case against J. Matthews, were dismissed. The case against John Zanini and the case against J. Matthews were sustained, and both were fined.

EAST KOOTENAY INSPECTION DISTRICT.

Report of Thomas Morgan, Inspector.

I have the honour, as Inspector of Coal Mines for the East Kootenay District, to submit my annual report for the year 1905. The only company actually producing coal in this district, as yet, is the Crow's Nest Pass Coal Co., Ltd., but this company is operating three separate and distinct collieries.

Crow's Nest Pass Coal Co., Ltd.

Officers.	*Address.*
Hon. Geo. A. Cox, President,	Toronto, Ont.
Robert Jaffray, Vice-President,	"
G. G. S. Lindsey, Secretary and Managing Director,	"
E. R. Wood, Treasurer,	"
R. G. Drinnan, General Superintendent,	Fernie, B. C.

Capital of the Company, $3,500,000.

The above company is now operating the following extensive collieries on the western slope of the Rocky mountains in the East Kootenay District, viz. :—

Coal Creek Collieries, situated on Coal creek, about five miles from the town of Fernie, on a branch railway to the mines.

Michel Collieries, situated on both sides of Michel creek, on the line of the C. P. Railway, being 23 miles in a north-easterly direction from Fernie.

Carbonado Collieries, situated on Morrissey creek and connected with the C. P. Railway and the Great Northern Railway at Morrissey. The colliery is about 14 miles from Fernie, by rail, in a south-easterly direction.

The total output of the Company's collieries for the past year was 831,933 tons. Of this 397,828 tons were used in the manufacture of coke, yielding 256,125 tons, and with 2,256 tons taken from stock, makes the total coke sales 258,381 tons, of which 145,044 tons were sold for consumption in Canada, and 113,337 tons were exported to the United States.

The coal exported to the United States amounted to 246,002 tons, while 148,939 tons were sold for consumption in Canada.

The amount and disposition of this combined output is more fully shown in the following table:—

RETURNS FROM CROW'S NEST PASS COAL COMPANY'S COLLIERIES.

SALES AND OUTPUT FOR YEAR.	COAL.				COKE.			
(Tons of 2,240 lbs.)	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
Sold for consumption in Canada	148,939	....			145,044	....		
" export to United States	246,002	....			113,337	....		
" " to other countries								
Total Sales			394,941				258,381	—
Used in making Coke	397,828	....						
" under Colliery Boilers	35,843	....						
Total for Colliery Use			433,671					
Retailed locally			3,321					
Stocks on hand first of year					2,256			
" last of year					*Nil.*			
Difference taken from Stock during year							2,256	
Output of Colliery for Year			831,933	—			256,125	—

NUMBER OF MEN EMPLOYED IN CROW'S NEST PASS COMPANY'S COLLIERIES.

CHARACTER OF LABOUR.	NUMBER EMPLOYED.		TOTAL NUMBER EMPLOYED.
	Underground.	Surface.	
Supervision and clerical assistance	37	18	55
Whites—Miners	535		535
Miners' helpers	158		158
Labourers	213	301	514
Mechanics and skilled labourers	51	123	174
Boys	21	13	34
Japanese			
Chinese		20	20
Indians			
Total	1,015	475	1,490

COAL CREEK COLLIERY.

Andrew Colville, Manager.

This colliery is situated about five miles in an easterly direction from Fernie, where No. 1, No. 9 and No. 5 tunnels, on the north side of Coal creek, and No. 2 on the south side, have been working.

No. 1 Mine.

David Martin, Overman.

Situated on the north side of Coal creek; worked by pillar and stall system. Slope district alone working, as it is too expensive to keep it open, owing to the roads heaving and the roof and sides squeezing and breaking the timbers all over the incline district. On my

inspection of the Slope district, December 7th, I found a little gas over the timbers in No. 3 stall on the south side of the slope. All the balance of the mine was clear and the mine well timbered all through. In making a test of the ventilation I found 36,000 cubic feet of air per minute passing through this district for the use of 70 men and 6 horses. Size of fan, 4 feet 10 inches by 14 feet, with a speed of 140 revolutions a minute, and 2-inch water gauge.

Firemen—Harry Dunlap, Andrew Bartley and George Holmes.

No. 2 Mine.

John McClimont, Overman.

Situated on the south side of Coal creek. This mine is worked by pillar and stall, with extraction of pillars. On making my inspection of this mine, December 8th and 9th, I found a little gas in No. 2 stall in the right counter to main entry, over the timbers, where the air could not get to it to drive it out. Balance of mine in good order, well timbered and free of gas. In making a test of the ventilation, in what is called No. 2 district, I found, for the use of 75 men, 33,000 cubic feet of air a minute going through to keep it pure and wholesome for those employed. There are two splits of air in this district.

In No. 3 district, for the use of 85 men, in two splits of air, there was 54,250 cubic feet a minute. There were 12,000 cubic feet a minute going up the No. 1 incline district to keep clear the old workings, in which no one works at present. Also 4,500 cubic feet per minute going into No. 3 mine to keep it clear. This mine has not worked since the pit-head was burned down in March last. Total air at fan shaft was 150,000 cubic feet a minute, leaving 46,250 cubic feet a minute for leakage for doors and old workings. Found by making a test in the return air course one-half of one per cent. gas.

Firemen—Robert Pengelly, Evan John, Harry H. Miard and Thos. H. William.

No. 5 Mine.

John Hunt, Overman.

Situated on the north side of Coal creek; worked by pillar and stall and extraction of pillars. Inspected December 5th, and found the mine clear of gas and well ventilated and well timbered. Ventilation test showed 22,500 cubic feet a minute for the use of 61 men and six horses. This mine is worked exclusively with locked safety lamps and very little blasting is done. Percentage of gas in the main return, taken by the Pelier gas-testing lamp, was one-eighth of one per cent. Size of fan, 3 feet by 10 feet. The level is in 2,500 feet.

Firemen—John Dobie, A. W. Courtenay and David James.

No. 9 Mine.

David Martin, Overman.

This mine is on the north side of Coal creek, and is worked on the long-wall system. On my inspection, December 6th, I found this mine in the best of order, and through the stalls and roads all well timbered and cogged. Ventilation good; in the slope district, 21,100 cubic feet a minute for the use of 28 men and four horses. This air returns to the fan of No. 1 mine.

Firemen—Daniel Elliot, Geo. O'Brien, Jas. Finlayson and Adam Watson.

In the Incline district I found, for the use of 50 men and seven horses, 27,600 cubic feet a minute. This air goes to the fan erected for No. 9 mine. Total air at the mouth of tunnel was 50,000 cubic feet a minute, leaving a balance for leakage of 1,280 cubic feet a minute for doors and stoppings. This fan is of the Guibal pattern; size, 3 feet by 10 feet. The per centage of gas in the main return was one-eighth of one per cent.

The following are the official returns of the Coal Creek Colliery for the year ending 31st December, 1905:—

SALES AND OUTPUT FOR YEAR.	COAL.				COKE.			
(Tons of 2,240 lbs.)	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
Sold for consumption in Canada	38,068	10			46,047	03		
" export to U. S.	177,860				78,282	16		
" " to other Countries								
Total Sales			215,928	10			124,329	19
Used in making Coke	189,016	01						
" under Colliery Boilers, &c	19,266	09						
Total for Colliery use			208,282	10				
Retail coal			1,282	03				
Stock on hand first of year					737			
" last of year								
Difference taken from stock during year					737		737	
Output of Colliery for year			425,493	03			123,592	19

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, &C.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.
Supervision and clerical assistance	20		8		28	
Whites—Miners	377				377	
Miners' helpers						
Labourers	93		130		223	
Mechanics & skilled labour	23		65		88	
Boys	17		7		24	
Totals	530		210		740	

Description and length of tramway, plant, etc.—On March 11th, 1905, the tipple at this colliery was completely destroyed by fire. It has been replaced by a steel structure 840 feet long and 35 feet high, having all the latest machinery for the dumping, screening, sorting and loading of coal.

We have also installed three Erie City return tubular boilers during the year 1905.

A new office and warehouse building was also erected at this colliery. This structure is built of hollow concrete blocks and is thoroughly fire-proof in every detail.

The Minister of Mines is hereby authorised to publish these Returns.

ROBERT G. DRINNAN.

MICHEL COLLIERY.

Arthur R. Wilson, Manager.

This colliery is situated 24 miles in an easterly direction from Fernie, where No. 6 and No. 8 mines are working at the present time.

No. 8 Mine.

Thomas Corkill, Overman.

This tunnel is in about 2,000 yards and is an extensive mine. The work is pillar and stall and extraction of pillars. On inspecting this mine December 12th and 13th, I found a little gas in Nos. 13, 14, 15 and 19 stalls, over the timbers, in the main east level district, where the air could not get to it to sweep it out. There is no blasting done in this district. Safety lamps only are used. The balance of the mine was clear of gas and well timbered, in good order and well ventilated. I may say that there is some blasting done in No. 2 incline district, and in the main incline, but it is done at night, after the shift is over. The powder used is manufactured by the Roburite Explosive Company, Ltd., Gathurst, Wigan—"negro" powder—and is a "permitted explosive' which makes no flame.

In making a test of the air, I found in the main east level district, for the use of 54 men and 3 horses, 33,600 cubic feet a minute going through this district to keep the places clear and wholesome for the men employed therein. For No. 2 incline district, 33,000 cubic feet a minute for the use of 45 men and 5 horses. For the main incline district, 28,800 cubic feet a minute, for the use of 42 men and 3 horses. Total air at fan shaft was 120,000 cubic feet a minute, leaving 25,200 cubic feet a minute for leakage through doors and stoppings and also for the old workings.

Firemen—Robert Middleton, William Eccleston and William Austin. Shot-lighter—Joseph Thomas.

No. 6 Mine.

William Powell, Overman.

This mine is situated on the south-west side of Michel creek. It is worked by pillar and stall and extraction of pillars. On my inspection I found this mine clear of gas, well timbered all through and well ventilated. For the use of 35 men and 1 horse there were 18,000 cubic feet of air a minute going through the workings, to keep the mine clear and healthy for those employed. Fan, 3 feet x 10 feet, and of Guibal pattern.

Fireman and shot-lighter for this mine is Evan Evans.

The following are the official returns of the Michel Colliery for the year ending December 31st, 1905:—

Sales and Output for Year.	Coal.				Coke.			
(Tons of 2,240 lbs.)	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
Sold for consumption in Canada	102,973	3			98,376	19		
" export to U. S	1,334	10			27,847	11		
" " to other Countries								
Total Sales			104,307	13			126,224	10
Used in making Coke	194,463	16						
" under Colliery Boilers, &c	9,110	19						
Total for Colliery Use			203,574	15				
Retail coal			1,623	7				
Stocks on hand first of year					1,519	00		
" last of year								
Difference taken from stock during year					1,519	00	1,519	00
Output of Colliery for Year.			309,505	15			124,705	10

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.
Supervision and clerical assistance	8		7		15	
Whites—Miners	100				100	
Miners' helpers	100				100	
Labourers	85		142		227	
Mechanics and skilled labour	22		40		62	
Boys	4		2		6	
Chinese			20		20	
Totals, mines and ovens	319		211		530	

Description and length of tramway, plant, etc.—The company installed this year a Rand high-stage air compressor and two compressed air locomotives for hauling coal out of No. 8 mine.

The Minister of Mines is hereby authorised to publish these returns.

ROBERT G. DRINNAN.

CARBONADO COLLIERY.

Charles Simister, Manager.

This colliery is situated on Morrissey creek about 13 miles from Fernie, and during the past year Nos. 0, 3 and 6 mines have been working.

No. 3 Mine.

Elijah Heathcote, Overman.

Situated on the north side of Morrissey creek, worked by pillar and stall and extraction of pillars. On my last inspection, December 2nd, I found it clear of explosive gas, well timbered all through and the ventilation good, 36,000 cubic feet of air a minute going through the mine for the use of 45 men and 1 horse. The "Wolf" safety lamp only is used and the blasting is done after the shift is over, and nothing but "Giant" powder is used in this mine as in all the other mines in Carbonado. Size of fan, 8 feet by 16 feet, with 1½-inch water gauge.

Firemen—James Derbyshire, Frank Aspinall and Edward Bridge.

No. 6 Mine.

Norman Fraser, Overman.

Situated on the north side of Morrissey creek. Inspected December 2nd. Worked by pillar and stall system, and was only in about 100 yards when inspected. I found the mine in good order and the roof of the best kind. "Wolf" safety lamps alone are used, and are cleaned and filled by the lamp-man before they are allowed to leave the lamp station, and are again tested by the firemen before they are allowed to enter the mine. Test of air showed 12,000 cubic feet a minute going through this mine for the use of 35 men, with a fan 8 feet by 16 feet, making 25 revolutions a minute.

Firemen—John Cunliffe, Chas. Simister, and Chas. Catchpole.

No. 0 Mine.

Norman Fraser, Overman.

Situated on the north side of Morrissey creek. Inspected December 2nd. This mine is worked on the long-wall system. On my inspection on above date I found this mine in good order, well timbered and cogged. Ventilation good, 20,000 cubic feet per minute for the use of 20 men when the mine was working. The mine was idle on this day. Size of fan, 3 feet by 10 feet, going at 90 revolutions a minute. This mine is worked by safety lamps exclusively and all the blasting is done after the shift is over.

Firemen—John Cunliffe, Chas. Simister, and Chas. Catchpole.

The following are the official returns of the Carbonado Colliery for the year ending 31st December, 1905:—

Coal and Coke Produced, Exported, etc.

Sales and Output for Year.	Coal.				Coke.			
(Tons of 2,240 lbs.)	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
Sold for consumption in Canada	7,896	17	.....	....	619	11		
" export to United States	66,807	16	.....	....	7,207	05		
" " other Countries	.....	....	.....	....	.....	....		
Total sales	.....	....	74,704	13	.....	....	7,826	16
Used in making Coke	14,348	04	.....					
" under Colliery boilers, etc.	7,466	02	.....					
Total for Colliery use	.....	....	21,814	06				
Retail Coal	.....	....	415	03				
			96,934	02				
Stock on hand first of year	.....	....						
" last of year	.....	....						
Difference taken from stock during year	.....	....	.....	....				
Output of Colliery for year	.....	....	96,934	02	.....	....	7,826	16

Number of Hands Employed, Daily Wages Paid, &c.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.	No. Employed.	Average Daily Wage.
Supervision and Clerical Assistance	9	.....	3	.....	12	
Whites—Miners	58	.....	.....	.....	58	
Miners' Helpers	58	.....	.....	.....	58	
Labourers	35	.....	29	.....	64	
Mechanics and Skilled Labour	6	.....	18	.....	24	
Boys	.....	.....	4	.....	4	
Japanese / Chinese / Indians	.....	.....		.....		
Totals, Mines and Ovens	166	.....	54	.....	220	

Description of seams, tunnels, levels, shafts, etc., and number of same—No. 6 is a new mine opened in September, 1905. Coal 3 feet 6 inches thick. Description of other seams, same as last year.

The Minister of Mines is hereby authorised to publish these Returns.

ROBERT G. DRINNAN.

PROSECUTIONS UNDER "COAL MINES REGULATION ACT."

May 2nd—George O'Brian, a fireman in No. 9 mine, Coal creek, for having matches in the mine, was fined $10.

July 3rd—John Bertas, for having matches in his possession in the mine, was fined $10 or 15 days' imprisonment. This man worked in No. 3 mine, Carbonado.

ACCIDENTS IN BRITISH COLUMBIA COLLIERIES DURING 1905.

Causes of Accident and Nature of Injury.	Name of Colliery.												Total for 1905.			
	Nanaimo.			Union.			Extension.			Crow's Nest.						
	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Total.
Gas—Explosion of	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9
Fatal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Serious	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slight	...	...	2	...	...	...	...	...	3	...	...	4	...	...	9	...
Falls of Coal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
Fatal	...	...	...	1	...	...	1	...	...	...	...	...	2	...	...	...
Serious	...	2	...	...	2	...	...	2	...	...	2	...	...	8	...	...
Slight	...	...	2	...	...	1	...	...	...	...	...	...	...	...	3	...
Falls of Rock	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11
Fatal	...	...	...	3	...	...	...	...	...	1	...	...	4	...	...	...
Serious	...	2	...	...	1	...	...	1	...	...	2	...	...	6	...	...
Slight	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
Mine Cars	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20
Fatal	...	...	...	3	...	...	...	...	...	...	...	...	3	...	...	...
Serious	...	2	...	...	1	...	...	2	...	...	4	...	...	9	...	...
Slight	...	...	7	...	...	...	...	...	1	...	...	...	...	...	8	...
Shot or powder	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Fatal	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...
Serious	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...
Slight	...	...	1	...	...	2	...	...	...	...	...	...	...	...	3	...
Ropes, Hoisting or Haulage	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Fatal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Serious	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Slight	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...
Post or Timber	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Fatal	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...
Serious	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...
Slight	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Miscellaneous—Underground	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Fatal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Serious	...	1	...	...	...	...	...	1	...	...	...	...	...	2	...	...
Slight	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
Miscellaneous—Surface	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Fatal	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...
Serious	...	2	...	...	...	...	...	...	...	...	...	...	...	2	...	...
Slight	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	0	9	14	8	4	4	1	9	4	3	8	4	12	30	26	68

SUMMARY—TABLE SHEWING ACCIDENTS OCCURRING IN B. C. COLLIERIES IN TEN YEARS—1896 TO 1905.

For the year	1896.				1897.				1898.				1899.				1900.				1901.				1902.				1903.				1904.				1905.				Total for 10 years.			
Output of coal—tons.	896,222				882,854				1,135,865				1,306,324				1,590,179				1,691,557				1,641,626				1,481,913				1,685,698				1,825,832				14,138,070			
No. persons employ'd	2,753				2,433				2,988				3,780				4,178				3,974				4,011				4,264				4,453				4,407				37,241			
Nature of Injury. / Cause of Accident.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.
Explosion (cause unknown).	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	64	..	..	64	125	..	..	125	..	..	..	..	14	..	..	14	..	..	..	..	203	..	..	203
Gas explosions	1	3	8	12	..	2	2	4	2	14	3	19	3	9	18	30	..	2	22	24	2	2	12	16	1	..	8	9	21	..	16	37	7	..	8	15	..	..	9	9	37	32	106	175
Falls of coal	3	4	1	8	1	3	2	6	3	4	..	7	1	4	3	8	2	14	3	19	6	9	2	17	1	4	1	6	4	5	2	11	5	12	1	18	2	8	3	13	28	67	18	113
" rock	2	8	..	10	2	7	2	11	1	5	3	9	3	5	4	12	6	15	3	24	6	8	4	18	7	6	2	15	8	8	4	20	4	7	1	12	4	6	1	11	43	75	24	142
Mine cars	1	8	..	9	3	4	..	7	1	9	3	13	3	9	4	16	4	7	3	14	3	5	5	13	3	6	5	14	5	7	2	14	3	15	5	23	3	9	8	20	29	79	35	143
" mules	..	2	..	2	..	1	..	1	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	5
" timber	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..	..	..	1	1	2	..	2	..	2	2	..	..	2	1	2	..	3	..	2	..	2	1	2	..	3	4	11	1	16
Hoisting, ropes, &c	..	1	..	1	..	2	..	2	..	..	..	..	..	..	..	..	1	..	..	1	..	2	..	2	..	2	..	2	..	4	1	5	..	2	..	2	..	..	1	1	1	13	2	16
Powder, &c., explo'n	..	1	..	1	..	..	..	..	..	3	1	4	..	2	1	3	1	3	3	7	..	4	6	10	..	..	1	1	1	5	..	6	..	..	..	..	1	1	3	5	3	19	15	37
Shot	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	3	..	..	..	..	..	..	..	..	..	2	..	2	1	..	1	2	..	..	..	..	1	4	4	9
Underground — Miscellaneous	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	3	..	2	1	3
On surface — miscellaneous.	2	..	..	2	..	..	..	..	..	2	..	2	1	..	..	1	3	1	..	4	2	2	2	6	..	3	1	4	2	..	1	3	3	3	0	6	1	2	..	3	14	13	4	31
Fire in Mine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19	..	..	19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19	..	..	19
	9	29	9	47	6	21	6	33	7	39	10	56	11	29	30	70	17	43	38	98	102	34	31	167	139	21	18	178	42	33	26	101	37	41	16	94	12	30	26	68	382	320	210	912

DETAILED STATEMENT OF ACCIDENTS IN B. C. COLLIERIES DURING 1905.

:o:

VANCOUVER ISLAND COLLIERIES.

Reported by Archibald Dick, Inspector.

No.	Colliery.	Date.	Name.	Occupation.	Details.
1	Extension.....	Jan. 9	Walter Carter.	Miner	Leg fractured and ankle dislocated by fall of rock in No. 1 Mine.
2	Nanaimo.....	Feb. 13	Frank Green ..	"	Hand badly cut with an axe, No. 1 Shaft.
3	"	" 18	F. Brambley...	"	Compound fracture of the leg, caused by fall of coal in Protection Mine.
4	Union	" 23	A. Clarkson...	Fireboss	Killed in shaft in No. 6 Pit. Cager pushed loaded car into shaft thinking cage was there. Clarkson was descending in cage, and was struck by falling car, with above result.
5	"	" 27	A. Mygren....	Miner	Run over by loaded cars, and had three ribs fractured in No. Slope.
6	Extension....	March 4	M. Ingham....	"	Spine injured. He had a shot lighted, and thinking some one coming, ran to warn them, when shot went off injuring him as above. No. 3 Mine.
7	Nanaimo.....	" 6	J. Metcalfe...	"	Jaw broken and compound fracture of nose by fall of rock in No. 1 Shaft.
8	Union	" 6	Coon Sing.....	"	Leg broken by fall of rock in No. 5 Pit.
9	Nanaimo.....	" 11	Thos. Burns...	Mule driver...	Middle finger of left hand taked off while uncoupling cars in Protection Mine.
10	"	" 17	Thos. Mills....	Colliery Mg'r..	Slightly burned about hands and face by gas in a cross-cut off No. 7 South Level. Knowing there was gas Mr. Mills had safety lamp, but man came in with naked light which kindled the gas.
11	"	" 17	Henry Devlin .	Fireboss	Same accident ; same circumstances ; same injuries.
12	"	" 27	Geo. Hall.....	Car pusher	Finger cut off while uncoupling a car in Protection Mine.
13	Extension.....	" 18	L. Giacomo ...	Miner's helper.	Legs broken by fall of stringer which he was helping to lift.
14	Nanaimo.....	April 24	C. Killeen.....	Miner	Knee twisted by fall of coal in No. 1 Shaft.
15	"	May 2	Geo. Harrison.	"	Hand cut by fall of coal in No. 1 Shaft.
16	"	" 2	James Brunt ..	"	Arm bruised. Riding on empty car, which left the track, crushing his arm against the " rib."
17	Union	" 6	James Watson.	"	Killed by fall of rock in No. 4 Mine.
18	"	" 6	Yun Gwan Lun	Miner's helper.	Fatally injured iu same accident as above. Died May 11th.

DETAILED STATEMENT OF ACCIDENTS IN V. I. COLLIERIES DURING 1905—*Continued.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
19	Union	May 9	Thos Neilson..	Cager	Instantly killed in No. 6 Shaft, upper seam. Neilson pushed loaded car into shaft, not knowing cage was away, and fell 352 feet, with above result.
20	"	" 11	Mah Way.....	Miner's helper.	Killed by fall of rock in No. 4 Mine.
21	Nanaimo	" 11	Jos. Thompson	Miner	Compound fracture of leg, caused by fall of rock in No. 1 Shaft.
22	Extension.....	" 11	Thos. Hunter..	"	Burned about the hands and neck by the explosion of a small quantity of gas in the roof of No. 2 Mine.
23	"	" 18	John Alton ...	"	Fatally injured internally by fall of shale and coal in No. 2 Slope. Died seven hours after.
24	Nanaimo.....	" 27	W. McMillan..	"	Arm injured by coal flying after discharge of shot in Protection Mine.
25	Union	June 12	Stamima (Jap.)	"	Fatally injured by premature blast in No. 5 Pit. Lived only a few minutes.
26	"	" 16	Arthur Warren	"	Slightly injured in back by fall of coal in No. 4 Mine.
27	Extension.....	July 10	Sale Saimjo ...	"	Back and leg broken by fall of coal in No. 3 Mine.
28	Union	" 18	J. Jamieson...	"	Slightly burned on neck, face and hands by explosion of gas and powder in No. 6 Pit. He was charging a shot, when his lamp ignited gas, apparently from the hole; this exploded the powder, but Jamieson had time to escape serious injury.
29	Extension.....	" 28	John Gordon .	"	Fractured skull. Car coming up incline struck prop holding the pulley. The prop struck Gordon on the head with above result.
30	Union	Sept. 1	Wong Chong..	Miner's helper.	Fatally injured by being run over by cars while crossing the slope in No. 4 Mine. Died in hospital two hours later.
31	"	" 9	S. Tanaka.....	Miner	Found lying dead in his "stall" under large piece of coal, which had fallen on him.
32	Nanaimo.....	Oct. 24	J. H. Piper ...	Mule driver...	Fingers badly crushed under car wheels in Protection Mine.
33	Extension.....	" 21	Jas. Woodell..	" ...	Leg fractured by mule falling on him in No. 2 Mine.
34	Extension.....	Oct. 31	Robt. Simpson	Runner	Both burned about face and hands by explosion of gas in No. 2 Mine. There was a small "feeder" of gas coming out of the roof above the roadway. A curtain had been put up to carry away the gas, but had got disarranged. The boys went up with a naked light, although supplied with safety lamps, and ignited the gas, with results as above.
35	"	" 31	D. Thomas....	"	

Detailed Statement of Accidents in V. I. Collieries during 1905—*Concluded.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
36	Extension.....	Nov. 2	M. Woodburn.	Miner	Ribs broken by mine car, which upset and rolled on him, in No. 3 Mine.
37	"	" 6	Chas. McKie..	"	Leg fractured by fall of coal in No. 3 Mine.
38	Nanaimo.. ...	" 7	Wm. Richards.	"	Back slightly injured by fall of rock in Northfield Mine.
39	"	" 9	Thos. Piper ...	"	Collar-bone broken and head bruised by falling in front of a car in No. 1 Shaft.
40	"	" 10	J. D. Smith...	"	Wrist sprained by being jammed between a mine car and a prop in Northfield Mine.
41	Union	" 13	Samuel Jones..	Mule driver...	Head and side bruised by fall of prop, round which was a rope by which a mine car was being lowered.
42	"	" 21	Enrico Pauz...	Miner	Arm broken and shoulder and leg bruised by fall of loose coal in No. 4 Mine.
43	Nanaimo.....	Dec. 2	S. Wilcock....	"	Back bruised by fall of coal, jamming him against a prop in Protection Mine.
44	Union	" 6	Geo. Peacock..	"	Two ribs fractured and side bruised by fall of coal while taking down his drilling machine in No. 6 Shaft.
45	Nanaimo.....	" 6	Hi Yung.....	Labourer	Struck on elbow by a car, breaking the arm. Was working on tipple at No. 1 Shaft.
46	"	" 14	James Bell....	Gripper.....	Leg fractured by being struck by endless rope while pulling cars out of a siding in Northfield Mine.
47	"	" 14	Jas. Bingham.	Machine-man..	Foot caught in wheel of coal mining machine. Small bone fractured and foot otherwise injured in Northfield Mine.
48	Union	" 15	Quong Wan. .	Miner's helper.	Face and hand slightly burned. He was getting ready to blast, when by some means the powder in his bottle exploded with results as above.
49	Nanaimo	" 16	L. Williams...	Rope-rider	Compound fracture of the leg. Was struck by runaway cars on the Protection Slope, lower seam.
50	"	" 19	W. Livingston.	Mule driver...	Little finger of right hand taken off by a piece of coal falling off a car which he was pushing.
51	"	" 28	Peter Gourley.	Box-pusher ...	Ankle bruised and sprained between draw-bars of two empty cars, the front one of which went off the track.
52	Extension.....	" 29	David Eddy...	Miner	Collar bone broken by fall of stringer in No. 2 Mine.
53	"	" 30	Alex. Kerr....	Mule driver...	Small bone of leg broken by car which mule suddenly switched into a by-way.

CROW'S NEST COLLIERIES.

REPORTED BY THOMAS MORGAN, INSPECTOR.

No.	Colliery.	Date.	Name.	Occupation.	Details.
1	Coal Creek....	Feb. 22	Rich. Nimmo .	Miner	Left leg broken by a fall of coal while working in his "place" in No. 5 Mine.
2	"	April 15	Sam Gatoni ...	Box car loader..	Fatally injured on the railroad at Coal Creek by being jammed between two box-cars. He was crossing the track, and was caught between the car under the chute and the empty cars that were being lowered down.
3	Michel	April 20	John Cottle ...	Miners ...	Slightly burned by gas in No. 8 Mine, Michel.
4	"	"	Thos. Perrins..		
5	"	May 26	Martin Rapp..	Miner	Slightly burned by gas.
6	Coal Creek....	June 16	David Patton..	"	Fell in front of moving car in No. 2 Mine, and had his left leg broken, necessitating amputation.
7	Carbonado	" 24	M. Parentheon.	"	Right leg broken by fall of rock, No. 3 Mine.
8	Coal Creek....	July 22	T. Chabra	Driver	Caught between cars in No. 9 Mine and had his left leg broken in two places.
9	Carbonado	" 23	C. Kibbert....	Miner	Left leg broken by fall of rock in No. 3 Mine.
10	Coal Creek....	May 30	Peter Farrell..	"	Bridge stick into crosscut swung out, letting down four cross-bars, allowing "place" to cave in, pinning Farrell, who was killed by a second cave before he could be extricated. No. 5 Mine.
11	"	Aug. 17	Jean Santoni..	"	Leg broken by fall of coal in No. 5 Mine.
12	"	Sept. 21	Wm. Rippley..	Driver.....	Leg broken by being jammed between two cars in No. 1 Mine.
13	Carbonado	" 24	Joseph Cooke..	Shot-lighter...	Slightly burned by fire damp in No. 6 Mine.
14	Michel	Nov. 16	Alfred Davis ..	Miner	Fatally injured by fall of rock in No. 8 Mine.
15	Coal Creek....	Dec. 8	Ben. Skyes....	Driver	Left leg broken and right shoulder smashed by being run over by cars in No. 2 Mine.

COAL MINE OFFICIALS.

Third class certificates issued under "Coal Mines Regulation Act Further Amendment Act, 1904," sec. 38, s.-s. 2, in exchange for certificates issued under the "Coal Mines Regulation Act Amendment Act, 1901."

Name.	Date.	Certificate No.	Name.	Date.	Certificate No.
Adam, Robert	Oct. 12, 1904	C 42	Marshall, Howard	Dec'r. 6, 1905	C127
Addison, Thos	Dec'r. 10, 1904	C 52	Matthews, Chas	April 27, 1904	C 9
Aitken, James	Oct. 24, 1904	C 44	Miard, Harry E	Mar. 3, 1905	C 76
Alexander, Wm	Feb. 17, 1905	C 72	Middleton, Robt	Feb. 11, 1905	C 71
Allsop, Harry	Oct. 11, 1904	C 34	Miles, Thos	Aug. 10, 1904	C 31
Aughinvole, Alex	Mar. 29, 1905	C 89	Miller, Thos. K	Feb. 21, 1905	C 74
Barclay, Andrew	April 27, 1904	C 19	McKenzie, John R	Oct. 12, 1904	C 40
Barclay, James	April 27, 1904	C 20	McKinnell, David	Mar. 29, 1905	C 99
Barclay, John	April 17, 1905	C111	McKinnon, Arch'd	April 3, 1905	C102
Berry, Jas	Feb. 11, 1905	C 70	McMillan, Peter	Mar. 29, 1905	C 94
Bickle, Thos	Oct. 11, 1904	C 37	McMillan, Henry	May 13, 1905	C115
Biggs, Henry	April 10, 1905	C110	McMurtrie, John	Mar. 29, 1905	C 96
Black, John S	April 3, 1905	C108	Moore, Wm. H.	June 17, 1905	C119
Bowie, James	May 13, 1905	C116	Morris, John	Dec'r. 27, 1904	C 57
Campbell, Dan	Mar. 29, 1905	C 93	Myles, Walter	April 3, 1905	C100
Carr, Jos. E	Oct. 11, 1904	C 36	Nash, Isaac	June 1, 1904	C120
Carroll, Harry	Mar. 29, 1905	C 98	Neave, Wm	Oct. 12, 1904	C 43
Clarkson, Alexander	April 27, 1904	C 18	Nellist, David	April 27, 1904	C 13
Collishaw, John	Feb. 7, 1905	C 68	Nelson, James	April 27, 1904	C 16
Comb, John	Mar. 23, 1904	C 2	Newton, John	Oct. 12, 1904	C 39
Cosier, Wm	Mar. 29, 1905	C 86	Nimmo, Jas. P	April 3, 1905	C103
Courtney, A. W	Nov. 2, 1904	C 45	O'Brien, Geo	Feb. 6, 1905	C 66
Crawford, Frank	April 6, 1904	C 7	Pengelly, Richard	Dec'r. 27, 1904	C 58
Daniels, David	April 27, 1904	C 12	Perrie, Jas	Mar. 15, 1905	C 81
Davidson, David	April 3, 1905	C106	Perry, James	June 13, 1904	C 27
Davidson, John	Mar. 29, 1905	C 87	Pounder, Geo	Oct. 16, 1905	C125
Devlin, Henry	Oct. 12, 1904	C 41	Price, Jas	Nov. 8, 1904	C 50
Dobbie, John	Nov. 27, 1905	C126	Reid, Thos	Nov. 3, 1904	C 47
Dudley, James	Mar. 22, 1905	C114	Rafter, Wm	Mar. 29, 1905	C 95
Dunlap, Henry	Nov. 21, 1904	C 51	Reid, James	Mar. 23, 1904	C 1
Dunn, Geo	Dec'r. 19, 1904	C 56	Richards, Thos	April 27, 1904	C 14
Dunsmuir, John	Mar. 29, 1905	C 90	Reid, Wm	Dec'r. 15, 1904	C 54
Eccleston, Wm	Mar. 15, 1905	C 80	Ross, John	April 3, 1905	C101
Evans, Evan	Mar. 13, 1905	C 78	Ryan, John	Dec'r. 28, 1904	C 59
Evans, W. H	Mar. 14, 1905	C 79	Sanders, John W	April 3, 1905	C107
Fagan, David	April 6, 1905	C109	Shenton, Thos. J	July 25, 1904	C 30
Farmer, Bernard	Jan. 31, 1905	C 64	Shepherd, Henry	June 13, 1904	C 26
Farquharson, John	April 27, 1904	C 17	Smith, Ralph	Mar. 7, 1905	C 77
Findlayson, James	June 6, 1904	C 25	Smith, Geo	Mar. 29, 1905	C 84
Fulton, Hugh T	April 3, 1905	C105	Somerville, Alex	Mar. 24, 1904	C 3
Gibson, Edward	May 30, 1905	C118	Stauss, Chas. F	Feb. 9, 1905	C 69
Gilchrist, Wm	Mar. 29, 1905	C 85	Steele, Jas	Mar. 29, 1905	C 92
Gillespie, Hugh	April 6, 1904	C 8	Stewart, Duncan H	Mar. 28, 1904	C 4
Gillespie, John	April 6, 1904	C 5	Stewart, John	April 3, 1904	C104
Gould, Alfred	April 17, 1906	C112	Stewart, Daniel W	May 16, 1904	C 23
Green, Francis	Oct. 11, 1904	C 38	Stobbart, Jacob	Feb. 21, 1905	C 73
Handlen, Jas	June 16, 1904	C122	Strachan, Robt	April 27, 1904	C 15
Harmison, Wm	Feb. 3, 1905	C 65	Strang, James	April 27, 1904	C 10
Haworth, Geo	Mar. 29, 1905	C 88	Thomas, John	Mar. 29, 1905	C 97
Hescott, John	Jan. 16, 1905	C 62	Tunstall, James	June 15, 1904	C121
Hutchison, Archie	Sept. 8, 1905	C123	Vass, Robt	Dec'r. 12, 1904	C 53
John, David	Nov. 8, 1904	C 49	Vater, Charles	April 6, 1904	C 66
Johnson, Geo	May 9, 1904	C124	Walkem, Thos	Dec'r. 16, 1904	C 55
Johnson, Wm. R	Mar. 1, 1905	C 75	Webber, Chas	Sept. 13, 1904	C 32
Kerr, Wm	Mar. 29, 1905	C 91	Webber, Chas. F	Sept. 13, 1904	C 33
Lander, Frank	Jan. 9, 1905	C 61	Whiting, Geo	May 29, 1905	C117
Landfear, Herbert	Jan. 27, 1905	C 63	Wilson, Austin	Feb. 7, 1905	C 67
Lewis, Thos	Oct. 11, 1904	C 35	Wilson, Thos	April 27, 1904	C 11
Lockhart, Wm	Jan. 6, 1905	C 60	Woodburn, Moses	Mar. 29, 1905	C 83
Malpass, James	Nov. 7, 1904	C113	Yarrow, Geo	Nov. 3, 1904	C 46
Marsden, John	May 3, 1904	C 21			

LIST OF CROWN-GRANTED MINERAL CLAIMS.

:o:

CROWN GRANTS ISSUED IN 1905.

CARIBOO.

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Tuscan	Cariboo	British Columbia Mica Co., Ltd	507	51.65	June 26
Eureka	"	" "	508	50.77	" 26

CASSIAR.

Good Hope	Atlin	George Pollay and John Kirkland	335	48.83	Nov. 20
Kelp	Skeena	John Stinson	305, R. 5	33.00	June 20
Queen Charlotte	Atlin	Henry Nicholson	256	45.32	July 25

EAST KOOTENAY.

Alice	Fort Steele	Alexander Polson *et al*	6409	46.14	May 31
Alioth Fract	"	T. T. McVittie, Hy. Eller and D. K. Newell	6192	6.32	Jan. 18
Alpha Fract	Golden	The Beaver Canyon Min. Co., Ltd., N. P. L.	5106	10.68	Oct. 30
Alpha No. 2	"	" " " "	5113	51.65	Oct. 30
Arena	Fort Steele	North Star Min. Co., Ltd., N. P. L., *et al*	3536	49.00	*Feb. 15
Arena Fract	"	" " " "	3537	14.18	*Feb. 15
Canby	"	Peter Jensen *et al*	2338	51.65	Mar. 6
Cashier	"	Alex. Polson *et al*	6411	33.14	May 31
Criffel	"	The Kootenay (Perry Ck.) Gold Mines, Ltd.	6404	38.76	Feb. 21
Dog Star	"	Alex. Polson *et al*	6856	9.49	May 31
Eastern Star	"	John Y. Kesler	6862	24.68	April 14
Estella	"	Alex. Polson *et al*	6412	36.26	May 31
Fisher River	"	Peter Jensen *et al*	2339	40.20	Mar 6
Four O'clock	"	John Y. Kesler	6858	34.45	April 14
Golden Crown	"	The Kootenay (Perry Ck.) Gold Mines, Ltd.	6406	18.71	Feb. 21
Highland Chief	"	" " "	6405	41.73	" 21
Iron	"	John Y. Kesler	6860	31.39	" 14
Jennings	"	Peter Jensen *et al*	2337	45.24	Mar. 6
Jew Fract	"	Wm. J. Whines and C. W. Burdsal	2409	41.00	May 17
Mac	"	" "	6189	40.60	" 17
Morning	"	Alex. Polson *et al*	6853	47.06	" 31
Morning Star	"	John Y. Kesler	6861	51.65	April 14
Pretoria	"	John P. Bailey	6324	46.17	July 24
Providence	"	O. F. Desaulniers	6670	35.58	May 19
Ramshorn	"	Wm. Carlin	6353	39.54	Feb. 22
Rover	"	Alex. Polson	6413	51.65	May 31
Skylark	"	" *et al*	6579	49.00	" 31
Senter Star	"	John Y. Kesler	6859	28.80	April 14
Sovereign	"	The Kootenay (Perry Ck.) Gold Mines, Ltd.	6403	28.84	Feb. 21
Standard	"	The North Star Min. Co., Ltd., N. P. L. *et al*	3538	51.65	* " 15
Violet Fract	"	Wm. J. Whines and Chas. W. Burdsal	2410	23.30	May 17
Western Star	"	John Y. Kesler	6857	37.82	April 14

* Issued 1906.

Vancouver Island and Coast.

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Acme	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	4G	44.23	Oct. 18
Alaska	"	" " "	136G	10.91	" 21
Arcadian	Nanaimo	Harry Whitney Treat	142	51.10	" 12
Bluebell	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	51G	27.15	" 21
Brooklyn	"	" " "	55G	42.34	" 18
C. L. Fract	"	" " "	57G	15.50	" 21
Conqueror	"	John Bentley, J. W. McGregor, Thos. Parsell, Henry Cathcart and Alfred Wood.	172	30.78	" 12
Copper Mint	"	The Vancouver Is. Min. and Dev. Co., Ltd.	49G	51.50	" 21
Cyrus	"	John Bentley, J. W. McGregor, Thos. Parsell, Henry Cathcart and Alfred Wood.	171	25.94	" 12
Daisy	"	P. J. Pearson, T. D. Conway and A. St. G. Hamersley	24G	48.50	June 21
Daniel	"	John Bentley, J. W. McGregor, Thos. Parsell, Henry Cathcart and Alfred Wood.	173	30.17	Oct. 12
Dewey	"	The Vancouver Is. Min. and Dev. Co., Ltd.	52G	47.53	" 18
Diamond	"	" " "	61G	50.27	" 21
Dixie Fract	"	" " "	21G	2.50	" 18
Donagan	"	" " "	18G	51.44	" 18
Enterprise	"	" " "	48G	39.80	" 21
Erick	"	" " "	8G	29.45	" 18
Estelle	"	" " "	53G	32.83	" 21
Fern	Alberni	Laurence Manson	332	48.52	Nov. 20
Fern No. 1	"	"	334	39.60	" 20
Flame	Nanaimo	Harry Whitney Treat	143	44.23	Oct. 12
Gold Bug	New West'r.	D. T. Lay, Brock Reid and Wm. T. Jones	188	13.87	June 20
Golden Rod	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	44G	45.15	Oct. 21
Indian Jack	Alberni	Wm. Harrison and Sarah M. McDonell	297	44.56	Feb. 22
Iron King No. 1	New West'r.	D. E. McKenzie	2039	50.22	May 30
Iron King No. 2	"	D. E. McKenzie, W. A. McAdam and H. H. Logan	2040	30.68	May 30
Iron King No. 3	"	Fanny Alice Huff	2041	43.38	" 30
Ivan	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	9G	48.50	Oct. 18
Jumbo	New West'r.	D. T. Lay, Brock Reed and Wm. T. Jones	187	39.40	June 20
King	Victoria	P. J. Pearson, T. D. Conway, A. St. G. Hamersley	25G	51.65	" 21
Klondyke King	"	The Vancouver Is. Min. and Dev. Co., Ltd.	137G	50.80	Oct. 21
Lincoln	New West'r.	D. T. Lay, Brock Reed and Wm. T. Jones	186	51.65	June 20
Lola	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	53G	36.22	Oct. 18
M. A. L. Fract	"	" " "	58G	35.50	" 21
Margie	"	" " "	5G	51.30	" 18
Moline Fract	"	" " "	50G	21.19	" 21
Mollie	"	" " "	6G	50.73	" 18
Mollie Fract	"	" " "	7G	8.00	" 18
Nellena	"	" " "	47G	51.30	" 21
Nero Fract	Nanaimo	Maurice Gintzburger	329R.I.	2.00	May 9
Newcastle	New West'r.	Annie Austin	1936	29.26	" 9
Ohio	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	51G	42.16	Oct. 18
Oregon	"	" " "	54G	51.65	" 18
Rose	"	P. J. Pearson, T. D. Conway and A. St. G. Hamersley	23G	45.80	June 21
Sea Lion	"	The Vancouver Is. Min. and Dev. Co., Ltd.	62G	48.20	Oct. 21
Sophia	"	Malcolm Young, Alex. Young & John Young	100	51.65	Jan. 30

VANCOUVER ISLAND AND COAST.—*Concluded.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Star	Victoria	Malcolm Young, Alex. Young & John Young	192	51.28	Jan. 30
Success	"	" " "	99	51.65	" 30
Sunset	"	" " "	98	34.80	" 30
Sunshine	Alberni	Laurence Manson	366	25.10	Nov. 20
Sunshine No. 1	"	"	337	36.84	" 20
Sunshine No. 2	"	"	338	26.50	" 20
Sunshine No. 3	"	"	339	28.92	" 20
Sunshine No. 4	"	"	368	38.50	" 20
Sunshine No. 5	"	"	367	49.80	" 20
Tip Top	N. Westm'r.	John J. McPhee	1951	51.65	Oct. 12
Victoria	Victoria	The Mount Sicker & Brenton Mines, Ltd., N. P. L.	90 G.	12.50	June 21
Wasp	Alberni	Laurence Manson	333	51.65	Nov. 20
Westholme	Victoria	The Vancouver Is. Min. and Dev. Co., Ltd.	54 G.	51.65	Oct. 21
Westholme Fract.	"	" " "	59 G.	1.50	" 21
W. G. Fract	"	" " "	56 G.	20.42	" 18

WEST KOOTENAY.

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
A. B. C. Fract	Slocan City	Archie B. Coleman	6930	6.58	Nov. 6
Alexandre	Nelson	Chas. R. Hamilton	5729	49.50	Feb. 27
Alhambra Fract	"	J. P. Swedberg	4651	4.53	*Jan. 23
Alma	W. Kooten'y	King Solomon's Mining Co	6284	42.78	June 15
Alma B.	Slocan City	Archie B. Coleman	6922	35.16	Nov. 6
Alpha	Ainsworth	The Beaver Canyon Mining Co., Ltd., N.P.L.	6875	51.65	Oct. 11
Alpine	Trout Lake	A. Milloy, R. H. Munroe & O. B. N. Wilkie	6468	51.65	Nov. 23
Alva	W. Kooten'y	King Solomon's Mining Co	6283	42.31	June 15
Anna	Trout Lake	Chas. W. McCrossan	5336	32.54	Sept. 11
Annie G	Nelson	J. A. Gibson, H. Sutherland, H. H. Nell & C. R. Holmes	6339	41.87	Nov. 15
Aricle	Slocan City	Archie B. Coleman	6459	19.47	" 6
Aricle Fract	"	Archie B. Coleman	6923	.36	" 6
Ark	Nelson	Walter M. Fee	3449	36.88	Jan. 28
Ashcroft	"	Percy Ernest Doolittle	4303	40.78	Mar. 22
Athens	Lardeau	Abraham N. Gray	4816	51.54	" 7
Athol	Ainsworth	W. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5896	34.28	Oct. 24
August Fract	W. Kooten'y	King Solomon's Mining Co	6287	.76	June 15
Basin Fract.	Ainsworth	Alfred R. Fingland and Charles Brand	6910	20.97	Nov. 27
Beaver Fract	Trail Creek	Joshua E. Mills and Cecil P. Newman	5858	21.08	May 10
Big Four	Nelson	Hugh Sutherland	3836	50.80	Nov. 13
Big Sheep	Trail Creek	Joseph Kloman and Godfrey Wys	6905	26.75	May 19
Biloxie	Slocan City	Archie B. Coleman	6929	27.08	Nov. 6
Biloxie Fract	"	" "	6926	8.38	" 6
Black Prince	"	Ernest Harrop and Robt. C. Andrews	5758	34.02	Jan. 30
Blade	Slocan	John Hopkin Wolverton	4519	22.16	Nov. 13
Blake	Nelson	Jas. L. Stamford, Angus G. Shaw and Walter John Beale	6293	40.39	*Jan. 23
Blind Canyon	"	James S. C. Fraser	3771	29.60	Mar. 23
Blue Jay	Trout Lake	John J. McGlone	4744	21.47	Sept. 16
Bradford	Nelson	Leonard M. Merrifield	6445	45.46	Oct. 12
Broken Hill	Trout Lake	Cutler T. Porter	7042	42.97	Nov. 6
Butterfly	Ainsworth	Edward Dedolph	5992	38.41	" 27
Byronodale	Trout Lake	Adolph P. Johnson	7090	18.00	" 21
Carbenet No. 2	Ainsworth	W. E. Gomm, H. D. Thompson, F. J. Donaldson and Geo. E. Martin	6811	51.65	Dec. 2

* Issued 1906.

WEST KOOTENAY.—*Continued.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
C. D	Trout Lake	Jas. J. McGlone	4743	36.55	Sept. 16
Centre Star	Nelson	J. S. C. Fraser *et al*	3766	41.70	Mar. 23
C. H	Trout Lake	Jas. J. McGlone	4741	41.91	Sept. 16
Clearwater	Ainsworth	W. E. Gomm, H. D. Thompson, F. J. Donaldson and Geo. E. Martin	6812	34.49	Dec. 2
Clinton	Nelson	Percy Ernest Doolittle	4302	37.32	Mar. 22
Clipper	Slocan City	Ernest Harrop and R. C. Andrews	5759	34.65	Jan. 30
Colby	Nelson	Hugh Sutherland	6340	51.65	Nov. 13
Copper King	"	" "	3835	51.65	" 13
Copper Queen	Ainsworth	The Trusts and Guarantee Co., Ltd.	6807	44.20	June 23
Copper Wonder Fr.	Trail Creek	Wm. A. Spilker	5854	1.25	Feb. 27
Crowfoot	Nelson	J. S. C. Fraser *et al*	3770	51.65	Mar. 23
Dazy	Ainsworth	Edward Dedolph	5993	37.60	Nov. 27
Doubtful	Trout Lake	John J. McGlone	4745	36.12	Sept. 16
Dumas	Nelson	Chas. R. Hamilton	5727	49.93	Feb. 27
Dum-Dum Fract.	Slocan	Geo. F. Ransom and Robert T. Twigg	5073	32.72	" 28
Dunragen	Ainsworth	Wm. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5890	51.18	Oct. 24
Duplex	Nelson	Hugh Sutherland	3632	51.65	Nov. 13
Eagle Fract.	Ainsworth	Highlander Mill and Mining Co.	2367	7.57	Feb. 20
Electric	Slocan	Robert Williams and W. S. Drewry	3738	51.65	Nov. 16
Empire	Trail Creek	S. McKee, J. Anderson and F. A. Williamson	6986	39.16	" 23
Enterprise	Trout Lake	Andrew Ferguson	5682	49.92	Feb. 1
Evening	"	Richard T. Dilworth	7228	34.80	Nov. 21
Evening Star No. 9	Slocan City	Duncan Graham and David Saulter	7058	8.77	May 19
Exchange [Fr	Nelson	The Pilot (Ymir) Gold M'g. & Milling Co., Ltd., N. P. L.	3451	32.47	Jan. 30
Fredericton Fract.	"	Percy Ernest Doolittle	4306	26.16	Mar. 22
Free Milling	Ainsworth	The Trusts and Guarantee Co., Ltd.	6808	50.92	June 23
Frisco	Slocan	Evan F. Lloyd	4879	46.05	Oct. 12
Flyette	Slocan City	Archie B. Coleman	6921	51.08	Nov. 6
Gem	Nelson	John A. Gibson, Hugh Sutherland, Henry H. Nell and Chas. R. Holmes	3631	40.60	" 15
Georgia Fract	Trail Creek	Albert H. McNeill and Louis L. Bertonneau	4668	1.30	Mar. 13
Gertrude	Ainsworth	The Trusts and Guarantee Co., Ltd.	6804	34.97	June 23
Golden King	Nelson	John A. Gibson, Hugh Sutherland, Henry H. Nell and Chas. R. Holmes	3624	51.65	Nov. 15
Gold Hill	Trout Lake	Wm. B. Pool	4739	28.98	Jan. 18
Goldsmith	"	"	4738	44.40	" 18
Goodenough	"	John J. Ross	7202	40.02	Aug. 18
Goodenough No. 1.	"	"	7203	38.96	" 18
Goodenough No. 2.	"	"	7204	40.80	" 18
Grace Fract.	"	Jas. A. M. Aikins	2640	.16	Sept. 16
Grand Fract	Nelson	Hall M. & S. Co.	2113	30.47	Mar. 22
Grey Bird	Ainsworth	Thos. Farquhar	5888	49.04	Nov. 13
Gringo	"	James Harvy, Wm. Jas. Twiss & A. B. Morris	6813	21.00	Sept. 16
Harland	"	A. R. Fingland and Charles Brand	6911	45.43	Nov. 27
Hanky Panky Fr.	Nelson	Harry McLeod	4808	15.59	" 14
Handy No. 2	Trout Lake	Wm. N. Brayton	1371	51.20	May 9
Hoffman	Lardeau	Abraham N. Gray	4817	51.13	Mar. 7
H. G. N	Nelson	J. L. Stamford, Angus G. Shaw & W. J Beale	6292	37.82	*Jan. 23
Helene Fract.	Ainsworth	David P. Hatch	5529	45.05	Nov. 27
Hub	"	Louis Martin, R. F. Green, A. Thisted, P. McCue and J. C. Ryan	6816	47.24	Dec. 11
Interprise	Nelson	Walter M. Fee	3450	37.37	Jan. 28
Island Boy	Ainsworth	Wm. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5893	45.51	Oct. 24
I Wonder	Slocan City	Archie B. Coleman	6928	36.94	Nov. 6
I. X. L	Trout Lake	Wm. N. Brayton	4727	50.10	Mar. 21
I. X. L. Fract.	"	" "	6469	49.98	" 21
J. A. Fr. Fractional	Nelson	John McLatchie and Edw. H. Stanley	4222	13.89	Feb. 20

* Issued 1906.

WEST KOOTENAY.—*Continued.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Jane	Ainsworth	The Trusts and Guarantee Co,, Ltd.	6806	46.93	June 23
Jeanie	Slocan	Ed. Hunt, D. D. MacDonald and Daniel J. Matheson	3629	34.90	" 27
Joe Joe	Trail Creek	Joseph Kloman and Godfrey Wys	6904	24.37	May 19
Jonny	Nelson	J. S. C. Fraser *et al*	3768	40.50	Mar. 23
Joseph	Trout Lake	Chas. W. McCrossan	5337	30.45	Sept. 11
Jumbo	Lardeau	Abraham E. Kincaid	6938	38.79	June 28
Kamloops	Trout Lake	Andrew Ferguson	4952	34.14	Feb. 1
Kamloops Fract	"	" "	5684	5.56	" 1
Kipling Fract	Nelson	Harry McLeod	4810	5.45	Nov. 14
Kootenay	"	John L. G. Abbott, Harry Abbott and Ernest L. Heatley	3798	51.05	Feb. 22
Lake View	Slocan	E. Hunt, D. D. MacDonald, & D. J. Matheson	3630	48.80	June 27
L. B	Trout Lake	John J. McGlone	5425	27.25	Sept. 16
L. H	Ainsworth	Alfred R. Fingland and Charles Brand	5738	46.86	Nov. 27
Lilly	Nelson	Percy Ernest Doolittle	4304	32.50	Mar. 22
Little Bell Fract	Ainsworth	Louis Martin, R. F. Green, Andrew Thisted, Patrick McCue and James C. Ryan	6817	3.23	Dec. 11
Little Jack Fract	Trail Creek	War Eagle Consolidated M'g & Dev. Co	1080	2.89	Nov. 16
Lost Cup	Lardeau	H. N. Baird, T. A. Crane, Eliza E. McClymont, R. H. Jameson & Jane B. S. Major	1870	51.23	" 23
Louisville	Slocan City	Archie B. Coleman	6461	38.45	" 6
Low Fract	Trout Lake	Wm. N. Brayton	1372	8.00	May 9
Lucky Jack	"	The Great Northern Mines, Ltd.	4731	22.13	June 16
Lucky Jack Fract	"	" "	4734	4.35	" 16
Lucky Three	"	" "	4732	20.56	" 16
Lydia A	Ainsworth	Wm. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5892	49.86	Oct. 24
Mamoth	Nelson	Hugh Sutherland	3837	51.65	Nov. 13
Marie Fract	Slocan	Jacob Kelsen	6870	21.45	*Jan. 23
Mariposa	Nelson	Harry McLeod	4809	40.82	Nov. 14
Mars	"	John McLatchie and Edw. H. Stanley	3675	51.62	Feb. 20
Martilde	"	A. C. Sutton, administrator of estate of Herman Lenker	3871	51.38	June 28
Maud	Trout Lake	Charles W. McCrossan	5338	35.52	Sept. 11
Mayflower	Nelson	J. L. Stamford, A. G. Shaw and W. J. Beale	3684	51.18	*Jan. 23
Mayeta	Slocan City	Archie B. Coleman	6460	50.63	Nov. 6
Mayeta Fract	"	"	6933	24.81	" 6
Meadow	Arrow Lake	Fredk. R. Blochberger	3793	50.09	" 20
Meadow Queen	"	Smith Curtis	3605	45.06	May 9
Meadow View No. 2	"	John B. Old	2152	51.65	Nov. 27
Mentor Fract	Slocan	Queen-Dominion M'g. Co., Ltd., N.P.L.	3180	3.51	June 5
Mollie	"	John M. Harris and James F. Armstrong	621A	16.01	May 9
Morning	Trout Lake	Richard T. Dilworth	7227	47.30	Nov. 21
Mountain M	Arrow Lake	Smith Curtis	3604	40.74	May 9
Mountain Trail	Trail Creek	Christian C. Knutson	5078	50.90	Oct. 24
Nellie Fract	Slocan	Monitor and Ajax Fract. Ltd	3108	14.85	April 17
Nina	Lardeau	H. N. Baird, T. A. Crane, Eliza E. McClymont and Jane B. S. Major	4239	51.00	Nov. 23
Nowell	Nelson	John A. Gibson, Hugh Sutherland, Henry H. Nell and Chas. R. Holmes	3838	49.35	" 15
Omega	Ainsworth	The Beaver Canyon Mining Co., Ltd., N.P.L.	6786	51.65	Oct. 11
Omega No. 2	"	" " "	6787	51.63	" 11
Oronogo	Nelson	Duncan McArthur and Christian L. Behnsen	5572	40.18	Feb. 27
Ouray	Slocan	Monitor and Ajax Fract	3109	50.62	Mar. 17
Ouray Fract	"	" "	1017	8.06	" 17
Paladora	Arrow Lake	A. H. Old and Wm. H. Page	2153	51.16	Nov. 27
Palmita	Slocan	Alfred Robinson	4880	31.02	Mar. 23
Phyllis	Lardeau	Hugh N. Baird, Thos. A. Crane, Eliza E. McClymont and Jane B. S. Major	3755	51.60	Nov. 23
Pialot Fract	Nelson	The Pilot (Ymir) Gold Mining and Milling Co., Ltd., N.P.L	3452	9.86	Jan. 30

* Issued 1906.

WEST KOOTENAY.—*Continued.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Pingree	Nelson	J. L. Stamford, A. G. Shaw and W. J. Shaw	3685	51.65	*Jan. 23
Princess Fract	"	Geo. Brine	5667	51.50	Jan. 21
Queen Fract	Slocan	Queen-Dominion Mining Co., Ltd., N.P.L.	3179	22.50	June 5
Recluse	Nelson	Edward C. Arthur	4228	48.77	Feb. 27
Redman	"	J. S. C. Fraser, *et al*	3769	50.00	Mar. 23
Resurgam	Ainsworth	W. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5889	49.55	Oct. 24
Revenge	Trout Lake	Andrew Ferguson	5685	20.25	Nov. 13
Revenue	Trail Creek	Sam'l McKee, John Anderson and Francis A. Williamson	6985	48.03	" 23
Robber King	Nelson	J. A. Gibson, Hugh Sutherland, H. H. Nell and Chas. B. Holmes	3626	50.40	" 15
Royal Five	Slocan	Edw. Hunt, D. D. MacDonald and D. J. Matheson	3628	51.65	June 27
Schmulka	Nelson	A. C. Sutton, administrator of the estate of Herman Lenker, deceased	3871	51.65	" 28
Second Extension	Slocan	Queen-Dominion Mining Co., Ltd., N.P.L.	6803	41.00	" 5
Shakespeare	Arrow Lake	Fredk. R. Blochberger	5720	48.94	Nov. 20
Shareholder	Slocan	Wm. S. Drewry, Oliver T. Stone, John F. McIntosh and Robert Williams	3736	49.36	" 16
Silver Bell	Ainsworth	Louis Martin, R. F. Green, Andrew Thisted, Patrick McCue and James C. Ryan	6815	51.65	Dec. 11
Silver Chief	Trout Lake	Andrew Ferguson	5683	36.25	Feb. 1
Silver Plume	Ainsworth	Wm. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5895	36.83	Oct. 24
Silver Six	"	Wm. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5894	5.90	" 24
Silver Star Fract	Slocan	The Byron N. White Company	4878	12.36	Nov. 13
Silver Tip	Nelson	Hugh Sutherland	3840	51.65	" 13
Silver Tip Fract	Slocan	Wm. G. Clark and Wm. Donald	4881	42.65	" 13
Silver Tip Fract	"	The Erl Synd., Ltd	5824	6.85	Sept. 16
S. J. M	Nelson	D. McArthur	5573	38.11	Feb. 27
Skylark	Arrow Lake	Fredk. R. Blochberger	5719	20.80	Nov. 20
Slocan Prince	Slocan	John Elliot *et al*	582	50.59	Feb. 21
Sloper Fract	Ainsworth	The Erl Synd., Ltd	5990	5.20	June 29
Spruce	"	The Trusts and Guarantee Co., Ltd	6805	51.65	" 23
St. Joe	Revelstoke	Wm. J. Butler	5675	23.23	Sept. 11
St. Joe	Ainsworth	A. R. Fingland and Charles Brand	6908	51.65	Nov. 27
Stockholm	Lardeau	Wm. J. Bonza and Peter Larsen	6934	32.37	Oct. 11
Storm King	Nelson	John A. Gibson, Hugh Sutherland, Henry H. Nell and Chas. R. Holmes	3625	51.65	Nov. 15
Summerset	Arrow Lake	Arthur H. Old and Wm. H. Page	2154	51.59	" 27
Summit	Ainsworth	A. R. Fingland and Charles Brand	6909	49.53	" 27
Sunset	Trail Creek	Wm. Frank Case	6563	51.60	Feb. 27
Sunset	Trout Lake	Chas. W. McCrossan	5339	43.46	Sept. 11
Survey Fract	Slocan City	Archie B. Coleman	6931	22.89	Nov. 6
Tamarack	Nelson	John A. Gibson, Hugh Sutherland, Henry H. Nell and Chas. R. Holmes	6338	50.61	" 15
Triune	Trout Lake	Andrew Ferguson	5681	50.81	Feb. 1
Twilight	Nelson	J. S. C. Fraser, *et al*	3767	48.30	Mar. 23
Umatilla Fract	Trail Creek	Fredk. R. Blochberger	2720	16.03	Nov. 24
Vancouver	Nelson	J. L. G. Abbott, Harry Abbott and Ernest Heatley	3797	51.65	Feb. 22
Victoria	Trail Creek	Fredk. R. Blochberger	5218	51.65	Nov. 24
Whistler	Trout Lake	Hy. H. Johnstone, Geo. D. Morton, E. W. Gustin and Alex'r Dobson	7433	51.25	*Jan. 23
Wooloomooloo	Nelson	Wm. G. Sivyer	897	51.59	Nov. 24
X. Y. Z	Trout Lake	Jas. J. McGlone	4742	14.45	Sept. 16

* Issued 1906.

WEST KOOTENAY.—*Concluded.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Yankee Kid	Ainsworth	Wm. J. Twiss, Annie Keown, Walter Stead and Thos. Farquhar	5891	49.18	Oct. 24
Young Dominion Fr	Slocan	Queen Dominion Mg. Co., Ltd., L. P. L.	2396	12.90	June 5
Zoolite	Trout Lake	A. P. Johnson	7089	49.20	Nov. 21

YALE.

Admiral	Greenwood	Thomas Hemmerle and Hugh McKee	2379	30.80	Jan. 12
African Farm	Grand Forks	Hugh S. Cayley	1095	45.69	July 24
Aldie	"	Leonard Vaughan	3239	27.75	Nov. 21
Alice	Greenwood	D. McBride, J. G. McMynn and Mary T. McMynn	2791	51.61	" 21
Alma	"	Philip B. S. Stanhope	2660	46.43	Mar. 7
Alpha	Grand Forks	H. A. McLaren	1204	36.75	Nov. 13
Alpine	Similkameen	John R. McRae and Hugh McRae	3269	21.69	Mar. 21
American Eagle	Greenwood	John B. Desrosiers	1289	50.75	June 27
Azurite	Similkameen	John R. McRae and Hugh McRae	3268	42.75	Mar. 21
Banner	Osoyoos	Josiah Graham and John E. Stevens	2819	26.00	April 14
Barnato	Greenwood	Victor R. Swanson and Samuel T. Larsen	2848	51.11	Sept. 16
Barnato Fraction	"	Victor R. Swanson and Samuel T. Larsen	2865	7.77	" 16
Bay Horse Fract	Grand Forks	John F. Farrell	1573	1.82	July 24
Bay Fract	Greenwood	David Manchester, Henry V. Fuller, and Fredk. K. Hall	3285	46.00	Feb. 20
Berlin Fract	Similkameen	The Boulder Mining Co., Ltd., N. P. L.	269	30.00	May 17
Billy Goat	Osoyoos	Robert Gaede and John Riordan	3122	34.62	April 14
Blackbird	Similkameen	The Boulder Mining Co., Ltd., N. P. L.	268	41.50	May 17
Boston	Greenwood	John N. Greden	2854	51.65	Mar. 13
Boston	Osoyoos	W. M. Cameron, administrator of the estate of G. M. Stump, deceased	3112	39.23	Sept. 16
Boundary Fract	Grand Forks	The Vancouver & Boundary Creek Development & Manufacturing Co., Ltd	2613	14.69	July 24
Bryan	"	Leonard Vaughan	3241	43.69	Nov. 21
Buller	"	Edmund J. Tett	3242	51.65	Dec. 21
Bullion	"	Mary Turner McMynn and Donald McLaran	1200	47.00	Nov. 20
Bullion No. 1	Osoyoos	Robert Gaede	3116	38.54	Mar. 3
Buna Vista Fract	Greenwood	Forbes M. Kerby	1553	22.70	Dec. 11
Bunker Hill	Grand Forks	Neil McCallum and Ella Clark	1609	51.65	July 24
Callao	Greenwood	Elizabeth Galloway	1017	46.30	Jan. 20
Canadian Belle	Osoyoos	Horatio J. Duffy and Thos. D. Pickard	3038	51.65	July 25
Charter Oak	"	Myron K. Rodgers and Geo. H. Cahill	3466	41.50	Nov. 6
City of Paris	Greenwood	Isaac H. Hallett and John P. McLeod	2948	44.36	" 6
Coldspring	Osoyoos	G. H. Cahill, Wm. B. Hine, & D. Braithwaite	723	48.00	May 23
Courment	Similkameen	C. J. Wilson and W. J. Wilson	278	44.65	Nov. 6
Constitutional	"	Albert Klockmann	282	44.20	*Jan. 23
Con Verdant	Kamloops	The British Columbia Trust Co., Ltd	1341	51.42	Nov. 15
Copper Glance	Similkameen	John R. McRae and Hugh McRae	3267	51.65	Mar. 21
Copper Head No. 1	Osoyoos	Robert Gaede	3115	18.76	Mar. 3
Copper Jack	Similkameen	J. S. C. Fraser, H. E. Poulinier & E. E. Wells	1189	46.45	Jan. 20
Copper Kettle No. 1	Osoyoos	Robt. Gaede and James Riordan	3445	35.45	Oct. 12
Copper Wonder Fra	"	Horatio J. Duffy and Thos. D. Pickard	695	22.80	July 25
Coronation	Greenwood	T. H. Paterson, administrator of the estate of Adolphus Ferguson, deceased intestate, Henry V. Fuller, and H. Bunting.	3365	30.24	Oct. 24
Cousin Jack	Similkameen	The Boulder Mining Co., N. P. L.	263	46.00	May 17
Deer Trail	Greenwood	Jane Russell, Wellington Elson and Evan Parry	1526	36.00	Mar. 6
Diamond	"	Wm. Claude Fox	1455	21.48	Jan. 24
Diamond Dot	Similkameen	Herbert H. Thomas	3265	51.60	Dec. 6
Dumphy	Grand Forks	Otto Gruno	3018	35.26	Jan. 18

* Issued 1906.

YALE.—*Continued.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Earnscliffe Fract ..	Kamloops ..	The British Columbia Trust Co., Ltd	1301	1.67	Nov. 15
Edward VII.....	Greenwood..	G. M. Bennett and Henry J. Homann	3499	51.57	" 27
El Rio.	Grand Forks	The British Columbia Trust Co., Ltd	1231	29.40	Mar. 11
Emma Fract.....	"	James F. Cunningham.....	2143	1.38	" 13
E Pluribus Unum..	Greenwood..	Wm. T. Hunter	3253	42.00	Sept. 11
E. P. U. Fract....	"	"	3254	3.44	" 11
First Chance	Grand Forks	Chas. E. Hamilton, Frank N. Maas and F. Dielher	3414	50.34	May 9
Flagstaff	Osoyoos	Robert Gaede and James Riordan	3444	50.22	Oct. 12
Florence.....	Grand Forks	R. B. Thomas and Gust. Holmes	3010	51.65	Mar. 13
Freddy Burn	Similkameen	Chas. J. Wilson and William J. Wilson....	270	51.65	Nov. 6
Gipsy	Greenwood..	John Mulligan	1811	32.14	" 13
Globe	"	Wm. M. Law and John Gray	2294	33.42	Sept. 11
Golden Dollar Fract	"	Alex. Waddell, Eugene Sullivan and Mary T. McMynn.....	2844	13.00	Nov. 21
Golden Gate	Similkameen	A. R. Carrington	1332	47.97	Mar. 21
Golden Nugget....	Greenwood..	Sydney M. Johnson.....	3142	21.47	Sept. 11
Gold Standard	"	W. M. Low, Albert Piper and R. Mathison	2980	21.89	May 23
Gum Boot Frac....	Grand Forks	Sigmund Dilsheimer	3304	3.52	Nov. 27
Gypsey Fract	Osoyoos	A. T. Broderick and Geo. Frederick	3106	30.51	June 21
Happy Jack.....	Similkameen	A. E. Howse, E. P. Lowe and Jas. Brown..	1187	51.65	Oct. 12
Hattie.....	"	J. S. C. Fraser, H. E. Poulinier, E. E. Wells	1188	51.65	Jan. 24
Hawthorne	Kamloops ..	Michael Snee.....	834	51.65	June 19
Honeysuckle	Similkameen	Thos. M. Day and Francis W. Groves	3263	51.65	Sept. 11
Hoyland Fract.....	Greenwood..	John A. Tuzo and Wilfred Cookson	2936	19.32	May 19
Humming Bird....	"	Isaac Skidmore.....	3337	19.76	Nov. 20
International.....	Similkameen	Albert Klockmann.....	283	46.45	*Jan. 23
Invincible	"	Wm. Knight and Thos. H. Reed	278	46.25	* " 23
I. X. L..... ..	"	H. H. Thomas, W. H. Thomas and Susan L. Allison.....	2047	51.65	June 28
Jerry.....	Greenwood..	Jewel Gold Mines, Ltd.....	2882	41.04	Jan. 14
Jim	Grand Forks	George Cook and Mary T. McMynn	2905	50.10	Nov. 20
Jim Hill.....	"	C. E. Hamilton, F. N. Mans and C. Diether	3416	42.75	May 9
Jumbo Fract	Greenwood..	John A. Crawford *et al*.....	3128	6.40	Mar. 6
Jumbo Fraction ...	Grand Forks	James H. Plummer	2401	2.45	Nov. 6
Juniper	Kamloops ..	Archibald Irwin	1230	51.65	Sept. 11
Juniper.....	Osoyoos	C. DeB. Green and E. Bullock-Webster....	1604	46.69	April 17
Kinlough Fract....	Kamloops ..	Thomas D. Guest	838	16.92	June 19
Klondyke.....	Vernon	The Vanc. & Bdy. Ck. Dev. & Mg. Co., Ltd	1188	44.40	Oct. 11
Lancashire Fract..	Greenwood..	Wm. T. Hunter	3254	8.23	Sept. 11
Lancaster	Grand Forks	Chas. J. McGee.....	3076	29.78	Oct. 11
Lillie James	Greenwood..	Chas. H. Tye.....	1724	36.14	" 12
Lion's Paw	Osoyoos	Horatio J. Duffy and Thomas D. Pickard...	642	50.41	July 25
Little Lottie	Similkameen	Albert E. Howse, E. P. Lowe, and J. Brown	1190	51.58	Oct. 12
Lorenia.....	Osoyoos	Horatio J. Duffy and T. D. Pickard	694	29.08	July 25
Lucky Boy.....	Greenwood..	Sydney M. Johnson *et al*.....	2331	27.53	June 14
May Day	Greenwood..	Jane Russell, W. Elson, and Evan Parry ..	1525	43.00	Mar. 6
Mayflower	"	C. H. Henning, P. Hickey, & D. McIntosh.	1773	35.34	" 7
Mayflower	Grand Forks	Jas. A. Macdonald.....	1734	27.67	July 24
Messina	Greenwood..	Alfred Cameron, E. Tennessen and C. Stooke	2951	47.57	Nov. 20
Midnight Sun.....	Osoyoos	Horatio J. Duffy and Thos. D. Pickard	2825	39.75	July 25
Molly Gibson.....	Kamloops ..	Andrew Noble.....	833	51.65	April 20
Montezuma	Grand Forks	Hugh S. Cayley	2812	48.75	Nov. 20
Morning	Similkameen	The Boulder Mining Co., Ltd., N. P. L.....	265	28.70	May 17
Mount Adams.....	Osoyoos	Henry W. Yates.....	1445	19.00	" 9
Myrtle Fract.....	Grand Forks	Otto Gruno	3019	19.59	Jan. 18
Nelly No. 1.....	Osoyoos	Robert Gaede	3117	22.14	Mar. 3
Nelly Fract.....	"	"	3121	32.47	" 3

* Issued 1906.

YALE.—*Continued.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date..
Nelson	Greenwood	Elizabeth Galloway	2293	50.27	Nov. 6
New York	Similkameen	Mary Agnes Voight	3574	51.65	" 15
No. 1	"	"	3349	51.39	Oct. 30
No. 14	"	"	3289	51.65	Nov. 15
No. 19	"	"	3358	40.91	Oct. 30
No. 21	"	"	3571	42.58	Nov. 15
No. 23	"	"	3346	48.89	Oct. 30
No. 33	"	"	3359	23.71	Nov. 15
No. 35	"	"	3363	49.72	" 15
No. 37 Fraction	"	"	3348	14.53	" 15
No. 39	"	"	3570	42.33	" 15
No. 41 Fraction	"	"	3569	51.63	" 15
No. 47 Fraction	"	"	3575	51.42	" 15
No. 48 Fraction	"	"	3580	44.10	" 15
No. 49 Fraction	"	"	3581	50.07	" 15
No. XII. Fraction	Greenwood	Melvin D. Schenck	2280	1.07	May 19
Noonday	Kamloops	Archibald Irwin	1231	50 90	Sept. 11
Norma	"	The British Columbia Trust Co., Ltd.	1302	51.20	Nov. 15
North Seattle Frac	Grand Forks	Ella Clark and Charles Hay	3017	8.80	" 23
Oregon	Similkameen	Mary Agnes Voight	3572	48.99	" 15
Oshkosh	"	The Boulder Mining Co., Ltd., N. P. L.	266	36.20	May 26
Owl	Greenwood	John N. Greden *et al*	2395	37.80	Mar. 7
Paymaster	Greenwood	Robert Wood	2800	51.65	Sept. 11
Peer	Grand Forks	R. E. Crawford, Fred. Lange and J. Shaw.	3045	51.65	Jan. 18
Peerless Fract	Similkameen	Albert Edward Irwin	250	20.10	Nov. 6
Penstowe Fraction	Kamloops	Fredk. J. Fulton	1201	10.03	June 19
Phœbe	Greenwood	David McBride, J. G. McMynn and Mary T. McMynn	2790	49.58	Nov. 21
Pilot	"	Thomas Roderick and Jas. Marshall	3297	44.00	Sept. 11
Pittsburg	Osoyoos	W. F. Cameron and L. W. Shatford	3113	49.99	" 16
Princess	Kamloops	Cecil W. Ward and Jas. O. Grahame	832	51.65	June 8
Princeton	Similkameen	The Vermilion Forks Min. & Dev. Co, Ltd.	153	26.28	Sept. 11
Pride of the West Fraction	Grand Forks	Walter Sterling	1947	50.83	Mar. 11
R. S.	Similkameen	Mary A. Voight and John W. Cook	3357	25.53	Oct. 30
S. & W. Fraction	Similkameen	Charles J. Wilson	271	30.40	Nov. 6
Sailor Jack	"	John B. Wood	273	47.40	" 6
Saturday	Osoyoos	Henry A. Whillans	2043	37.40	*Jan. 23
Seth	Greenwood	Jewel Gold Mines, Ltd	2883	46.08	Jan. 14
Shamrock	Osoyoos	Robert Gaede and James Riordan	3123	10.54	April 14
Silverside	"	J. F. Campbell, H. W. Yates & S. M. Johnson	718	47.00	July 15
Smelter	Similkameen	Mary Agnes Voight	3573	48.39	Nov. 15
Solomon Fract	Grand Forks	John Rogers and Geo. T. Nye	2999	8.07	Jan. 20
St. Elmo	Similkameen	Jessie R. Hunter	3266	23.16	*Jan. 23
St. George	"	W. H. Armstrong and Chas. F. Law	259	46.31	Jan. 3
St. Helen	"	" " "	261	36.67	" 3
St. Lawrence	"	" " "	258	44.67	" 3
St. Louis	Greenwood	John N. Greden	2355	41.92	Mar. 13
Strathmore	"	Elizabeth Galloway	1018	37.80	Jan. 20
Summit No. 1	Osoyoos	Robert Gaede	3118	32.78	Mar. 3
Superior	Greenwood	John Gray	2786	51.65	Sept. 11
Telephone	Lillooet	Leslie Hill, E. J. Taylor and Lee G. Burns.	670	28.70	Oct. 11
Thunder Hill	Greenwood	Sydney M. Johnson	3143	49.17	Sept. 11
Tinhorn Fract	Similkameen	Edgar E. Burr	3026	00.61	Nov. 6
Thunder Hill	Grand Forks	C. E. Hamilton, F. N. Maas, C. F. Diether	3413	49.79	May 9
Toronto	Greenwood	John N. Greden	2856	29.65	Mar. 13
Torpedo Fract	Vernon	The Vancouver and Boundary Creek Development and Mining Co., Ltd	1189	42.18	Oct. 11
Undine	Grand Forks	J. S. C. Fraser and James Foulds	2138	38 70	Dec. 6
Ute Fract	Greenwood	John Moran	2611	4.71	Sept. 11

* Issued 1906.

YALE.—*Concluded.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Viceroy Fract.....	Greenwood..	Sydney M. Johnson *et al*.....	1722	25.07	Mar. 7
Victor.....	Kamloops ..	The British Columbia Trust Co., Ltd	1340	40.81	Nov. 15
West Fork.....	Grand Forks	Chas. E. Hamilton, Frank N. Maas, and Chas. F. Diether.....	3415	51.65	May 9
Winibago.....	Similkameen	The Boulder Mining Co., Ltd., N. P.L.....	267	33.50	" 26
Woodchuck.....	Lillooet ...	Leslie Hill, E. J. Taylor, and L. G. Burns ..	579	38.20	Oct. 11
Wood Duck.....	Lillooet ...	" " " ..	671	24.58	" 11
Yellow Jacket	Similkameen	Mary Agnes Voight.....	3356	38.45	" 30
Yellow Jacket No. 1	Osoyoos	Robert Gaede	3119	46.19	Mar. 3
Yellow Jacket No. 1 Fract.....	"	"	3120	19.20	" 3
Ymir	Similkameen	The Boulder Mining Co., Ltd., N. P. L....	264	33.10	May 17

GOLD COMMISSIONERS AND MINING RECORDERS.

Mining Districts and Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Atlin District	Atlin	J. A. Fraser		
Atlin Mining Division	"		Herbert Young	
Sub-office	Telegraph Creek			Jas. Porter.
"	Discovery City			W. H. Vickers.
Cassiar District	Port Simpson	John Flewin		
Skeena Mining Division	"		John Flewin	H. C. Flewin.
Sub-office	Masset, Q. C. I.			C. Harrison.
"	Skidegate, "			W. H. Dempster.
"	Kitimat			Jas. L. Steele.
"	Essington			John Collins.
"	Bear River			John Conway.
"	Unuk River			Burt E. Daily.
"	Hartley Bay			Ed. McCoskrie.
Bella Coola	Victoria	Neil F. Mackay	Neil F. Mackay	
Sub-office	Bella Coola			Chris. Carlson.
Omineca District	Victoria	Neil F. Mackay		
Omineca Mining Divisi'n				
Sub-office	Fort St. James			Alex. C. Murray.
"	Fort St. John			F. W. Beatton.
"	Manson Creek			Ezra Evans.
"	Aldermere			
"	Lorne Creek			F. E. Holt.
Cariboo District	Barkerville	Jas. McKen		
Cariboo Mining Division	"		Geo. Walker	
Quesnel "	Quesnel Forks		W. Stephenson	
Lillooet District				
Clinton Mining Division	Clinton	F. Soues	F. Soues	
Lillooet "	Lillooet	C. Phair	C. Phair	
Kamloops District	Kamloops	G. C. Tunstall		
Kamloops Mining Div.	"		E. T. W. Pearse	
Sub-office	Nicola			Geo. Murray.
Ashcroft Mining Div.	Ashcroft		H. P. Christie	
Similkameen	Princeton		Hugh Hunter	
Sub-office	Hedley			F. M. Gillespie.
"	Nicola			Geo. Murray.
Yale Mining Division	Yale		Wm. Dodd	
Vernon District	Vernon	L. Norris		
Vernon Mining Division	"		H. F. Wilmot	
Boundary District				
Greenwood Mining Div.	Greenwood	W. G. McMynn	Geo. Cunningham	
Sub-office	Vernon			H. F. Wilmot.
"	Camp McKinney			H. Nicholson.
"	Beaverdell			F. F. Ketchum.
Grand Forks	Grand Forks	S. R. Almond	S. R. Almond	
Osoyoos Mining Division	Fairview	C. A. R. Lambly	J. R. Brown	
Sub-office	Olalla			John McDonald.
"	Hedley			F. M. Gillespie.
Golden District	Golden	J. E. Griffith		
Golden Mining Division	"		F. C. Lang	Colin Cameron.
Windermere "	Wilmer		E. J. Scovil	

Mining Districts and Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Fort Steele District	Cranbrook	J. F. Armstrong		
Fort Steele Mining Div.	"			
Sub-office	Steele			Joseph Walsh.
"	Fernie			A. Soyce.
"	Elkmouth			M. Phillipps.
"	Moyie			Fred. J. Smyth.
Slocan District	Kaslo	E. E. Chipman		
Ainsworth Mining Div.	"		R. J. Stenson	
Sub-office	Howser			W. Simpson.
"	Poplar Creek			J. Simpson.
"	Trout Lake			F. C. Campbell.
Slocan Mining Division.	New Denver		Angus McInnes	
Sub-office	Sandon			E. M. Sandilands.
Slocan City Mining Div.	Slocan City		H. R. Jorand	
Nelson District	Nelson	R. A. Renwick		
Nelson Mining Division	"		C. D. Blackwood	
Sub-office	Ymir			P. J. Gleazer.
"	Creston			J. Wilson.
Arrow Lake	Nakusp		W. Scott	
Sub-office	Vernon			H. F. Wilmot.
Revelstoke District	Revelstoke	Fred Fraser		
Revelstoke Mining Div.	"		W. E. McLauchlin.	
Illecillewaet	"		"	
Lardeau	Camborne		G. Sumner	
Trout Lake	Trout Lake		F. C. Campbell	
Sub-office	Poplar Creek			J. Simpson.
Rossland District	Rossland	John Kirkup		
Trail Creek Mining Div.	"		J. A. Hooson	
Nanaimo District	Nanaimo	Marshal Bray		
Nanaimo Mining Div	"		Marshal Bray	
Sub-office	Ladysmith			J. Stewart.
"	Alert Bay			W. Woollacott.
Alberni District	Alberni	A. L. Smith		
Alberni Mining Division	"		A. L. Smith	
Clayoquot	Clayoquot		W. T. Dawley	
Quatsino	Yreka		B. W. Leeson	
Victoria District	Victoria	Neil F. Mackay		
Victoria Mining Division	"		G. V. Cuppage	
New Westminster	New Westminster		C. C. Fisher	
Sub-office	Vancouver			R. J. Skinner.
"	Harrison Lake			L. A. Agassiz.
"	Chilliwhack			J. Pelly.

TABLE OF CONTENTS.

INDEX.

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

K.

L.

O.

P.

T.

U.

V.

W.

Y.

Z.

LIST OF ILLUSTRATIONS.

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1906.

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Series.

British Columbia. *Bureau of Mines.*

Annual Report of the Minister of Mines for the year ending 31st December, 1905, being an account of mining operations for gold, coal, etc., in the Province. William Fleet Robertson, Provincial Mineralogist. 273 p., plates, maps, 1905.

Victoria, Government Printing Office, 1906.

Author.

Robertson, William Fleet. *(Provincial Mineralogist.)*

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