ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31st DECEMBER,

1908,

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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1909

REPORT

OF THE

MINISTER OF MINES,

1908.

To His Honour the Honourable James Dunsmuir,
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 1908 is herewith respectfully submitted.

RICHARD McBRIDE,
Minister of Mines.

Minister of Mines' Office,
March, 1909.

FALLS ON INGENIKA RIVER, TWO MILES BELOW McCONNELL CREEK.

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, 1908.

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.,
March, 1909.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

:o:

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, consequently, 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 credited 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 1908.

Gold, placer	$ 70,196,103
Gold, lode	50,353,597
Silver	28,611,316
Lead	21,549,996
Copper	49,953,371
Coal and Coke	94,329,377
Building stone, bricks, etc.	7,893,100
Other metals	490,699
Total	$323,377,559

TABLE II.—Production for each Year from 1890 to 1908 (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
1906	24,980,546
1907	25,882,560
1908	23,851,277
Total	$323,377,559

TABLE

SHOWING MINERAL PRODUCTION

OF

BRITISH COLUMBIA.

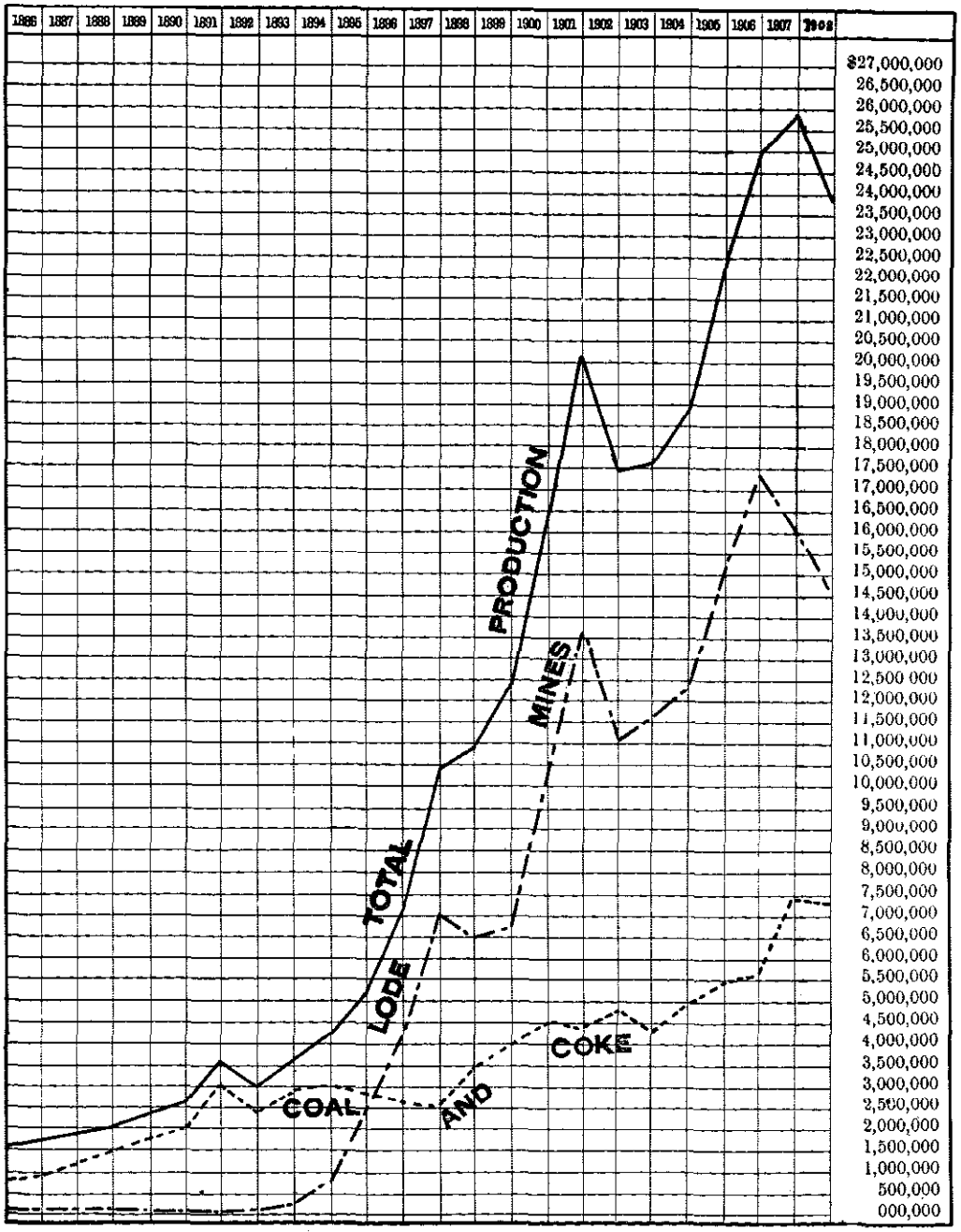


Table IV. gives a statement in detail of the quantity and value of the different mineral products for the years 1906, 1907 and 1908. As it has been impossible as yet to collect accurate statistics regarding building stone, lime, bricks, tiles, etc., these are estimated.

TABLE IV.

QUANTITY AND VALUE OF MINERAL PRODUCTS FOR 1906, 1907 AND 1908.

	Customary Measure.	1906.		1907.		1908.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer	Ounces.	.....	$ 948,400	41,400	$ 828,000	.....	$ 647,000
" lode	"	224,027	4,630,639	196,179	4,055,020	255,582	5,282,880
Silver	"	2,990,262	1,897,320	2,745,448	1,703,825	2,631,389	1,321,483
Lead	Pounds	52,408,217	2,667,578	47,738,703	2,291,458	43,195,733	1,632,799
Copper	"	42,990,488	8,288,565	40,832,720	8,166,544	47,274,614	6,240,249
Coal	Tons, 2,240lbs	1,517,303	4,551,909	1,800,067	6,300,235	1,677,849	5,872,472
Coke	" "	199,227	996,135	222,913	1,337,478	247,399	1,484,394
Other materials		.....	1,000,000	.....	1,200,000	.....	1,370,000
			$24,980,546		$25,882,560		$23,851,277

TABLE V.

PRODUCTION OF MINERAL BY DISTRICTS AND DIVISIONS.

NAME.	DIVISIONS.			DISTRICTS.		
	1906.	1907.	1908.	1906.	1907.	1908.
CARIBOO DISTRICT	.....	.....	.....	$ 405,400	$ 360,500	$ 405,000
Cariboo Mining Division	$ 355,800	$ 306,500	$ 355,000	.....	.....	.....
Quesnel "	39,600	44,000	30,000	.....	.....	.....
Omineca "	10,000	10,000	20,000	.....	.....	.....
CASSIAR DISTRICT	.....	.....	.....	555,599	572,809	298,234
EAST KOOTENAY DISTRICT	.....	.....	.....	5,171,024	5,548,880	4,802,680
WEST KOOTENAY DISTRICT	.....	.....	.....	4,660,352	4,792,976	5,448,224
Ainsworth Division	268,111	364,868	422,181	.....	.....	.....
Nelson "	515,709	614,395	462,836	.....	.....	.....
Slocan "	532,228	619,842	676,580	.....	.....	.....
Trail Creek "	3,223,587	3,049,702	3,713,392	.....	.....	.....
Other parts	120,717	144,169	173,235	.....	.....	.....
LILLOOET DISTRICT	.....	.....	.....	20,314	15,721	13,779
YALE DISTRICT	.....	.....	.....	8,779,711	8,444,326	7,649,963
Osoyoos, Grand Forks & Greenwood Divisions	8,698,470	8,354,995	7,545,380	.....	.....	.....
Similkameen & Nicola Divisions	2,624	56,564	101,583	.....	.....	.....
Yale Division	78,617	32,767	3,000	.....	.....	.....
COAST DISTRICTS (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria)	.....	.....	.....	5,388,146	6,147,348	5,233,397
				$24,980,546	$25,882,560	$23,851,277

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 1908, 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	1875	$ 2,474,004	1892	$ 399,526
1859	1,615,070	1876	1,786,648	1893	356,131
1860	2,228,543	1877	1,608,182	1894	405,516
1861	2,666,118	1878	1,275,204	1895	481,683
1862	2,656,903	1879	1,290,058	1896	544,026
1863	3,913,563	1880	1,013,827	1897	513,520
1864	3,735,850	1881	1,046,737	1898	643,346
1865	3,491,205	1882	954,085	1899	1,344,900
1866	2,662,106	1883	794,252	1900	1,278,724
1867	2,480,868	1884	736,165	1901	970,100
1868	3,372,972	1885	713,738	1902	1,073,140
1869	1,774,978	1886	903,651	1903	1,060,420
1870	1,336,956	1887	693,709	1904	1,115,300
1871	1,799,440	1888	616,731	1905	969,300
1872	1,610,972	1889	588,923	1906	948,400
1873	1,305,749	1890	490,435	1907	828,000
1874	1,844,618	1891	429,811	1908	647,000
				Total	$70,196,103

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
1906	224,027	4,630,639	2,990,262	1,897,320	52,408,217	2,667,578	42,990,488	8,288,565	17,484,102
1907	196,179	4,055,020	2,745,448	1,703,825	47,738,703	2,291,458	40,832,720	8,166,544	16,216,847
1908	255,582	5,282,880	2,631,389	1,321,483	43,195,733	1,632,799	47,274,614	6,240,249	14,477,411
To'l	2,446,811	50,353,597	49,665,404	28,611,316	534,859,728	21,549,996	331,512,530	49,953,371	150,468,280

* 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.
1836-73	480,872	$ 1,824,140
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
1906	1,517,303	4,551,909
1907	1,800,067	6,300,235
1908	1,677,849	5,872,472
Total	27,622,549 tons.	$84,988,130

COKE.

1895-7	19,396	$ 96,980
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
1906	199,227	996,135
1907	222,913	1,337,478
1908	247,399	1,484,394
Total	1,774,187 tons.	$9,341,247

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	1905		15,600	330,000						
	1906		17,790	355,800						
	1907		15,325	306,500						
	1908		17,760	355,000						
Quesnel "	1905		4,800	96,000						
	1906		1,980	39,600						
	1907		2,200	44,000						
	1908		1,500	30,000						
Omineca "	1905		500	10,000						
	1906		500	10,000						
	1907		500	10,000						
	1908		1,000	20,000						
Cassiar										
Atlin Division	1905		23,750	475,000						
	1906		22,750	455,000						
	1907		20,400	408,000						
	1908	2	10,150	203,000			90	45		
Liard, Stikine, Skeena and Queen Charlotte Divisions	1905	143	1,250	25,000	187	3,865	477	274	5,500	233
	1906	5,394	2,200	44,000	2	41	26	16		
	1907	9,611	1,250	25,000	165	3,410	2,291	1,422		
	1908	6,928	450	9,000	693	14,324	14,079	7,070		
East Kootenay										
Fort Steele Division	1905	170,078	708	14,160			1,137,872	652,342	48,248,828	2,045,750
	1906	180,036	520	10,400			1,049,536	665,931	44,487,481	2,264,413
	1907	154,968	500	10,000	6	124	821,367	509 740	37,526,194	1,801,257
	1908	165,313	170	3,400			641,865	322,340	30,204,768	1,141,741
Windermere-Golden	1905	226	50	1,000	14	289	16,880	9,677	149,584	6,842
	1906	243			10	207	22,174	14,069	167,691	8,585
	1907	64					3,955	2,455	73,842	3,544
	1908	714	20	400			3,364	1,899	358,270	13,543
West Kootenay										
Ainsworth Division	1905	3,331			28	579	99,781	57,204	1,002,114	42,490
	1906	19,431			19	393	165,915	105,273	3,178,553	161,524
	1907	17,781			118	2,439	301,322	187,000	3,654,775	175,429
	1908	38,282			162	3,349	314,142	157,762	4,790,216	181,070
Nelson "	1905	50,090	150	3,000	17,667	365,177	116,729	66,921	1,363,388	58,020
	1906	50,135	50	1,000	11,677	241,364	211,122	133,957	1,034,553	52,659
	1907	52,693	50	1,000	13,383	276,627	236,837	146,981	1,582,118	75,942
	1908	24,864	50	1,000	17,376	359,162	25,067	12,589	345,424	13,057
Slocan & Slocan City	1905	88,279			134	2,770	1,045,948	599,642	5,399,330	228,932
	1906	14,973			69	1,426	571,618	362,658	2,976,674	151,462
	1907	18,412			14	289	590,998	366,773	4,305,826	206,680
	1908	23,309			96	1,984	848,595	426,164	6,572,268	248,432
Trail Creek "	1905	330,618			129,843	2,683,865	147,753	84,707		
	1906	279,527			105,356	2,177,709	126,174	80,057		
	1907	285,923			94,573	1,954,824	126,661	78,606	4,514	217
	1908	302,419			142,314	2,941,630	129,558	65,034	29,692	1,122
Revelstoke, Trout Lake and Lardeau Divisions	1905	22,302	280	5,600	2,707	55,954	121,561	69,685	339,883	14,431
	1906	8,715	200	4,000	2,048	42,332	79,262	50,292	469,000	23,872
	1907	5,845	250	5,000	1,168	24,143	122,232	75,857	566,020	27,169
	1908	2,819	250	5,000	870	17,983	173,675	87,220	873,360	33,032
Lillooet										
Lillooet and Clinton M. D.	1905	133	1,500	30,000	125	2,584				
	1906	215	840	16,800	170	3,514				
	1907	309	600	12,000	180	3,721				
	1908	15	660	13,200	28	579				
Yale—BOUNDARY										
(Grand Forks, Greenwood and Osoyoos Divisions.)	1905	965,628	90	1,800	78,689	1,626,501	630,407	361,412	67,076	2,844
	1906	1,182,517	165	3,300	94,125	1,945,564	671,661	426,169	100,465	5,113
	1907	1,173,416	75	1,500	81,218	1,678,776	469,206	291,189	25,419	1,220
	1908	1,491,063	100	2,000	81,551	1,882,359	451,323	226,654	21,215	802
Similkameen, Nicola, and Vernon Div'ns.	1905	88	57	1,140	19	393				
	1906	3	125	2,500	6	124				
	1907	11	50	1,000			14	9		
	1908	57	50	1,000			23	12		
Yale, Ashcroft and Kamloops Divisions	1905	14,642	280	4,600	610	12,608	3,863	2,215		
	1906	3,837	250	5,000	215	4,444	1,034	656		
	1907	348	150	3,000	20	413	209	130		
	1908		150	3,000						
Coast (Nanaimo, Alberni, Clayoquot, Quatsino, New Westminster and Victoria Divisions).	1905	61,126	100	2,000	3,637	178,527	118,156	67,739		
	1906	218,846	50	1,000	10,330	213,521	91,745	58,212		
	1907	84,788	50	1,000	5,334	110,254	70,356	43,663		
	1908	27,831	50	1,000	2,492	51,510	29,598	14,864		
Miscellaneous (other metals, building stone, brick, etc.)	1905									
	1906									
	1907									
	1908									
TOTALS	1905	1,706,679	48,465	969,300	238,660	4,933,102	3,439,417	1,971,818	56,580,703	2,399,022
	1906	1,963,372	47,420	948,400	224,027	4,630,639	2,990,262	1,897,320	52,408,217	2,667,578
	1907	1,804,114	41,400	828,000	196,179	4,055,020	2,745,448	1,703,825	47,738,703	2,291,458
	1908	2,063,606	32,350	647,000	256,582	5,282,880	2,631,389	1,321,483	43,195,733	1,632,799

METALLIFEROUS MINES, ETC., FOR 1905, 1906, 1907 AND 1908.

COPPER.		TOTALS FOR DIVISIONS.				TOTALS FOR DISTRICTS.			
Pounds.	Value.	1905.	1906.	1907.	1908.	1905.	1906.	1907.	1908.
	$	$	$	$	$	$	$	$	$
						406,000	405,400	360,500	405,000
		300,000							
			355,800						
				306,500					
					355,000				
		96,000							
			39,600						
				44,000					
					30,000				
		10,000							
			10,000						
				10,000					
					20,000				
						504,372	555,599	572,809	236,234
		475,000							
			455,000						
				408,000					
1,014	134				203,179				
		29,372							
293,269	56,542		100,599						
674,887	134,977			164,809					
489,859	64,661				95,055				
						2,731,214	2,964,887	2,827,120	1,483,123
		2,712,252							
			2,940,744						
				2,321,121					
					1,467,481				
10,606	1,654	18,962							
6,910	1,332		24,143						
				5,999					
					15,642				
						5,257,659	4,548,253	4,707,876	5,228,224
		100,273							
			267,190						
				364,868					
					342,181				
92,663	14,446	507,564							
216,034	41,651		470,631						
434,222	86,845			587,395					
53,243	7,028				392,836				
		831,844							
2,861	552		516,128						
				573,742					
					676,580				
5,800,294	904,266	3,672,828							
4,750,110	915,821		3,173,587						
5,080,275	1,016,055			3,049,702					
5,042,244	685,576				3,673,392				
		145,650							
1,145	221		120,717						
				132,169					
					143,235				
						32,584	20,314	15,721	13,779
		32,584							
			20,314						
				15,721					
					13,779				
						6,433,504	8,674,710	8,289,288	7,429,824
27,670,644	4,313,853	6,306,410							
32,226,782	6,213,323		8,593,469						
31,521,550	6,304,310			8,276,995					
40,178,521	5,303,565				7,425,380				
		1,533							
			2,624						
2,586	517			1,526					
3,269	432				1,444				
680,808	106,138	125,561							
355,377	68,517		78,617						
36,120	7,224			10,767					
					3,000				
						784,131	1,263,339	771,533	266,227
3,437,236	535,865	784,131							
5,138,000	990,606		1,263,339						
3,083,080	616,616			771,533					
1,508,464	198,353				258,227				
						800,000	1,000,000	1,200,000	1,370,000
		800,000							
			1,000,000						
				1,200,000					
					1,370,000				
37,692,251	5,876,222	16,949,464				16,949,464			
42,990,488	8,288,565		19,432,502				19,432,502		
40,832,720	8,166,544			18,244,847				18,244,847	
47,274,514	6,240,249				16,494,411				16,494,411

TABLE X.

Showing Comparative Production in 1908 of Certain Minerals by British Columbia and Other Provinces of Dominion.

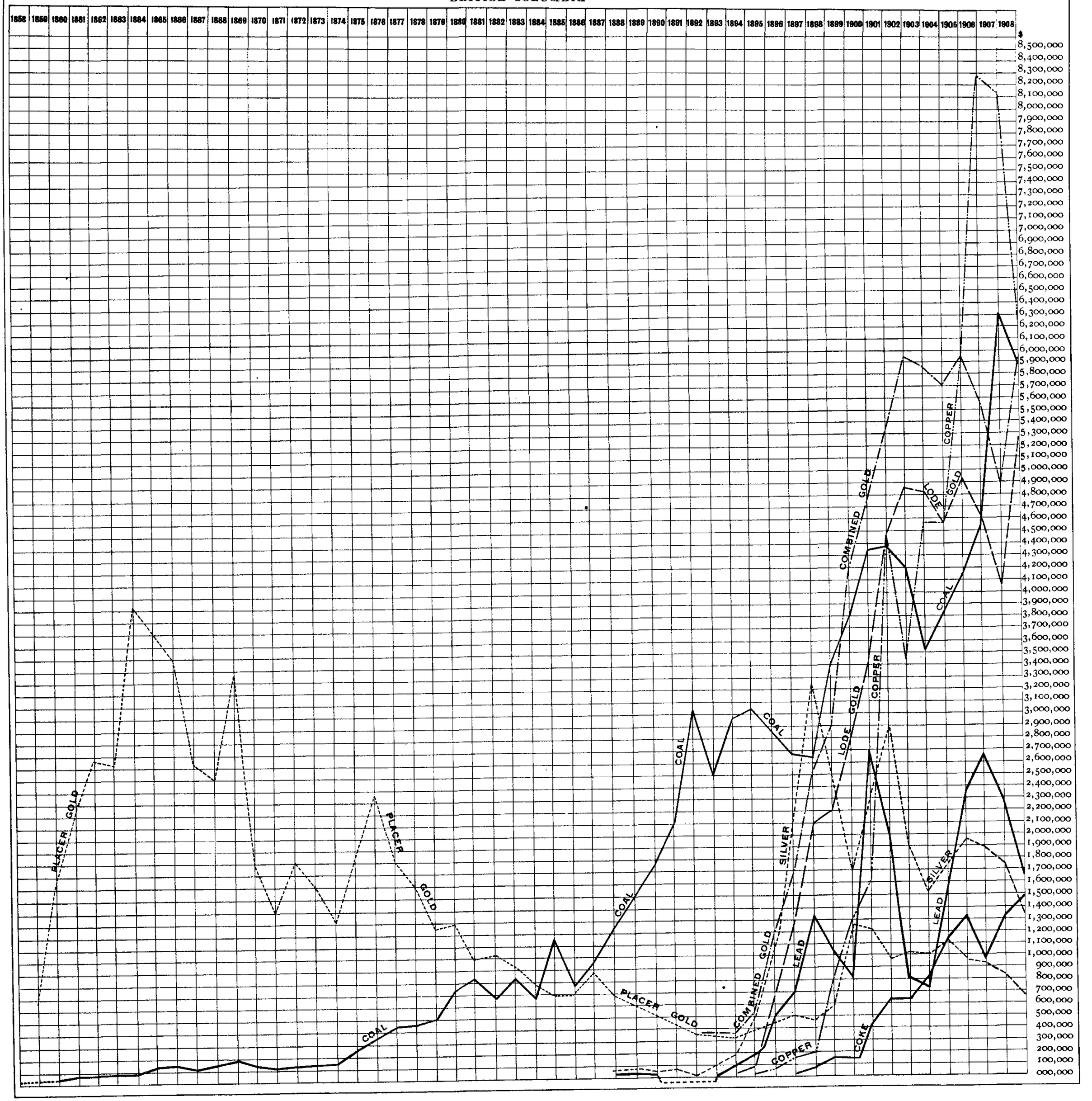
	Aggregate of Provinces.*	BRITISH COLUMBIA.	ALL OTHER PROVINCES COMBINED.
Gold		YUKON TERRITORY. $3,600,000	
Gold	$6,198,010	$5,929,880	$ 268,130
Silver †	11,064,517	1,321,483	9,743,034
Copper	8,403,359	6,240,249	2,163,110
Lead †	1,632,799	1,632,799	*Nil.*
Iron	1,664,302	*Nil.*	1,664,302
Coal	22,237,695	5,872,472	16,365,223
Coke	3,665,368	1,484,394	2,180,974
Total	54,866,050	$22,481,277	$32,384,773

* Taken from "Preliminary Report on the Mineral Production of Canada in 1908," corrected by final figures of British Columbia Statistics.

† At the British Columbia valuation.

TABLE

SHOWING MINERAL PRODUCTION OF BRITISH COLUMBIA



PROGRESS OF MINING.

The value of the mineral products of the Province for the year 1908 amounts to $23,851,277, which, while it is less than that of 1907 and 1906, is still considerably greater than that of any previous year.

The tonnage of ore mined in 1908 was the largest ever produced by the Province, and the average assay of the ore also slightly greater than that of 1907, but the average market value of the various metals for the year was much lower, which accounts entirely for the decreased value of this year's output; since the drop in the market price of metals amounts to some $3,966,826.

The tonnage of ore mined in the Province during the year 1908, exclusive of coal, was 2,083,606 tons, an increase over the proceding year of 279,492 tons or 15.5 %.

This total tonnage was produced by the various Districts in the following proportions:— Boundary, 71.6 percentage of total; Rossland, 14.5 %; Fort Steele, 7.9 %; Coast District, 1.7 %; all other Districts, 4.3 %.

The number of mines from which shipments were made in 1908 was 108, and of these only 59 shipped more than 100 tons each during the year, while but 33 shipped in excess of 1,000 tons, and of these 8 were in the Boundary District, 6 in Nelson Mining Division, 8 in Slocan District, 4 in Coast District, 3 in Rossland, 3 in Fort Steele M. D., and 1 in Trout Lake M. D.

The following table shows the number of mines which shipped ore during the year 1908; the districts in which they are located, and the tonnage produced in each district, together with the number of men employed, both above and below ground:—

TABLE SHOWING DISTRIBUTION OF SHIPPING MINES IN 1908.

	Tons of Ore Shipped.	No. of Mines Shipping.	No. of Mines Shipping over 100 tons in 1908.	Men Employed in these Mines.		
				Below.	Above.	Total.
CASSIAR:						
Atlin, Skeena & Queen Charlotte	6,930	2	1	9	90	99
EAST KOOTENAY:						
Fort Steele	165,313	3	3	353	118	471
Windermere	714	4	2	11	21	32
WEST KOOTENAY:						
Ainsworth	38,282	16	5	89	65	154
Nelson	24,854	18	11	163	94	257
Slocan	23,309	27	12	237	68	305
Trail	302,419	14	6	631	195	826
Other Divisions	2,819	4	4	51	18	69
LILLOOET	15	1	..	.....	1	1
YALE:						
Boundary	1,491,063	14	11	783	325	1,108
Ashcroft-Kamloops	.....	.....	.....	.....	.....	.....
Similkameen-Vernon	57	1	.....	6	9	15
COAST	27,831	4	4	115	85	200
Total	2,083,606	108	59	2,448	1,089	3,537

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 589 tons of ore mined for each man employed about the mines. In this respect, however, the districts vary very materially, since in the Slocan the figures show 134 tons mined to the man in the year, in the Nelson Division 97 tons, in Trail Creek (Rossland) Division 366 tons, and in the Boundary 1345 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, 1908.

DISTRICT.	Number of Mines.	Men employed under ground.	Men employed above ground.	TOTAL.
COAST AND CASSIAR	11	15	11	26
EAST KOOTENAY (Ft. Steele & Windermere)	7	2	..	2
SLOCAN D. (Slocan, Slocan City, Ainsworth)	43	43	10	53
NELSON	15	19	5	24
TRAIL CREEK	3	2	..	2
LARDEAU AND TROUT LAKE	3	1	..	1
BOUNDARY	20	37	12	49
Total	102	119	38	157

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 mined in the Province up to the end of 1908, aggregating $323,377,559. From this it will be seen that coal mining has produced more than any other separate class of mining—a total of $94,329,377—followed next in importance by placer gold at $70,196,103, and third by lode gold at $50,353,597.

The metal gold, derived from both placer and lode mining, amounts to $120,549,700, the greatest amount derived from any one mineral, the next important being coal, the total gross value of which, combined with that of coke, is $94,329,377, followed by copper at $49,953,371; silver at $28,611,316, and lead at $21,549,996.

TABLE II. shows the values of the total production of the mines of the Province for each year from 1890 to 1908, during which period the output has increased nearly ten-fold, and has now reached a production, for the past year, valued at $23,851,277, or more than double what it was in 1898. The value of the total products of the mines of the Province up to the end of 1908 is $323,377,559.

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 mining has been a constantly increasing industry during this whole period of 20 years, lode mining did not begin practically until 1894; since when it has risen with remarkable rapidity, though not without interruption, until it reached the $17,000,000 line, and the total production nearly reached the $26,000,000 line; although this year there is a drop, owing to the shrinkage of market values.

TABLE IV. gives the quantities 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 $181,000, and at the same time an increase in the output of lode gold of $1,227,860, making a net increase of $1,046,860 in the production of the metal.

The amount of silver produced this past year was 2,631,389 ounces, having a gross value of $1,321,483, a decrease from the preceding year of $382,342, due chiefly to the decreased production of the Nelson and Fort Steele Divisions.

The table shows an output of lead in 1908 amounting to 43,195,733 lbs., valued at $1,632,799, which is a decrease from the production of the preceding year of 4,542,970 lbs. of lead.

The production of copper this past year was 47,274,614 lbs., an increase in amount of 6,441,894 lbs. or about 15.77 per cent., but owing to the decreased market value of the metal the value of the product of 1908 was less than that of the previous year by $1,926,295.

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 again the Yale (Boundary) District has the honour of first place on the list, with West Kootenay, for many years our greatest producer, second, followed in order of output by the Coast and East Kootenay Districts.

The Coast and East Kootenay Districts, however, owe a considerable percentage of their outputs to the coal mines situated within their limits, whereas in the other districts the production is almost entirely from lode mining.

TABLE VI. gives the statistical record of the placer mines of the Province from 1858 to 1908, and shows a total production of $70,196,103. The output for 1908 was $647,000, a decrease of about 21.8 % 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 quantities and values of the various metals produced each year since the beginning, in 1887, of such mining in the Province. The gross value of the product of these mines to date is $150,468,280. The production in 1908 was $14,477,411, a decrease from the preceding year of $1,739,436, or about 10.7 per cent.

TABLE VIII. contains the statistics of production of the coal mines of the Province. The total amount of coal mined to the end of 1908 is 27,622,549 tons of 2,240 lbs., worth $84,988,130. Of this there was produced in 1908 some 1,677,849 tons, valued at $5,872,472.

In these figures of coal production the coal used in making coke is not included, as such coal is accounted for in figures of output of coke.

The amount of coal used in 1908 in making coke was 431,538 tons, from which was made 247,399 tons of coke, having a value of $1,484,394, an increase over the preceding year of 24,486 tons of coke, equal to 10.9 %, with an increased value of $146,916.

While 247,399 tons of coke was actually made, only 246,631 were sold, owing to the sudden shutting down of the smelters on the Coast, necessitating the carrying over of 768 tons of coke in stock.

Within the last three years the selling prices of coal and coke have risen, and it has been estimated that the average selling prices are now approximately $3.50 per ton (2,240 lbs.) for coal, and for coke $6 per ton of 2,240 lbs., which prices have been used in calculating the values of these productions. The prices formerly used in such calculations prior to 1907 were $3 and $5 per ton respectively.

More detailed statistics as to the coal production of the Province and of the separate districts are given elsewhere in this Report.

TABLE IX. gives the details of production of the mines of the Province (excepting coal mines) for the years 1905, 1906, 1907 and 1908, 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 2,083,606 tons having a gross value of $16,494,411.

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

Yale (Boundary) District	71.5	per cent.	of tonnage and	51.3	per cent.	of values.
Trail Creek M. D.	14.5	"	"	25.3	"	"
Coast Districts.....	1.7	"	"	1.8	"	"
Fort Steele M. D.....	7.9	"	"	10.1	"	"
Slocan District.....	3.0	"	"	4.7	"	"
Other Divisions	1.4	"	"	6.8	"	"
	100			100		

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 1908 British Columbia produced of the metals and coal an amount over 69.4 per cent. of that of all the other Canadian Provinces combined.

COAL.

While nearly all the coal mined in British Columbia during the year 1908 was produced by three companies, viz. : The Crow's Nest Pass Coal Co. in East Kootenay, the Wellington Colliery Co., and the Western Fuel Co. on Vancouver Island, it is encouraging to note that several new collieries are being opened up which promise, in the near future, probably this coming year, to produce a considerable tonnage of coal.

Of these new collieries, probably the most important is the Hosmer Mines, Ltd., at Hosmer, a few miles north of Fernie in East Kootenay, where the seams being opened up are supposed to be the same series as that now being worked by the Crow's Nest Pass Coal Co. A description of the development of this colliery is given elsewhere in this report, and it is sufficient to say here that the plant installed is most extensive and modern in all respects, while the fact that the company is an offshoot of the Canadian Pacific Railway, guarantees to it an ample market, even in supplying the wants of that railway and its allied interests.

Another colliery that has just been opened up in the same section of East Kootenay is the Corbin Mines, at Corbin, on McGillvray creek. These coal seams are also supposed to belong to the same series as those being worked by the Crow's Nest Pass Coal Co. and at Hosmer, but are on the opposite, or eastern, side of the coal basin.

The company, as its name implies, is associated with powerful railway interests to the south, and it would seem that a large output was also guaranteed thereby for this colliery. At present the colliery is connected by a branch railway with the Canadian Pacific Railway system near the Loop, just west of the British Columbia boundary line but, as a charter has ust been granted for the purpose, it is almost certain that, within a year or two, further r l. way connection will be given this colliery by a line passing down the valley of the Flathead river, south into Montana, there connecting with the large railway systems of the United States.

In the Coast District, among the newer collieries that are beginning to make an appreciable output may be mentioned the Nicola Valley Coal & Coke Co., which shipped in 1908 some 26,227 tons of coal, and this production was limited by the market which the Canadian Pacific Railway freight rates would allow it to reach, rather than by the capacity of the mines. Adjoining this colliery is the Diamond Vale Colliery Co.'s property, which, though still in a state of development, mined in 1908 some 3,011 tons of coal.

On Vancouver Island the South Wellington Coal Mines, Ltd., mined at South Wellington —a few miles south of the city of Nanaimo—some 19,153 tons of coal, which amount is likely to be very much exceeded during the coming year, as the company is about to build its own branch railway down to salt water at Boat harbour, from which point shipment by water will be made.

The Gilfillan Colliery, McGowan & Co., at Wellington, mined 9,765 tons of coal.

The gross output of the coal mines of the Province for the year 1908 was 2,109,387 tons (of 2,240 lbs.), and as 12,820 tons additional were taken from stock, it makes the total quantity of coal disposed of during the year 2,122,207 tons; of this gross amount 918,872 tons were sold for consumption in Canada, 567,274 tons were exported to the United States, and 29,883 tons were exported to other countries, making the total amount of coal sold 1,516,029 tons.

In addition to the sales, there was used in making coke 431,538 tons of coal, while 174,640 tons were consumed under colliery boilers, etc.

From the amount of coal mentioned there was produced 247,399 tons (2,240 lbs.) of coke, of which amount 768 tons were added to stock, leaving the net coke sales of 246,631 tons, of which 209,317 tons were sold for consumption in Canada, while the remainder 37,314 tons, was exported to the United States.

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

Coal.	Coast District.	Crow's Nest Pass District.	Total for Province.
Sold for consumption in Canada.....(Tons—2,240 lbs)	717,964	200,908	918,872
" export to United States..... "	300,445	266,829	567,274
" export to other countries..... "	29,883	.....	29,883
Total for District....	1,048,292	467,737	1,516,029
Coke.			
Sold for consumption in Canada.....(Tons—2,240 lbs)	2,904	206,413	209,317
" export to United States..... "	3,118	34,196	37,314
" export to other countries..... "	.....	.....	.....
Total for District....	6,022	240,609	246,631

COAST COLLIERIES.

The Coast Collieries mined in 1908 1,226,182 tons of coal, which, with an addititional 13,921 tons taken from stock, makes the amount of coal distributed from these collieries in 1908 come to a total of 1,240,103 tons, which was distributed as follows :—

Sold as coal in Canada	717,964 tons	
" United States	300,445 "	
" other countries	29,883 "	
Total sold as coal		1,048,292
Used under companies' boilers, etc.		120,523
Used in making coke		71,288
		1,240,103

The total coal sales of the Coast Collieries for the year show, as compared with the sales of the previous year, a decrease of 31,453 tons, equivalent to only 2.9 per cent., but are still considerably in advance of those of the year 1906.

The consumption of coal in that portion of British Columbia served by the Coast Collieries shows in 1908 an increase of 19,923 tons, equal to 2.85 % over the preceding year, while the amount sold for export to countries other than the United States also shows an increase of 7,845 tons, equal to 35.6 %.

The decrease seems, therefore, to be confined to the export sales to the United States, which in 1908 show a dropping off of 59,221 tons, or about 13.7 % as compared with 1907, while, as compared with 1906, the decrease is still greater, amounting to 132,738 tons, or about 30.6 % of the shipments in that earlier year to the United States These decreased sales to the United States seaboard are accounted for primarily by the use of oil fuel in California and, to a lesser extent, by the importation of coal from the Orient.

The production of coke in the Coast District in 1908—and which is confined to the one company producing, the Wellington Colliery Co—was 12,530 tons, of which, however, only 6,022 tons were sold. Of this amount, 2,904 tons was for consumption in British Columbia and 3,118 tons to the United States, while 6,508 tons were added to stock during the year.

These figures show a very great falling off in the consumption of coke in the Coast section of British Columbia; as compared with 1907, the decrease is 11,688 tons, or equal to 80 %.

The coke export to the United States from the Coast District, which in 1907 was almost *nil*—only 220 tons—has in 1908 somewhat revived and amounted to 3,118 tons, but even at that figure is not yet half the amount so exported in 1906.

EAST KOOTENAY COAL FIELD.

The Rocky Mountain coal field—that portion of which to the west of the main summit is in the East Kootenay District of British Columbia—has been developed rapidly within the past few years, not only on the British Columbia side of the divide but also in Alberta; on both sides of the field the markets are identical and the conditions as to working very similar.

The returns of the eastern slope, or Alberta side, are made to the Government of that Province, from whence they can be obtained by those interested.

In the East Kootenay coal field, until this year, there has been but one company operating —the Crow's Nest Pass Coal Company—but, during 1908, two new producers have entered the field, *i.e.*, the Hosmer Mines, Ltd., and the Corbin Coal & Coke Company, the details of whose operations are given elsewhere, as are also some particulars as to other properties at present under development.

By far the greater proportion of coal produced in the district is mined by the Crow's Nest Pass Coal Co., operating collieries at Michel, Coal Creek (Fernie), and Carbonado, the united gross output of which, this past year, was 876,467 tons of coal, of which 359,703 tons were used in making coke, some 234,098 tons being produced.

Hosmer Mines produced 2,627 tons of coal and 771 tons of coke, while the Corbin Coal and Coke Co. produced some 4,111 tons of coal, but has not, as yet, made coke.

The collieries in the East Kootenay District made in 1908 a gross production of 883,205 tons of coal, of which 1,101 tons were still in stock at the end of the year, leaving the amount of coal distributed 882,104 tons; of this amount 360,250 tons were used in making coke, some 234,869 tons being produced.

The following table shows the disposition made of the coal output of this district:—

Sold as coal in Canada	200,908 tons	
" United States	266,829 "	
Total sold as coal		467,737
Used by company in making coke		360,250
Used under company's boilers, etc		54,117
		882,104 tons.

The amount of coke actually produced in 1908 was 234,869 tons (2240 lbs.), all of which, together with 5,740 tons taken from stock, was sold, making the total coke sales for the year 240,609 tons.

The sales were made as follows:—206,413 tons coke sold for consumption in Canada and 34,196 tons for export to the United States.

As compared with the previous year, the coke production of 1908 shows an increase of 28,328 tons, or 13.7 %; the total coke sales show an increase of 39,732 tons, or 19.7 %; the coke sales in Canada show an increase of 65,426 tons, or 46.4 %; but the coke sales to the United States show a decrease of 25,694 tons, or 42.9 %.

It might be said, with reference to the output of this district, that the operations of the large producing company were considerably hampered by the fire which destroyed most of the town of Fernie in August, 1908, together with the company's slack-coal pockets, etc.

This company's output was also temporarily retarded by the inauguration of a more permanent system of mine development, which, when completed, will, it is expected, amply repay in coming years for any temporary retardation and render the mines more regular in their output and safer for the workmen.

GOLD.

Placer Gold.

The production of placer gold during the year 1908 was about $647,000, a decrease as compared with the previous year of $181,000, or 21.8 %. Placer gold mining, while probably the most fascinating form of mining, since a prospector can attempt it without the aid of capital, is certainly subject to the greatest fluctuations, even after it passes out of the range of individual methods into the hands of large companies. The fluctuation this year has been downward, particularly in the Atlin District—last year our largest producing district—where this year's production was $203,000, only half what it was the year before. In this camp—as is usual in placer camps once they become firmly established—the ground has passed into the possession of a few large companies, and the temporary stopping of one of these companies makes a large percentage of decrease in the output. In Atlin it was the Atlin Consolidated Mining Company, owning the "Guggenheim

Steam Shovel," that failed to operate, while another large company, the Pine Creek Power Company (Ruffner's holdings) was enlarging its ditch and was therefore prevented from getting through it the necessary water for gravel-washing.

In the Dease Lake section of Stikine Division, the Berry Creek Co.—the largest Company there—failed to operate this year, so reducing the output of the camp by two-thirds.

The Cariboo District—including Barkerville and Quesnel sections—this year, as it has done for some years past, held its own and produced over half the placer output of the Province.

Dredging for gold has not been successful; the inland dredges at Atlin have been abandoned, and, although a little dredging was done at Lillooet and Yale on the Lower Fraser river, the amount of gold recovered was small.

Gold from Lode Mining.

The value of gold produced from lode mining in the Province during the year 1908 was $5,282,880, an increase of some $1,227,860, or over 30 %. This remarkable increase was due principally to the Rossland Camp, which produced this year some $986,806, or 50 %, more gold than in 1907, partly by an increased tonnage, but chiefly through an increased average assay value of ores of the camp.

The next largest increase in gold output was from the Boundary District, which shows an increase of $213,583, or about 12.7 %, but as the tonnage mined in this district increased about 27 %, it indicates that the average gold tenure of ore smelted was slightly lower this year.

Nelson Mining Division shows an increase of some $82,535, chiefly due to the activity of the gold-bearing properties in Sheep Creek camp, in the vicinity of Salmo.

The only district showing a large deficit in lode gold output was the Coast District, which produced $58,744 less gold than in previous years.

About 87.5 % of the lode gold output of the Province was recovered from the smelting of copper-bearing ores. The remaining 12.5 % was recovered by stamp milling, etc.

The only large stamp mill in operation was at Hedley, in the Osoyoos Mining Division, which milled some 42,000 tons of ore, producing about 20,000 ounces of gold.

SILVER.

The total amount of silver produced in the Province during the year 1908 was 2,631,389 ounces, valued at $1,321,483, a decrease in amount of 114,059 ounces and in value $382,342.

The average market price of silver in 1908 was 11.84 cents per ounce lower than in 1907, which on the present year's output accounts for $311,556 of the decrease in value this year.

About 77 % of the total silver output was obtained from ores in which it was found associated with lead, the remainder being found chiefly in conjunction with copper-bearing ores.

The Slocan District—including Ainsworth, Slocan, Slocan City and Trout Lake Mining Divisions—provided about 50 % of the total Provincial output of silver this year, and the Fort Steele Mining Division about 24 %, all from argentiferous galena.

LEAD.

The lead production of the Province for the year 1908 was 43,195,733 lbs. of lead, having a market value of $1,632,799, showing, as compared with the previous year, a decrease in amount of 4,542,970 lbs. of lead, or 9.5 %, and a decrease in value of $658,659, or 29 %.

The average market price of this metal for the year 1908 was a little over one cent a pound lower than for the previous year.

The lead production is this year, as usual, derived chiefly from the Fort Steele Mining Division, as is shown in the following table:—

Fort Steele M. D. produced	30,204,788 lbs.	lead = 69.9 %	of total.
Slocan "	6,572,268 "	15.2 "	
Ainsworth "	4,790,216 "	11.1 "	
Trout Lake "	873,860 "	2.1 "	
Nelson	345,424 "	0.8 "	
All others	409,177 "	0.9 "	
	43,195,733	100.00	

COPPER.

The output of copper made in 1908 was 47,274,614 pounds of copper, having a gross market value of $6,240,249.

This is the largest year's output that the Province has ever made, and is an increase over the preceding year in the amount produced of 6,441,894 lbs., or about 15.7 per cent., but despite this substantial increase in the amount produced, owing to the lower average market value of the metal for the year 1908, the value of this year's output is $1,926,295, or 23.5 per cent., less than was the output of 1907.

The average market price for the year 1908 was 6.8 cents a pound less than it was in 1907, and this means a direct loss to the producers of $3,214,674.

The great increase in production was made in the Boundary District, due to the increased tonnage of ore mined.

There was a decrease in the production of the Coast Districts of 1,760,630 lbs., or nearly 50 per cent.

The following table shows the production of the various districts for the years 1906, 1907 and 1908:—

	1906.	1907.	1908.	
Yale (Boundary) District	32,226,782 lbs.	31,521,550 lbs.	40,181,790 lbs.	= 85.0 %
Rossland "	4,750,110 "	5,080,275 "	5,042,244 "	10.7 "
Coast & Cassiar "	5,431,269 "	3,757,967 "	1,997,337 "	4.2 "
Yale-Kamloops "	355,377 "	36,120 "	.....	.....
Nelson "	216,034 "	434,222 "	53,243 "	.1 "
Other Districts	10,916 "	2,586 "	.....	.....
	42,990,488 "	40,832,720 "	47,274,614 "	100.00

The average assays of the copper ores of the various camps, based upon the copper recovered, were as follows:—

Boundary, 1.35 %; Coast, 2.87 %; and Rossland, 0.834 %.

OTHER MINERALS.

Iron Ore. There has been no iron ore mined in the Province this past year, other than that necessarily mined in development work, and none of this has been shipped, the reason being that there is no iron blast-furnace in operation within the district, and, consequently, no market for iron ore.

Zinc Ore. There has been a comparatively small quantity of zinc ore produced this past year, although the industry has not been neglected. There has for some years been a question as to how the United States tariff applied to zinc ore concentrates, and the decisions have been contradictory; if such ores were rated as a partly manufactured product, that classification rate was prohibitory, and prevented export to that country. Since the close of the year, however, a final ruling has been given by the United States Treasury Board, which will admit the zinc ore into the United States free of duty, and this will permit of a considerable quantity of ore being marketed during the coming year.

The Canadian Metal Company's plant on Kootenay lake has made a considerable tonnage of zinc concentrates, which have been shipped, but as the manager writes that settlements for these shipments have not yet been made, they are not included in this year's output.

The Canadian Zinc Company's plant at Nelson, for the treatment of complex zinc-lead-silver ores by electro-thermic smelting, was completed last fall and several "runs" made, which, while they were considered to have demonstrated the metallurgical feasibility of the process, developed a number of mechanical and electrical problems which have so far prevented the commercial operation of the plant. A description of the plant is given elsewhere in this Report.

Platinum. While platinum is found in many of the alluvial gold workings, where it can be saved as a by-product, the saving of it in a small way is attended with so much trouble that it has been practically neglected and no appreciable production made.

Building Stone. Excellent building stone of various sorts is found in abundance in almost every part of the Province, but the fact of its wide-spread distribution has, however, been somewhat against the establishment of large quarrying industries, as a sufficient local supply could always be obtained, and, except within reach of the larger cities, few regularly equipped quarries have been opened.

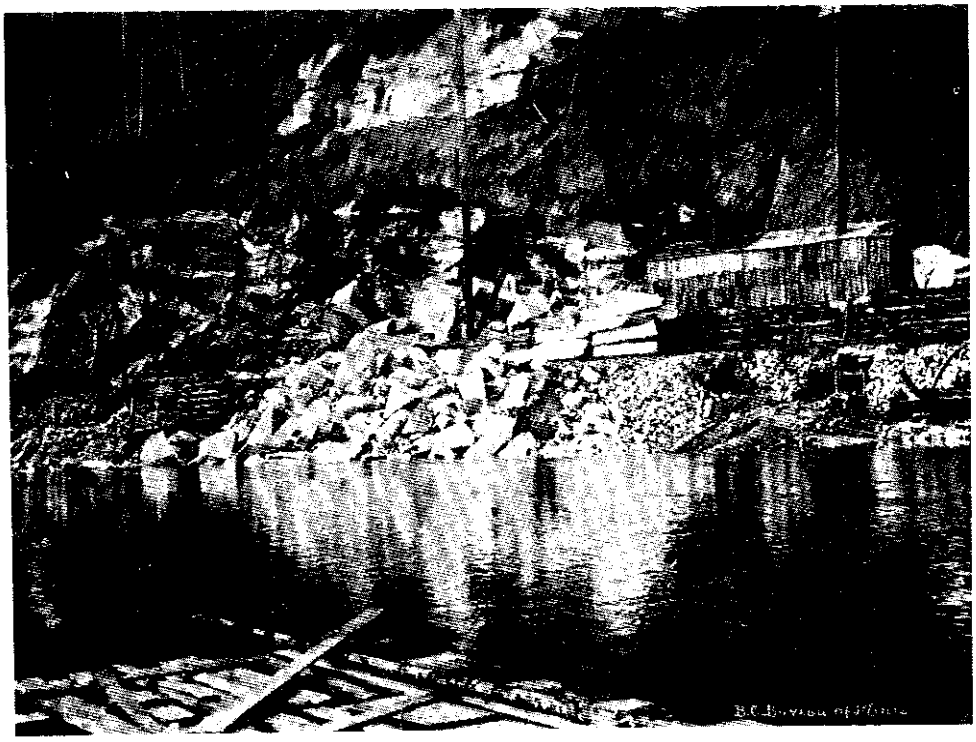
On the Coast, chiefly between Vancouver island and the Mainland, there are several well-equipped quarries taking out granite, sandstone and andesite, all of excellent quality. These quarries supply the stone building material of the Coast cities, and also export to the United States.

A detailed description of the more important quarries was given in a previous report of this Bureau.

Marble. In the interior of the Province, the Canadian Marble & Granite Company opened a marble quarry on the line of the Lardo-Trout Lake Railway, about eight miles from Lardo, and took during 1908 block marble which, when sawed into slabs, amounted to some $50,000 in value. From the same vicinity marble was taken for the construction of the Court House and Government Building, and also for a bank building at Nelson, the value of which stone is not known.

On the Coast, the Nootka Marble Quarries, Ltd., has opened up a quarry on Nootka Sound, on the West Coast of Vancouver island, from which some very beautiful marble has been taken, but, as the Company only commenced shipments in December, the value of the product for 1908 was merely nominal.

NOOTKA MARBLE CO.'S PLANT, NOOTKA SOUND, V. I.



CANADIAN MARBLE & GRANITE CO.'S MARBLE QUARRY, LARDO, W. K.

A detailed description of these companies' plants is given later in this Report, under the districts in which they are located.

Red Brick. The rapidly increasing demand for building brick is being met by the various yards. This demand is, as yet, chiefly in the Coast cities, and it is in these vicinities that the greatest production has been made. Suitable clay deposits are found in all parts of the Province, and the demands for brick are, for the greater part, met by local production.

A special report by the Provincial Assayer on the "Clay Deposits and Brick-yards of the Coast" appears in another portion of this Report.

Fire Brick and Fire Clay. The coal mines at Cumberland shipped about 5,000 tons of fire clay for use in the manufacture of pottery, etc., the B. C. Pottery Works' sales for the year amounting to over $100,000. The fire brick plant at Comox has made no material shipments this year.

There is a very fine deposit of fire clay at Clayburn, near Vancouver, from which an excellent quality of pressed brick and fire brick is made by the Vancouver Fire Clay Co.

Fire brick made here has recently been used in the construction of the more recent coke ovens in the Crow's Nest Pass District, whereas formerly brick for this purpose was brought from Pennsylvania.

Lime-Silica Brick. The Silica Brick & Lime Company, whose plant, located near Victoria, was described in last year's Report, has been in operation all the year, and has produced, approximately, 3,000,000 brick, which have been sold at an average price of about $12 a thousand.

Lime. The manufacture of lime is carried on in a small way at a number of points, while near Victoria, on the Saanich arm, Texada island, near Vancouver, and elsewhere, there are kilns which make a considerable output. Limestone is to be found in nearly every part of the Province, and on the Coast, where the greater part of the production is made; the limestone deposits are particularly and unusually pure, yielding a lime of exceedingly good quality.

Cement. The only company producing cement in British Columbia is the Vancouver Portland Cement Co., with works at Tod inlet, on the Saanich arm. The capacity of these works at present is 300,000 barrels of cement a year, manufactured from clay and limestone quarried on the Company's property a few yards from the plant. The Company sold in 1908 some 170,861 barrels of Portland cement, valued at $256,300.

Oil and Oil Shales. No very serious attempt has been made at drilling for petroleum during the past year. The Flathead field, in which oil is supposed to exist, will, in all probability, be traversed this coming year by a railway, which would materially lessen the cost of prospecting work, and it is probable no serious work will be attempted until the railway shall be in operation.

Of the oil-bearing shales near Harper's Camp, Quesnel District, which were talked of a couple of years ago, nothing further has been heard.

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.

Provincial Mineralogist.

Immediately after the publication of the Report for the previous year and the finishing of the office work, the Provincial Mineralogist started on a long overland trip to the headwaters of the Finlay river, to investigate the reports of the finding of placer gold diggings in that district. Arrangements were made in advance, by sending a man to Hazelton to have a pack-train ready for the first opening of the trail, and the Provincial Mineralogist left Victoria on June 3rd, by the steamer "Camosun," arriving at Essington on the 8th and at Hazelton on the 14th, the journey up the Skeena being interrupted, as the Hudson Bay Company steamers could not run between the Little and Big canyons; this distance of 15 miles had to be made on foot, the baggage being taken in canoes poled by Indians. The pack-train left Hazelton on the 16th and was the first over the trail.

McConnell creek, at the headwaters of the Ingenika river, was reached on July 17th, and the camp there was inspected.

On July 21st the pack-train started from McConnell creek for Lake Thutade, the headwaters of the Finlay river, that river being followed down for some 41 miles to Delta creek; this creek was then followed up to the summit and a pass found on to Bower creek, which creek was followed down to its junction with the Finlay river, two miles below the canyon of the Finlay. The route from McConnell creek to this point was through unknown country and, as no trails existed, a trail had to be prospected out and cut for the passage of horses.

At this point, on August 11th, the pack-train was sent back light, the Provincial Mineralogist with three men deciding to proceed down the Finlay river, along the banks of which there was no possible way of taking horses.

A boat was built of whipsawed lumber and the party travelled in it as far as Fort Grahame, a distance of 120 miles, the baggage being portaged around Deserters' canyon, and the boat paddled through light.

At Fort Grahame an old canoe was procured and repaired, in which the journey was continued down the Finlay to the head of the Peace river, then up the Parsnip and Pack rivers

to McLeod lake, a distance of 152 miles; from here one of the men returned to Fort Grahame. From McLeod lake to Fort St. James, a distance of 85 miles, the trip was made on horses obtained from Indians.

At Fort St. James a Hudson Bay Company's scow was taken to the portage between Fraser and Babine lakes, a distance of 35 miles, and after crossing the portage, no Indians being available, a canoe—kindly loaned by the Dominion Government Hatchery officials—was taken down Babine lake to Babine post, a distance of 105 miles.

At Babine, a post of the Hudson Bay Company, the pack-train, which had been sent back light, was met and the journey continued to Hazelton, arriving there on September 16th.

The time occupied by the trip from Hazelton and returning to that point was 90 days, during which camp was moved 70 times.

From Hazelton down the Skeena to Essington the trip had to be made by canoe.

At Essington the steamer "Princess Beatrice" was taken and Victoria was reached on the evening of September 24th.

The distance travelled was estimated at, approximately, 2,626 miles, divided as follows:—

By steamer, 1,455 miles; by pack-train or on foot, 559 miles; by canoe or bateau, 612 miles.

These distances and the modes of travelling are set forth in tabular form in the following table:—

From	To	Steamer.	Pack train or on foot.	Canoe or Bateau.	Total.
Victoria	Essington	645			
Essington	Hazelton	165	15		
Hazelton	Babine		70		
Babine	Tacla Lake		37		
	On Tacla Lake			20	
Tacla Lake	McConnell Creek		133		
McConnell Creek.	Finlay River		137		
	Below canyon on Finlay River			180	
	On Parsnip and Pack Rivers			92	
McLeod Lake	Fort St. James		85		
Fort St. James	Portage			35	
	On Portage		12		
Portage	Babine Post			105	
Babine Post	Hazelton		70		
Hazelton	Essington			180	
Essington	Victoria	645			
		1,455	559	612	2,626

Arriving at Victoria at 9.20 P. M. on the 24th, the Provincial Mineralogist took the steamer the same night to Vancouver to meet the Canadian Mining Institute—then visiting the Province—returning to Victoria on the 27th of September.

On October 6th, the Provincial Mineralogist left Victoria for the Crow's Nest Pass to investigate as to the cause of certain "bumps" which had occurred during the summer in the coal mines at Coal Creek, near Fernie, causing considerable loss of life. During this trip the coal mines at Michel, Carbonado and Hosmer were also visited.

Returning to Nelson, under instructions of the Department, the Electro-thermic Smelting plant of the Canada Zinc Co. was examined and a report thereon made to the Government.

A short trip was made to Rossland to the Le Roi Mine and then to the Northport Smelter; from Northport the train was taken to Salmo and to the gold-producing camp at Sheep creek.

A return was then made to Victoria, arriving there on October 22nd, when the report of these trips was made and presented to the Government.

In May, and again in December, examinations for Assayers were held in the Government Laboratory, Victoria, by the Board of Examiners, appointed under the Act, on which Board the Provincial Mineralogist and Provincial Assayer sat as examiners.

The remainder of the season was employed in the preparation for publication of the notes taken in the field, the collection and preparation of statistics and the routine work of the office, which included, in connection with the various inquiries for information and the collection of statistics, the sending out of, approximately, 1,200 letters, with about the same number received.

In addition to the work performed in the Assay office, which is noted in a separate report herewith, the Provincial Assayer was engaged during the summer in obtaining data for, and preparing, a report on the Clay Deposits of the Coast, which is contained in this Report.

ASSAY OFFICE.

The following is a summary of the work of the Assay Office of the Bureau for the year 1908, as reported by the Provincial Assayer, Mr. Herbert Carmichael:—

During the year 1908 there were made by the staff in the Government Assay Office 950 assays or quantitative determinations, which is a slight 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	$ 400 00
" melting and assaying gold dust and bullion	352 00
" assayers' examinations	195 00
Total cash receipts	$947 00
Determinations and examinations made for other Government Departments for which no fees were collected	400 00
Value of assaying done	$1,347 00

The value of gold melted during the year was $45,255, in 78 lots, as against $63,540 in 84 lots in 1907.

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 any fees charged, as it is the established custom of the Bureau to examine and test qualitatively, without charge, samples of minerals 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 discovery 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.

A number of clays and shales have been analysed, and during the year a large amount of photographic work has been done.

EXAMINATIONS FOR ASSAYERS.

Report of Herbert 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, and such have duly taken place.

Both these examinations were held in the Government Laboratory at Victoria, each occupying a week; the first examination began on May 4th, and the second on December 7th, 1908.

At the first examination the Board consisted of the Provincial Mineralogist, Mr. D. E. Whittaker, Assistant Assayer, and Mr. W. J. Watson, Manager Tyee Smelter, Ladysmith; at this examination two candidates came up for examination, and both passed the required examination. At the December examination the Board consisted of the Provincial Mineralogist, the Provincial Assayer and Mr. D. E. Whittaker, the Assistant Assayer, at which five candidates stood for examination and three successfully passed.

In addition to the five candidates mentioned above, who successfully passed the examinations, the Board recommended during the year the granting of one certificate by exemption, under sub-section (2) of section 2 of the Act. In accordance with these recommendations, all these six certificates have been duly issued by the Honourable the Minister of Mines.

The following is a list, up to December 31st, 1908, 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	Jedway.
Baker, C. S. H	Greenwood.
Barke, A. C	Greenwood.
Belt, Sam'l. Erwin	Greenwood.
Bernard, Pierre	Monte Christo, Wash.
Bishop, Walter	Grand Forks.
Buchanan, James	Trail.
Campbell, Colin	New Denver.
Carmichael, Norman	Clifton, Arizona.
Church, George B	
Cobeldick, W. M	Scotland.
Collinson, H	
Comrie, George H	Vancouver.
Crerar, George	
Cruickshank, G	Rossland.
Day, Athelstan	Dawson.
Dedolph, Ed	Nelson.
Dockrill, Walter R	Chemainus.
Dunn, G. W	Rossland.
Farquhar, J. B	Vancouver.
Fingland, John J	Sandon.
Grosvenor, F. E	Riondel.
Hannay, W. H	Rossland.
Mitchell, Charles T	Grand Forks.
McCormick, Alan F	Ruth, Nevada.
MacDonald, Alex. C	Vancouver.
McFarlane, James A	Kaslo.
Nicholls, Frank	Norway.
O'Sullivan, John	Vancouver.
Parker, Robt. H	Rossland.
Parsenow, W. L	
Perkins, Walter G	Basin, Montana.
Pickard, T. D	Observatory Inlet.
Richmond, Leigh	
Robertson, T. R	
Rombauer, A. B	Butte, Montana.
Schroeder, Curt. A	Hazelton.
Segsworth, Walter	
Sharpe, Bert N	
Sim, Charles John	England.
Snyder, Blanchard M	Greenwood.
Steven, Wm. Gordon	
Stewart, James W	Portland Canal.
Stimmel, B. A	Boundary Falls.
Sundberg, Gustave	Mexico City.
Tally, Robert E	Spokane, Wash.

LIST OF ASSAYERS HOLDING PROVINCIAL CERTIFICATES OF EFFICIENCY.—*Concluded.*

Under Section 2, sub-section (1).—Concluded.

Hart, P. E.....
Hawkins, Francis.....Silverton.
Hook, A. Harry.....
Hurter, C. S.....
John, D.....Haileybury, Ontario.
Kiddie, Geo. R.....Clifton, Arizona.
Kitto, Geoffrey B.....Ladysmith.
Lang, J. G.....
Langley, A. S.....Britannia Beach.
Ley, Richard N.....Kiondel.
Lindsay, W. W.....Rossland.
Livingston, Carroll L.....Ladysmith.
Longworth, F. J.....Greenwood.
Marsh, Richard.....Spokane, Wash.
Marshall, H. Jukes.....Vancouver.
Marshall, William S.....Ladysmith.
Miles, Arthur D.....
Thomas, Percival W.....
Tretheway, John H.....
Turner, H. A.....Princeton.
Vance, John F. C. B.....Vancouver.
Van Agnew, Frank.....Siberia.
Vaughan-Williams, V. L.....Victoria.
Wales, Roland T.....
Watson, Wm. J.....Ladysmith.
Welch, J. Cuthbert.....Spokane, Wash.
Wells, Ben T.....Ladysmith.
West, Geo. G.....Vancouver.
Whittaker, Delbert E.....Victoria.
Widdowson, E. Walter.....Nelson.
Williams, W. A.....Grand Forks.
Williams, Eliot H.....Nelson.
Wimberly, S. H.....Nevada, U. S. A.

Under section 2, sub-section (2).

Archer, Allan.....
Brennan, Charles Victor.....Nova Scotia.
Browne, D. J.....Rossland.
Bryant, Cecil M.....Vancouver.
Blaylock, Selwyn G.....Moyie.
Cartwright, Cosmo T.....Vancouver.
Cavers, Thomas W.....Rossland.
Clothier, George A.....Rossland.
Cole, Arthur A.....Cobalt, Ontario.
Cole, G. E.....Rossland.
Cole, L. Heber.....Phœnix.
Coulthard, R. W.....Toronto, Ontario.
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.....Lachine, Que.
Kaye, Alexander.....Vancouver.
Kendall, George.....Vancouver.
Lathe, Frank E.....Grand Forks.
Lay, Douglas.....Silverton.
Lewis, Francis B.....South Africa.
Merrit, Charles P.....
Musgrave, William N.....Mexico City.
Mussen, Horace W.....Siberia.
McArthur, Reginald E.....
McDiarmid, S. S.....
McLellan, John.....Queen Charlotte Islands.
McMurtry, Gordon O.....
McNab, J. A.....Trail.
McVicar, John.....Edmonton, Alta.
Maclennan, F. W.....Rossland.
Outhett, Christopher.....Kamloops.
Pemberton, W. P. D.....Victoria.
Reid, J. A.....Greenwood.
Ritchie, A. B.....
Scott, Oswald Norman.....
Shannon, S.....
Sharpe, G. P.....Midland, Ontario.
Sloan, David.....Three Forks.
Stevens, F. G.....Mexico.
Sullivan, Michael H.....Trail.
Sutherland, T. Fraser.....
Swinney, Leslie A. E.....
Thomson, H. Nellis.....Anaconda, Montana.
Watson, A. A.....Olalla.
Watson, Henry.....
Workman, Ch. W.....
Wright, Richard.....Rossland.
Wynne, Lewellyn C.....Kaslo.

Under section 2, sub-section (3).

Carmichael, Herbert.....Victoria.
(Provincial Assayer.)
Harris, Henry.....Tasmania.
Kiddie, Thos.....Northport, Wash.
Sutton, W. J.....Victoria.
McKillop, Alexander.....Nelson.
Pellew-Harvey, Wm.....London, England.
Robertson, Wm. F.....Victoria.
(Provincial Mineralogist.)
Marshall, Dr. T. R.....Glasgow, Scotland.

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 were 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 the 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 the Province may be accepted by the Board. Any certificate is considered to include that of any lower class.

EXAMINATIONS FOR MINERS.

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 examiner appointed by the owners, an examiner elected by the miners of that colliery, and an examiner appointed by the Government.

Examinations for first, second and third classes were held simultaneously at Fernie, Nanaimo and Cumberland on June 16th, 17th and 18th, 1908, and for third class only at Middlesboro on June 16th, 1908.

BOARD OF EXAMINERS FOR COAL MINE OFFICIALS.

FIRST, SECOND AND THIRD CLASS CERTIFICATES.

Report of Secretary of Board, Francis H. Shepherd.

I beg to submit the Annual Report covering the transactions of the above Board for the year ending December 31st, 1908.

The Board of Appointment of Examiners consists of:—Messrs. Andrew Bryden, Ladysmith, Chairman; Tully Boyce, Nanaimo, Vice-Chairman; T. R. Stockett, George Williams, and A. Dick, Nanaimo; R. G. Drinnan, Hosmer, and John John, Wellington; F. H. Shepherd, Nanaimo, Secretary. The office of the Board is in the Provincial Court House building, at Nanaimo.

The appointed Examiners were:—For Fernie, Mr. R. G. Drinnan, Mr. C. Simister, and Inspector Morgan; for Nanaimo, Mr. George Williams, Mr. T. R. Stockett, Mr. T. Graham, and Mr. F. H. Shepherd; for Cumberland, Mr. J. Mathews and Mr. Tully Boyce; for Middlesboro, Mr. B. Browett and Inspector Dick.

Examinations for First, Second and Third Class Certificates of Competency were held simultaneously on June 16th, 17th and 18th, 1908, at Nanaimo, Fernie and Cumberland, and for Third Class Certificates of Competency at Diamond Vale, near Middlesboro, on June 16th.

The list of candidates was the largest in the history of the Province, the total number applying being 70, and of which only one, a third class candidate, failed to put in an appearance.

For the first class examination there were 13 applicants, 8 being from Nanaimo, 4 from Fernie, and 1 from Cumberland. Ten candidates were successful, two failing at Nanaimo and one at Fernie.

For the second class examination there were 16 applicants, 2 being from Nanaimo, 12 from Fernie, and 2 from Cumberland. All the candidates were successful.

For third class examination there were 41 applicants; one failed to appear and one failed at the examination.

The same general high standard adopted by the Board was maintained as heretofore, and the candidates showed by their work that they appreciated the fact that special study and application is necessary to success. Present day facilities for self-study and education are within the reach of all mine workers, if they wish to apply themselves willingly to the task.

The correspondence schools, and the various mining journals, both British and American, have, I feel sure, contributed largely to the generally improved class of candidates now applying for examination. Another contributing feature is the usual practice of the Board in giving publicity to the questions after each examination, thereby placing the standard before the intending candidate, whereby he may be enabled to gauge the amount of study and application necessary to success.

The practical feature of the examination was also adhered to, and the majority of the questions were of such a practical nature that, no matter how proficient the candidate might be in the academic portions of the examination, practical experience was absolutely necessary to ensure passing.

The Board is of the opinion, therefore, that the best candidates are those who, while applying themselves studiously to self-improvement, possess considerable practical experience, and it was with this object in view that the Board decided, in the more recent examinations, to give more prominence to the practical feature. The opinion of the Board is that the change has been for the better, and the classes of mine officials now available are well fitted for the various responsible positions necessary to mining operations.

Candidates for First Class Certificates should be able to pass an examination of the standard necessary to show that they are well qualified to assume the control of the whole of the operations incident to the opening and working of a colliery. It may be contended that, in ordinary practice, some of the subjects in which the candidate is examined do not generally fall within his numerous duties as manager, and this may be partly true as to the subject of surveying. A large number of the candidates have not had the opportunity to get the practical side of this subject, and it may be contended that at nearly all large collieries the surveying is done by a regularly appointed surveyor, but this does not relieve the manager from a great responsibility, and especially where the workings may be approaching a dangerous accumulation of gas or water, and he should be able to personally check the survey and assume the responsibility of this detail in the manager's supervision of the mining operations.

In the second class examination, for Overman, the Board leans still more to the practical feature in submitting the questions to the candidate, for to this official the daily details of the working of the mine belong, and much of the technical part can be very well left to the manager.

Of the third class candidate, the Board insists that he shall possess a thorough knowledge of the "Coal Mines Regulation Act," and especially that portion of the Act with which he will as a mine official be directly concerned. This is the third class candidate's most important paper, and having this fact in view the Board raised the percentage necessary to pass from 50 per cent. to 65 per cent.

A subject which concerns all classes of candidates is rescue work. The Board has not so far demanded much from the candidate upon this subject, but expresses the hope that the desirability of establishing rescue stations, with the necessary respiratory apparatus, and facilities for imparting instruction, may be taken up upon similar lines to those adopted in Great Britain and the Continent of Europe.

The percentages earned were good throughout. The oral examination of the third class candidates at the close of the examination was satisfactory. The object of this examination is to bring out the candidate's actual knowledge and experience in dealing with inflammable gas in the mine, and to exemplify how he would proceed to examine the mine or working place for this and other gases.

I append hereto a list of the candidates who successfully passed the Examinations, of the various classes, held during the past year.

List of Successful Candidates. Examinations held June 16th, 17th and 18th, 1908.

First Class Certificates.

Name.	Date.	No.
C. F. J. Galloway John Newton William James John Wylie J. G. Biggs W. Lancaster Joseph Smith Thos. McGuckie Edward Bridge Luther Saville	Filled and issued from Mines Department, Victoria, July 22nd, 1908.	

SECOND CLASS CERTIFICATES.

NAME.	DATE.	No.
Robert W. Morton	July 22nd, 1908	B 59
Robert Henderson	"	B 60
William Merrifield	"	B 61
Henry Carroll	"	B 62
James Francis	"	B 63
Joseph Cook	"	B 64
James Churchill	"	B 65
William T. Jones	"	B 66
John Morris	"	B 67
John Gardner	"	B 68
William Robinson	"	B 69
W. Wilson	"	B 70
Thomas Tonge	"	B 71
Robert Middleton	"	B 72
James E. McPherson	"	B 73
Thomas Wilson	"	B 74

THIRD CLASS CERTIFICATES.

NAME.	DATE.	No.
William Roper	July 2nd, 1908	C 274
George Rankin	"	C 275
J. H. Brownrigg	"	C 276
Frank Jaynes	"	C 277
Thomas Brown	"	C 278
R. Rallison	"	C 279
T. H. Manson	"	C 280
Adam L. McNeil	"	C 281
Vincient Frodsham	"	C 282
H. Winstanley	"	C 283
D. Evans	"	C 284
J. McKelvie	"	C 285
W. Almond	"	C 286
Al. McBroom	"	C 287
George Watson	"	C 288
T. Parkinson	"	C 289
Fred. Hilley	"	C 290
William Bradley	"	C 291
John Graham	"	C 292
Thomas Mather	"	C 293
Henry Scott	"	C 294
J. Worthington	"	C 295
James McLeod	"	C 296
J. Mason	"	C 297
Ernest Blewett	"	C 298
Thomas Moreland	"	C 299
J. Baggaley	"	C 300
Watkin Williams	"	C 301
Edwin Rutledge	"	C 302
Thomas Reilly	"	C 303
William Commons	"	C 304
Howel John	"	C 305
Carmichael McNay	"	C 306
J. Halsall	"	C 307
J. Wilcock	"	C 308
F. Briscoe	"	C 309
A. Pickup	"	C 310
Ben. Cheetham	"	C 311
S. Horwood	"	C 312
William Clifford	"	C 313

MEMO.—Certificate C 314 issued in lieu of C 255 destroyed at the Fernie fire, to Edward Spark, December 8th, 1908.

Registered List of Holders of Certificates of Competency as Coal Mine Officials.

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

John Bryden, Victoria.
Edward G. Prior.
Thomas A. Buckley.
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, "
Honobin, William	May 1st, 1882
Little, Francis D	" 1st, "
Martell, Joshua	" 1st, "
Chandler, William	December, 21st, 1883
Priest, Elijah	" 21st, "
McGregor, James	January 18th, 1888
Randle, Joseph	" 18th, "
Matthews, John	" 8th, 1889
Norton, Richard Henry	August 26th, "
Bryden, Andrew	December 30th, "
Russell, Thomas	April 20th, 1891
Sharp, Alexander	October 27th, "
Kesley, John	March 4th, 1892
Wall, William H	May 30th, 1896
Morgan, Thomas	" 30th, "
Wilson, David	" 30th, "
Smith, Frank B	" 30th, "
Bradshaw, George B	June 12th, 1899
Simpson, William G	" 12th, "
Hargreaves, James	February 5th, 1901
Drinnan, Robert G	" 5th, "
Browitt, Benjamin	August 3rd, "
Stockett, Thomas, Jr	" 3rd, "
Pearson, Robert	" 3rd, "
Cunliffe, John	" 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, "

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

NAME.	DATE.
Biggs, J. G.	July 22nd, 1908
Bridge, Edward	" 22nd, "
Darbyshire, James	November 9th, 1907
Elliott, Daniel	" 9th, "
Emmerson, Joseph	" 9th, "
Evans, Evan	" 9th, "
France, Thos	" 22nd, 1906
Fraser, Norman	March 4th, 1905
Galloway, C. F. J.	July 22nd, 1908
Graham, Charles	November 14th, 1905
Graham, Thomas	" 9th, 1907
Heathcote, Elijah	March 4th, 1905
Jackson, Thos. R	November 9th, 1907
James, William	July 22nd, 1908
Keith, Thomas	November 9th, 1907
Lancaster, W	July 22nd, 1908
Millar, John K	November 22nd, 1906
McGuickie, Thomas	July 22nd, 1908
Newton, John	" 22nd, "
Saville, Luther	" 22nd, "
Shaw, Alex	November 14th, 1905
Smith, Joseph	July 22nd, 1908
Strachan, Robert	March 4th, 1905
Williams, Thos. H.	November 22nd, 1906
Wylie, John	July 22nd, 1908

SECOND CLASS CERTIFICATE 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
Millar, 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

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
Bastian, John	November 2nd, 1907	B 42
Biggs, John G	" 2nd, "	B 40
Bridge, Edward	October 23rd, 1906	B 33
Brown, John C	" 23rd, "	B 39
Canfield, Bernard	" 23rd, "	B 30
Carroll, Henry	July 22nd, 1908	B 62
Churchill, James	" 22nd, "	B 65
Cook Joseph	" 22nd, "	B 64

Second Class Certificates of Competency Issued under "Coal Mines Regulation Act Further Amendment Act, 1904."—*Concluded.*

Name.	Date.	Cer. No.
Daniels, David	November 2nd, 1907	B 53
Darbyshire, James	October 23rd, 1906	B 32
Devlin, Henry	November 2nd, 1907	B 44
Dunsmuir, John	" 14th, 1905	B 26
Evans, Evan	March 11th, 1905	B 2
Finlayson, James	July 29th, "	B 21
France, Thos	November 14th, "	B 27
Francis, James	July 22nd, 1908	B 63
Freeman, Henry N	November 2nd, 1907	B 45
Gardner, John	July 22nd, 1908	B 68
Gillespie, Hugh	" 29th, 1905	B 24
Gillespie, John	October 23rd, 1906	B 36
Graham, Chas	March 4th, 1905	B 1
Henderson, Robert	July 22nd, 1908	B 60
Jackson, Thos. R	March 4th, 1905	B 5
James, David	November 2nd, 1907	B 58
Jones, William	July 29th, 1905	B 20
Jones, William T	July 22nd, 1908	B 66
Lancaster, William	November 2nd, 1907	B 50
Lockhart, William	October 23rd, 1906	B 34
Merryfield, William	July 22nd, 1908	B 61
Middleton, Robert	" 22nd, "	B 72
Monks, James	November 2nd, 1907	B 55
Morgan, John	" 2nd, "	B 43
Morris, John	July 22nd, 1908	B 67
Morton, Robert W	" 22nd, "	B 59
McGuckie, Thomas M	October 23rd, 1906	B 35
McKinnell, David	" 23rd, "	B 37
McPherson, James E	July 22nd, 1908	B 73
Nellist, David	March 4th, 1905	B 6
Newton, John	October 23rd, 1906	B 31
Ovington, John	November 2nd, 1907	B 52
Parnham, Charles	" 2nd, "	B 49
Reid, Thomas	July 29th, 1905	B 23
Richards, Thomas	November 2nd, 1907	B 57
Rigby, John	July 29th, 1905	B 29
Robinson, William	" 22nd, 1908	B 69
Russell, Daniel	November 2nd, 1907	B 41
Russell, John	" 2nd, "	B 47
Saville, Luther	" 2nd, "	B 51
Shaw, Alex	July 29th, 1905	B 19
Somerville, Alex	March 4th, "	B 4
Spruston, Thos. A	November 2nd, 1907	B 46
Stockwell, William	" 2nd, "	B 56
Thomas, Joseph D	October 23rd, 1906	B 38
Tonge, Thomas	July 22nd, 1908	B 71
Vanhulle, Peter	November 2nd, 1907	B 54
Watson, Adam G	" 14th, 1905	B 28
Webber, John Frank	March 4th, 1905	B 3
White, John	November 2nd, 1907	B 48
Wilson, Thomas	July 22nd, 1908	B 74
Wilson, W	" 22nd, "	B 70
Wyllie, John B	" 29th, "	B 22

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

NAME.	DATE.	Cer. No.
Almond, Alex	October 1st, 1907	C 252
Almond, W.	July 22nd, 1908	C 286
Baggaley, J.	" 22nd, "	C 300
Biggs, John	March 4th, 1905	C 210
Birchell, Richard	October 1st, 1907	C 266
Blewett, Ernest	July 22nd, 1908	C 298
Bradley, William	" 22nd, "	C 291
Bridge, Edward	" 29th, 1905	C 223
Briscoe, F.	" 22nd, 1908	C 309
Brown, Thomas	" 22nd, "	C 278
Brownrigg, J. H.	" 22nd, "	C 276
Bushnell, Jas. P	October 1st, 1907	C 264
Catchpall, Charles	July 29th, 1905	C 227
Cheetham, Ben	" 22nd, 1908	C 311
Clifford, William	" 22nd, "	C 313
Commons, William	" 22nd, "	C 304
Cooke, Joseph	March, 4th, "	C 209
Crawford, David	" 4th, "	C 208
Cunningham, G. F	November 11th, "	C 229
Cunliffe, Thos	October 1st, 1907	C 265
Devlin, Edward	" 23rd, 1905	C 241
Doney, John	March, 4th, "	C 211
Douglas, D. B	October 23rd, 1906	C 235
Dykes, Joseph W	" 1st, 1907	C 248
Evans, D.	July 22nd, 1908	C 284
Francis, James	October 1st, 1907	C 250
Freeman, H. G	November 14th, 1905	C 230
Frodsham, Vincient	July 22nd, 1908	C 282
Graham, John	" 22nd, "	C 292
Halsall, J.	" 22nd, "	C 307
Hilley, Fred.	" 22nd, "	C 290
Hodson, R. H	March 4th, 1905	C 216
Horwood, S	July 22nd, 1908	C 312
Hutchison, Ben	November 14th, 1905	C 232
Jarrett, Fred. J	October 1st, 1907	C 256
Jaynes, Frank	July 22nd, 1908	C 277
Jemson, J. W	March 4th, 1905	C 205
John, Howel	July 22nd, 1908	C 305
Johnson, Moses	October 1st, 1907	C 258
Jones, W. T.	March 4th, 1905	C 221
Lancaster, William	October 23rd, 1906	C 243
Lane, Joseph	" 1st, 1907	C 254
Liddle, John	July 29th, 1905	C 228
Malone, Patrick	October 1st, 1907	C 247
Manson, T. H.	July 22nd, 1908	C 280
Marsh, John	October 1st, 1907	C 270
Mason, J.	July 22nd, 1908	C 297
Mather, Thomas	" 22nd, "	C 293
Mattishaw, Samuel K	October 23rd, 1906	C 237
Matusky, Andrew	" 1st, 1907	C 259
Merrifield, George	" 23rd, 1906	C 239
Merrifield, William	" 23rd, "	C 236
Monks, James	November 14th, 1905	C 234
Moore, George	October 23rd, 1906	C 242
Moreland, Thomas	July 22nd, 1908	C 299
Morgan, John	" 29th, 1905	C 224
McAlpine, John	March 4th, 1905	C 217
McBroom, Al.	July 22nd, 1908	C 287
McGuckie, Thomas	" 29th, 1905	C 226
McKelvie, J.	July 22nd, 1908	C 285
McLellan, William	March 4th, 1905	C 219
McLeod, James	July 22nd, 1908	C 296
McNay, Carmichael	" 22nd, "	C 306
McNeil, Adam T.	" 22nd, "	C 281
Nelson, Horatio	October 1st, 1907	C 263

Third Class Certificates Issued under "Coal Mines Regulation Act Further Amendment Act, 1904."—*Concluded.*

Name.	Date.	Cer. No.
Parkinson, T	July 22nd, 1908	C 289
Perry, James	March 4th, 1905	C 215
Pickup, A	July 22nd, 1908	C 310
Plank, Samuel	November 14th, 1905	C 233
Rallison, R	July 22nd, 1908	C 279
Rankin, George	" 22nd, "	C 275
Ratcliffe, Thomas	October 1st, 1907	C 253
Raynor, Fred	" 1st, "	C 257
Reilly, Thomas	July 22nd, 1908	C 303
Richards, James	October 1st, 1907	C 249
Richards, Samuel	" 23rd, 1906	C 244
Rigby, John	July 29th, 1905	C 225
Roper, William	July 22nd, 1908	C 274
Rutledge, Edwin	" 22nd, "	C 302
Saville, E. O	October 1st, 1907	C 251
Scott, Henry	July 22nd, 1908	C 294
Shooter, Joseph	October 1st, 1907	C 261
Smith, Joseph	March 4th, 1905	C 207
Smith, Thos. J	October, 1st, 1907	C 271
Sparks, Edward (C 314 issued in lieu of C 255 destroyed by Fernie fire)	" 1st, "	C 255
Spruston, Thomas A	March 4th, 1905	C 206
Stewart, James M	October 23rd, 1906	C 240
Stockwell, William	" 23rd, "	C 238
Taylor, Charles M	March 4th, 1905	C 213
Thomas, John B	November 14th, "	C 231
Thomas, Joseph	March 4th, "	C 220
Thomas, Warriett	October 1st, 1907	C 273
Thompson, Thomas	" 1st, "	C 267
Thompson, Joseph	" 1st, "	C 269
Thomson, Duncan	March 4th, 1905	C 218
Wallace, Fred	October 1st, 1907	C 260
Watson, Adam G	March 4th, 1905	C 212
Watson, George	July 22nd, 1908	C 288
Watson, William	October 22nd, 1906	C 246
Weeks, John	March 4th, 1905	C 214
White, John	October 22nd, 1906	C 245
Wilcock, J	July 22nd, 1908	C 308
Williams, Watkin	" 22nd, "	C 301
Wilson, Thomas	October 1st, 1907	C 272
Wilson, William	" 1st, "	C 262
Winstanley, H	July 22nd, 1908	C 283
Wintle, Thomas A	" 29th, 1905	C 222
Worthington, J	" 22nd, 1908	C 295

COAL MINES 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	Marsden, John	May 3, 1904	C 21
Addison, Thos	Dec. 10, 1904	C 52	Marshall, Howard	Dec. 6, 1905	C 127
Aitken, James	Oct. 24, 1904	C 44	Matthews, Chas	April 27, 1904	C 9
Alexander, Wm	Feb. 17, 1905	C 72	Miard, Harry E	March 3, 1905	C 76
Allsop, Harry	Oct. 11, 1904	C 34	Middleton, Robt	Feb. 11, 1905	C 71
Ashman, Jabez	Feb. 5, 1907	C 131	Miles, Thos	Aug. 10, 1904	C 31
Aughinvole, Alex	March 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	March 29, 1905	C 99
Barclay, John	April 17, 1905	C 111	McKinnon, Arch'd	April, 3, 1905	C 102
Berry, James	Feb. 11, 1905	C 70	McMillan, Peter	March 29, 1905	C 94
Bickle, Thos	Oct. 11, 1904	C 37	McMillan, Henry	May 13, 1905	C 115
Biggs, Henry	April 10, 1905	C 110	McMurtrie, John	March 29, 1905	C 96
Black, John S	April 3, 1905	C 108	Moore, Wm. H	June 17, 1905	C 119
Bowie, James	May 13, 1905	C 116	Morris, John	Dec. 27, 1904	C 57
Briscoe, Edward	Oct. 10, 1906	C 129	Myles, Walter	April 3, 1905	C 100
Campbell, Dan	March 29, 1905	C 93	Nash, Isaac	June 1, 1904	C 120
Carr, Jos. E	Oct. 11, 1904	C 36	Neave, Wm	Oct. 12, 1904	C 43
Carroll, Harry	March 29, 1905	C 98	Nellist, David	April 27, 1904	C 13
Clarkson, Alexander	April 27, 1904	C 18	Nelson, James	April 27, 1904	C 16
Collishaw, John	Feb. 7, 1905	C 68	Newton, John	Oct. 12, 1904	C 39
Comb, John	March 23, 1904	C 2	Nimmo, Jas. P	April 3, 1905	C 103
Cosier, Wm	March 29, 1905	C 86	O'Brien, Geo	Feb. 6, 1905	C 66
Courtney, A. W	Nov. 2, 1904	C 45	Pengelly, Richard	Dec. 27, 1904	C 58
Crawford, Frank	April 6, 1904	C 7	Perrie, Jas	March 15, 1905	C 81
Daniels, David	April 27, 1904	C 12	Perry, James	June 13, 1904	C 27
Davidson, David	April 3, 1905	C 106	Pounder, Geo	Oct. 16, 1905	C 125
Davidson, John	March 29, 1905	C 87	Price, Jas	Nov. 8, 1904	C 50
Devlin, Henry	Oct. 12, 1904	C 41	Rafter, Wm	March 29, 1905	C 95
Dobbie, John	Nov. 27, 1905	C 126	Reid, Thos	Nov. 3, 1904	C 47
Dudley, James	March 22, 1905	C 114	Reid, James	March 23, 1904	C 1
Duncan, Thomas	Aug. 29, 1906	C 128	Reid, Wm	Dec. 15, 1904	C 54
Dunlap, Henry	Nov. 21, 1904	C 51	Richards, Thos	April 27, 1904	C 14
Dunn, Geo	Dec. 19, 1904	C 56	Ross, John	April 3, 1905	C 101
Dunsmuir, John	March 29, 1905	C 90	Roughead, George	Jan. 30, 1907	C 130
Eccleston, Wm	March 15, 1905	C 80	Ryan, John	Dec. 28, 1904	C 59
Evans, Evan	March 13, 1905	C 78	Sanders, John W	April 3, 1905	C 107
Evans, W. H	March 14, 1905	C 79	Shenton, Thos. J	July 25, 1904	C 30
Fagan, David	April 6, 1905	C 109	Shepherd, Henry	June 13, 1904	C 26
Farmer, Bernard	Jan. 31, 1905	C 64	Smith, Ralph	March 7, 1905	C 77
Farquharson, John	April 27, 1904	C 17	Smith, Geo	March 29, 1905	C 84
Findlayson, James	June 6, 1904	C 25	Somerville, Alex	March 24, 1904	C 3
Fulton, Hugh T	April 3, 1905	C 105	Stauss, Chas. F	Feb. 9, 1905	C 69
Gibson, Edward	May 30, 1905	C 118	Steele, Jas	March 29, 1905	C 92
Gilchrist, Wm	March 29, 1905	C 85	Stewart, Duncan H	March 28, 1904	C 4
Gillespie, Hugh	April 6, 1904	C 8	Stewart, John	April 3, 1904	C 104
Gillespie, John	April 6, 1904	C 5	Stewart, Daniel W	May 16, 1904	C 23
Gould, Alfred	April 17, 1906	C 112	Stoddart, Jacob	Feb. 21, 1905	C 73
Green, Francis	Oct. 11, 1904	C 38	Strachan, Robt	April 27, 1904	C 15
Handlen, Jas	June 16, 1904	C 122	Strang, James	April 27, 1904	C 10
Harmison, Wm	Feb. 3, 1905	C 65	Thomas, John	March 29, 1905	C 97
Haworth, Geo	March 29, 1905	C 88	Tunstall, James	June 15, 1904	C 121
Hescott, John	Jan. 16, 1905	C 62	Vass, Robt	Dec. 12, 1904	C 53
Hutchison, Archie	Sept. 8, 1905	C 123	Vater, Charles	April 6, 1904	C 66
Jonn, David	Nov. 8, 1904	C 49	Walkem, Thos	Dec. 16, 1904	C 55
Johnson, Geo	May 9, 1904	C 124	Webber, Chas	Sept. 13, 1904	C 32
Johnson, Wm. R	March 1, 1905	C 75	Webber, Charles F	Sept. 13, 1904	C 33
Kerr, Wm	March 29, 1905	C 91	Whiting, Geo	May 29, 1905	C 117
Lander, Frank	Jan. 9. 1905	C 61	Wilson, Austin	Feb. 7, 1905	C 67
Landfear, Herbert	Jan. 27, 1905	C 63	Wilson, Thos	April 27, 1904	C 11
Lewis, Thos	Oct. 11, 1904	C 35	Woodburn, Moses	March 29, 1905	C 83
Lockhart, Wm	Jan. 6, 1905	C 60	Yarrow, Geo	Nov. 3, 1904	C 46
Malpass, James	Nov. 7, 1904	C 113			

CARIBOO DISTRICT.

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CARIBOO AND QUESNEL MINING DIVISIONS.

REPORT BY GEORGE WALKER, GOLD COMMISSIONER.

I have the honour to submit herewith my report on mining operations in Cariboo District during the year 1908, accompanied by the statistics in tabular form, from which it will be seen that the gold yield of the District, taken as a whole, is a trifle under the output of last year. Nothwithstanding this fact, considerable interest has been manifested in the section of the District around Tête Jaune Cache and vicinity, where twenty-two mineral and two placer claims have been recorded during the past year, while considerable prospecting work has been done and, from the best information obtainable, the result of the work done is very encouraging.

The office statistics show that the revenue of the District is steadily increasing from year to year, although, at the present time, this increase is not on account of an increased revenue derived from mining, but I believe that the completion of the Grand Trunk Pacific Railway will open up to the prospector a large area of mineral country, when the greater part of the revenue derived from the District will be from the mines.

On the Cariboo waggon road, thirteen miles north from the town of Quesnel, several mineral locations have been made and considerable development work done, showing a large body of copper sulphide ore.

THE CARIBOO MINING DIVISION.

In the Cariboo, or Barkerville, Mining Division of Cariboo District the result of the season's operations has been fairly good, but shows a slight decrease from that of last year.

WILLIAMS CREEK AND TRIBUTARIES.

On the *Mucho Oro* hydraulic mine, on Stouts gulch, Mr. John Hopp continued work, with practically the same results as reported last year.

The *Forest Rose* hydraulic mine, on Williams creek, also operated by Mr. John Hopp, having enlarged its hydraulic plant and ditches last year, commenced operations in the early spring and worked the whole season, the result of which, I have been informed, is satisfactory.

The *First of May* hydraulic mine, situate on upper Williams creek, owned by Messrs. Boyce and Joule, worked the entire season with a small hydraulic plant; and it is the intention of the owners to enlarge their plant next season, when it is expected that good results will be obtained.

The *Lowhee Creek* hydraulic mining property, situate on Lowhee creek, operated by Mr. John Hopp, worked again this season, continuing its flume up stream through a very rough portion of the creek. It is expected that the flume will reach bedrock next year. The result of the season's operations proved satisfactory.

LIGHTNING CREEK AND TRIBUTARIES.

I am indebted to the president and manager of the Lightning Creek Gold Gravels and Drainage Company, Mr. C. H. Unverzagt, for the following report:—

"We have added to our equipment a turbine water-wheel and air compressor, besides a propeller pump and a 75 horse-power engine. These, with installation costs, will represent an

outlay of at least $30,000. The air compressor is 150 horse-power, and we propose to use it mainly for pumping by use of compressed air. We will construct a new flume or ditch next season, which will give us 40 feet head and our turbine is rated at 410 horse-power for such fall. The balance of the power not used on the air compressor will be converted into electrical energy and the power distributed to various shafts, and will be sufficient, all told, to operate four shafts. Our No. 2 shaft-house has been finished, also a building for our compressor and dynamo. We are sinking our No. 2 shaft and will proceed with the No. 1 as soon as we can use compressed air for power, our boilers being required at No. 2. The equipment consists of a saw-mill, three engines, two boilers, eight steam and other pumps, a Keystone drilling rig, two air compressors, three water-wheels, one dynamo, large pipe-cutting and threading machine. two steam hoists, one eight-foot lathe, one large planer, and a full general equipment of every kind necessary in our work. We have been delayed by bad weather and in waiting for certain shipments required; otherwise a large amount of miscellaneous work has been done. The works are in good shape and we are now employing 21 men."

VENTURE MINING COMPANY, PETERS CREEK.

Regarding this company's work the foreman, Mr. L. Ford, says:—

"The Venture Mining Company's property consists of five leaseholds situated on Peters creek, a tributary of Lightning creek, and is wholly owned by local capital. The company began operations in November, 1907, and since then has been pushing the work continuously, with a force varying from five to twelve men; during this time we have sunk three prospecting shafts; two of the shafts were sunk to a depth of 20 feet, with the expectation of reaching clay and puddling, but being unable to reach the clay in this manner, the company decided to install a pumping plant and continue the third shaft to bedrock, the rim of which was reached at a depth of about 20 feet. During the summer the Government has kindly aided us in building three miles of waggon road to our property. We have built an eighteen-foot overshot water-wheel with a four-foot breast. A quarter of a mile of ditch has been dug for the purpose of bringing water on to the wheel, and we have purchased a ten-inch Cornish pump which will shortly be on the ground. We are at present erecting a shaft-house, size 30 by 60 feet, which we expect to complete by the 1st December, after which the pump will be installed and sinking continued in the rim to a depth of about fifty feet, when a drift will be run out to tap what we think will be the deep ground of the present Peters creek channel."

The Wormald Creek Mining Company, situate on Wormald creek, a tributary of Lightning creek, having installed an overshot water-wheel and Cornish pump, again attempted to reach the bottom gravels by continuing the shaft, which was previously sunk to a depth of 80 feet, but I regret to say that after working the greater part of the season, the company was obliged to abandon the shaft on account of the quantity of water and slum encountered. I am informed that next year another attempt will again be made to reach the channel of this creek.

The Fountain Creek Mining Company has continued work nearly the whole season in prospecting the deep channel of Fountain creek, but so far has not succeeded in reaching the bedrock, although work is being steadily pushed ahead.

SLOUGH CREEK.

Mr. Walter B. Hill, acting manager in charge of the Slough Creek, Limited, of Slough creek, writes me as follows:—

"During last winter measurements of weirs were taken, for obtaining accurate data as to the amount of water available for power; the same will be continued this winter. At present there are two men constructing such weirs.

"The regular staff during the past year has been an accountant in charge, with one cook and one man for outside work, gardener, etc. There is a very comprehensive scheme under consideration—in fact, we may say now adopted—involving a large expenditure for working the mine on an extensive scale.

"Conditions over which we have no control, viz., the money crisis of recent date, and lately the abandonment of the deep leads in Victoria, Australia, have had a depressing effect on projects such as ours, but our Board in London, England, now advise us that matters are progressing most satisfactorily, and that it looks forward with every confidence to next year pushing construction with vigour."

Willow River.

The Willow River Mining Company, of Willow river, continued work for a few months, completing a bedrock tunnel to tap the bottom gravels of the deep channel. Work on this property was shut down in the early spring, but from the best information obtainable, it is confidently expected that operations on this mine will be again resumed next year.

The *Alabama* and *Williams* hydraulic claims, on Mosquito creek, operated by Mr. John Hopp, have again kept up their reputation as being amongst the most prolific gold producers of the District. On both these mines the plant is very small, using No. 1 monitors, but I am informed that it is the intention of the manager next year to enlarge the plant and ditches and to work these mines on a larger scale than hitherto.

The Thistle Gold Company, operating at Eight-Mile lake, worked the greater part of the season, but owing to the banks sliding into the hydraulic pit, it was unable to get the pit cleared out and cleaned up.

Canadian Creek.

On the property which was originally owned by the Slocan-Cariboo Mining and Development Company, but which is now held by Alfred Ansley as trustee, sinking the shaft was continued, and the bottom gravels of the deep channel of Canadian creek was reached, but at the present writing I am unable to inform you of the results.

The Waverley Company, of Grouse creek, I regret to say, has not paid as well this year as last, on account of the pay gravel dipping below the grade of the present flume.

The Little Valley Company, operating on Little Valley creek, with L. A. Bonner as manager, secured a drilling plant this year, and has been continuously boring to ascertain the depth of the channel of this creek. Several holes have been put down to bedrock, varying from 100 to 250 feet in depth. So far the borings are not completed, and the deep channel has not as yet been definitely ascertained.

Mr. W. F. Gore has this year almost completed four miles of ditch and has installed a hydraulic plant on what is known as the old *Guyat* claim, on the east bank of Antler creek, a short distance above the mouth of Grouse creek. It is the intention to commence piping in the early spring.

The hydraulic properties on China creek and Nugget gulch, which are owned by Mr. B. A. Laselle, were again worked this year with good results.

The Bear Hydraulic Mining Company of Cunningham creek, resumed work in the early spring, but I regret to say that the manager informs me that the results of the season's operations are not satisfactory, and that the present company will not operate the mine again. However, I am informed that arrangements are being made by other parties for the working of the property next season.

OFFICE STATISTICS—CARIBOO MINING DIVISION.

Free miners' certificates issued, company	13
" " " individual	325
Records and transfers of placer mining claims	111
Leaves of absence	23
Water records issued	16
Placer mining leases issued	21
" " cancelled	8
Mineral claims recorded	33

Revenue Receipts.

Free miners' certificates	$ 2,735 75
Mining receipts, general	25,891 56
Leaves of absence	67 50
Land sales	78,782 89
Land revenue	508 75
Revenue tax	2,757 00
Real property tax	3,736 50
Personal property tax	2,405 97
Wild land tax	14,925 73
Income tax	243 83
Licence, spirits	1,287 50
" trade	600 00
J. P. Court fines	730 00
Miscellaneous	513 80
Total	$135,186 78

QUESNEL MINING DIVISION.

REPORT BY C. W. GRAIN, MINING RECORDER.

I have the honour to submit herewith a report on the progress of mining in the Quesnel Mining Division for the year 1908. The condition of the District remains much the same as last year, but little real mining work having been carried on, the little that was done being practically prospecting work, which was chiefly carried on in the Snowshoe creek and Keithley creek portions of the Division. In the Clearwater section some prospecting work was done, with encouraging results.

In the Horsefly section, on the upper Horsefly river, there was also a certain amount of prospecting work carried on, and, as I understand, with results that warrant further work being done next year. It would appear that the Division has not yet recovered the setback that it received when the Guggenheim Exploration Company, of New York, in July, 1907, shut down work on the property that was formerly operated by the Consolidated Cariboo Hydraulic Company, and which was the largest and most important property in this Division. There was a certain amount of work done on this property in the early part of the season, with fair results, which, considering the small staff employed and the short duration of the work, seems to show that this property is not yet worked out.

As regards lode mining, there have been no new records and no development work done.

Although this year work has been practically at a standstill, nevertheless lease rentals, on the whole, have been well paid up, which leads one to hope that the coming year may be a more prosperous one for the Division.

CASSIAR DISTRICT.

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ATLIN MINING DIVISION.

Report of J. A. Fraser, Gold Commissioner.

I have the honour to submit my report on mining operations in the Atlin Mining Division of Cassiar District for the year ending December 31st, 1908, which, from the standpoint of output and revenue, I regret to say, has been the poorest since the inception of the camp. Although there was apparently a falling off all along the line in the matter of revenue, a glance at the statistical return hereto appended will reveal the fact that the discrepancy between this year and last is more than covered by two items, one of which is the mineral tax or royalty, and that is easily explained by the fact that some of the larger companies contributed nothing under this head this year and others comparatively little, owing to their having devoted their time and energies to prospecting and development work. One company, which alone paid nearly $1,500 in royalty in 1907, did not contribute anything this season. Notwithstanding this poor showing, there were about as many men employed in the Division this year as last, and the general feeling of all classes throughout the Division at the close of this season was more hopeful for the future than in the previous year. There were about twice as many people engaged in "drifting" this winter as there were last. Drifting and other mining operations are being carried on this winter on Boulder, Otter, Ruby, Gold Run, Wilson, Birch and McKee creeks.

McKee Creek.

The anticipations of last year's report as to a good start being made on this creek were realised and some very good "clean-ups" were secured early in the season. Owing to the fact that the banks are very high and that a large quantity of barren overburden must be removed to expose the "pay gravel," the management decided to install a high pressure plant, to which a good portion of the working season was devoted. This high pressure plant consists of a flume on McKee creek and one on Eldorado creek (a tributary), connecting with a supply flume 56″ by 48″ on a 2½ % grade. This flume is supplied with overflows to regulate the supply required, so arranged as not to require any attention, even at flood time. The pipe lines supplied by those flumes comprise 30″, 22″, 20″, 18″ and 16″ pipe, 5,200 lineal feet in all, and are so arranged that one pit will be operated on each side of the creek and two pipe-lines will lead to each pit. The lower lines have 450 feet head pressure. The work was carried on entirely under the direct superintendence of Mr. Fletcher T. Hamshaw, President and Managing Director of the Amalgamated McKee Creek Mining Co., Ltd., with Mr. George Adams as foreman. Operations were commenced early in May and continued until late in October, and some preparatory work is being done there this winter. Notwithstanding the time devoted to the installation and changing of plant as above stated, this Company uncovered over 6,300 square yards of bedrock and washed about 7,600 cubic yards of pay-gravel, which yielded well up to $28,000 in gold, which gave an average of nearly $5 per square yard of bedrock (some going considerably over that), and a very fair average value for the gravel washed. To get at this, however, they moved over 220,000 cubic yards of material, besides about 130,000 cubic yards of stripping preparatory for next season's operations. About 25 men were employed throughout the season. I understand that the installation of a much larger and

more efficient plant, including a steam shovel, with electric power and dumping station is contemplated, and as this will involve a larger expenditure, a reorganisation with an increased capitalisation is now being consummated.

PINE CREEK.

Between 20 and 30 individual miners worked on Pine creek and from 2 to 8 on Gold creek during the greater part of the season. Of those, some did very well indeed, while I have not learned that any made less than fair wages. The non-operation of the steam-shovel gave those individuals who were in a position to avail themselves of it a good opportunity and ample water, and in one case some miners who had been hitherto unable to work their claims for lack of water and other facilities, and who had in consequence been granted leave of absence from season to season, were this year enabled to work and recovered $10,000 for their season's operations.

On the upper portion of "Gold Run" Mr. L. B. Harris continued prospecting throughout the season with his Keystone drill, and while he has not announced the definite discovery of the "pay-streak" for which he has been searching, he has declared it to be his intention to continue the search, and is apparently still sanguine of ultimate success.

The North Columbia Gold Mining Company, under the superintendence of Mr. J. M. Ruffner, managing director, operated the Pine Creek Power Company's property and plant, turning on water in the lower or No. 1 pit on April 26th, and using four 6 and 7-inch nozzles throughout the season—three in the pit and one on the dump for stacking boulders, and so utilising continuously about 2,700 miner's inches of water. The compactness of the material and the low pressure available as in former seasons necessitated the use of dynamite to loosen up the gravel. As described in a former report, this was done by a series of drifts (tunnels) driven into the bank, in the form of a "T," which were loaded with 75 % dynamite, well distributed, and tamped by being filled with water. The charges were fired simultaneously by battery, and were very effective in loosening up the cemented material encountered. Mining operations were suspendeded for the season on October 29th, being about two weeks earlier than usual, owing to an unusually severe cold snap which closed up everything for the time being. Owing to the work necessitated by the enlargement of its main ditch, this company did not attempt to operate its own pits proper (pits Nos. 2 and 3, mentioned in previous reports) for lack of water, but concentrated its efforts on the construction of this ditch. This was done by means of a one-yard dipper dredge, floating in the ditch, which was taxed to its limit of strength and capacity in cutting through the hard material encountered. Operations with this dredge were commenced on May 16th and continued until November 30th, during which period there was constructed about three miles of ditch; some very large boulders being encountered and cuttings made through banks 60 feet in height. This ditch, as far as completed, is about five miles long, 26 feet wide, with a minimum depth of six feet, and is calculated to carry 15,000 miner's inches of water on a grade of 8 feet to the mile. It is now constructed to the pressure box site for No. 3 pit, and will provide for the operation next season of at least two pits on this company's property. It is claimed that this ditch will have the largest capacity of any mining ditch in the world, and it is expected that the volume of water, with the additional head pressure available, will obviate the necessity for the use of dynamite as above mentioned, which, although effective, is very expensive and occasions much loss of time. It is intended to carry the ditch some distance farther, to the lower boundaries of the respective companies' leases and holdings. An average of 37 men was employed throughout the season and over $27,000 in gold won by the mining operations, which sum, however, did not nearly recoup the company for its season's expenditure.

The Atlin Consolidated Mining Company, Ltd., locally known as the "Guggenheims," which, last year with its steam shovel and accessories, produced the largest output in the camp, commenced operations very early this season, under the superintendence of a new manager, Mr. W. F. Copeland, who, however, upon looking the situation over, seemed to think that improved methods might be introduced which would lessen the cost of production. As the same people were experimenting along similar lines elsewhere, the management decided to await these results and discontinued all operations here beyond moving some track and machinery and otherwise preparing the ground for the installation of new plant next season.

About 80 men were employed on Pine creek and "Gold Run" during the season.

Spruce Creek.

About 125 men were operating on this creek during the season, some doing very well indeed, but the least successful having no great cause for complaint. More new ground was prospected than for several years, and those who have undertaken such development feel encouraged to continue. There does not seem to be any good reason for doubting the existence, farther up the creek, of the same rich "pay" as has been found in the portions worked during the past ten years, but, as the ground is deeper and the banks very steep and high, it is not so easily located.

There are about 100 people on the creek this winter, of whom 75 to 80 are drifting.

The Spruce Creek Power Company, Ltd., under the management of Mr. W. C. Hall, did not attempt any hydraulic work in the old pits, but confined its efforts to prospecting and constructing a new ditch and pipe-line from the falls up stream. Only a small force of men with two monitors was engaged upon this work, but the company has arranged for prospect work on some of its upper leases by means of drifts and tunnels, which will be carried on all winter.

On this creek are to be seen the results of misdirected investment, by the installation of machinery unsuited for the class of ground to be encountered. In one instance the steam shovel installed by the Northern Mines, Ltd., stands idle upon what was one of the richest sections of Spruce creek, the ground being too deep for the class of shovel installed—an ordinary railway shovel—and the inadequate appliances for handling the material when dug. Individual miners, with their picks, shovels, china pumps and derricks, are operating all around it and successfully working the ground with very good results—from $15 to $30 per day to the man being commonly reported. In another place lies the body or hull of the dismantled dredge installed by the B. C. Dredging Company, Ltd., whose ground contained so many large boulders and a hard, uneven bedrock as to render dredging an impossibility, but upon whose abandoned ground we may expect to see individual miners working in considerable numbers next season.

I may remark in passing that a large number of leases held on the upper portion of this creek have been cancelled for non-fulfilment of statutory and leasehold conditions, and I think it may be wise to withhold the greater portion of it from re-location in lease form for some time, so as to enable individual miners to prospect and re-locate it if they wish.

Birch Creek.

About a dozen men again operated on this creek, with excellent results, both the individual miners and those operating hydraulically having had perhaps the best season in the history of the creek.

Messrs. Pearse & Co., who are operating the ground and plant of the Dominion Trust Co., commenced piping with two monitors on May 16th and continued until October 18th, when frost compelled them to close down. They only had full water for about a week and for most of the time were limited to two hours' piping in every 24, but still did well. There were from

6 to 8 men employed and they washed about 26,000 cubic yards of gravel, uncovering a little over 4,000 square yards of bedrock and winning therefrom over $10,000. This creek improves in richness as they work up stream, and if sufficient water could be secured would give a good account of itself. Three men are operating there this winter.

BOULDER CREEK.

On this creek not more than 30 men were employed, including the French Company's employees. The results were, as usual, very good for the number of men employed.

The Société Minière de la Colombie Britannique, under the superintendence of T. Obalski, employed from 8 to 12 men during the season, commencing about May 15th and closing down on September 20th. Its operations were chiefly confined to cleaning bedrock and working over the ground that had been worked before. The company reported nearly $13,000 recovered under those circumstances and in that short period. There are over 30 people on the creek this winter, of whom 25 or more are drifting.

RUBY CREEK.

On this creek some desultory prospecting was done on the upper end, but without satisfactory results; in fact, only one man has done any work worth mentioning on the upper end and he intends continuing, as he has not located the pay which he believes to exist there.

Lower down, the property of the Ruby Creek Syndicate having been bonded to a syndicate of Seattle capitalists, represented by Mr. T. M. Daulton of Seattle; prospecting was vigorously prosecuted by those gentlemen from May 20th to October 1st, during which time they employed from 2 to 11 men, systematically prospecting the ground by running drifts in various directions. The results were highly satisfactory, and in consequence they have taken up the bond and are making the necessary preparations for the installation, next season, of a fully equipped hydraulic plant.

WRIGHT CREEK.

About the same number of miners (11) operated on this creek this season as last, and, as usual, with varying results. The same people contemplate continuing.

OTTER CREEK.

On the upper portion of this creek the Otter Creek Development Company, under the management of Mr. J. E. Moran, operated with 6 men, and, notwithstanding shortage of water, moved 30,000 cubic yards of gravel, built two new storage dams, etc., and, I understand, are in good shape for next season's work.

On lower Otter creek the Maluin Syndicate (which in last year's report was designated the "Otter Creek Hydraulic Gold Mining Company") brought in a hydraulic plant over the ice and commenced installation work about the 1st of May, had it installed and water turned on in two No. 4 giants with 6-inch nozzles on May 26th, and throwing a stream estimated at 1,200 miner's inches under 150 feet pressure. With an average force of 8 men, they operated until October 15th, during which time they moved about 112,000 cubic yards of material, cutting through the northern bank of Otter creek, where at one point it was 103 feet deep, so as to gain access to Surprise lake for dumping purposes. They laid about 1,050 feet of flume 40″ x 40″, paved with 8″ x 8″ x 8″ riffle blocks, which is laid on a 3 % grade, and when operations were suspended the outer end had an elevation of 53 feet above Surprise lake, and the inner or pit end was 25 feet below the surface of the creek bed, but still not on bedrock. With a view to prospecting the ground and ascertaining where bedrock is, they commenced a shaft in the pit near the upper end of the flume, and with a steam pump and hoist are sinking and

drifting from that point. They have also built another storage dam, half-way up the valley (say 2½ to 3 miles), which is 250 feet long and 16 feet high, with provision for raising it to 20 feet. It is well constructed and provided with spillway, etc., to accommodate surplus water. The installation of the plant and the construction of this dam was superintended by W. H. Brethour, of Victoria. Should the pay in the gravel on this property prove as good as the prospects indicate, this syndicate, which controlls 11 leases, will be found to possess a very valuable property.

Wilson Creek.

About 30 men were operating on this creek for the greater part of the season and a good deal of time and money was spent in prospecting, with rather indifferent results. The creek valley and bottom is from 1,000 to 2,000 feet wide, with low and gradually sloping banks, and the great difficulty seems to be in locating and following the "pay-streak," which seems to be unusually erratic. No exceptional returns were reported, and quite a number spent from one to three months prospecting without any definite results. There are about eight people wintering on the creek.

O'Donnell River.

Nothing has been done on this creek during the year, but I am pleased to note that Robt. McKee, who has control of several leases on the stream, and who has spent considerable time and money in prospecting work there in the past, has succeeded in floating a company for the operation of said properties and expects to bring in and install suitable plant for prospect and development work, just as soon as climatic conditions will permit.

On Graham, Volcanic and Gold Bottom creeks nothing has been done this year, but they have recently been attracting renewed attention, and it is quite possible that there will be definite progress to report with respect to each before the end of another season.

On Consolation and Lincoln creeks some prospecting was again done, but not to any great extent, and nothing definite was discovered. It is the intention of interested parties to prosecute the prospecting work on both creeks with more vigor during the coming season, and with reference to Lincoln, at least, I have reason to anticipate systematic development on a scale that should at least determine whether the creek is worthy of further attention or not. The ground is deep in all those creeks and the impecunious prospector unfortunately cannot follow it for any length of time where the cost of living is as high as it is here.

Some location and development has been undertaken during the year on other outlying creeks, hitherto practically unheard of, but sufficient has not been done—or reported—to call for particular notice.

A large number of leases throughout the District have recently been cancelled, but that fact means nothing except that about 90 % of them had been located and held for speculative purposes and had never been prospected, so that nothing more as to their actual values is known now than when they were first located.

Mineral Claims.

Under this head I may state that the large beds of hydro-magnesite lying adjacent to and within Atlin townsite have been recently acquired by British capitalists and are likely to be exploited in the very near future. I understand that analytical investigation has proven this deposit to be of a very high and pure grade and has disclosed the presence of properties which render it capable of being utilised for an astonishing number of valuable by-products and uses. These may be manufactured here or the raw material may be shipped elsewhere. I believe that the purchasers intend to begin work just as soon as the necessary facilities for so doing can be obtained.

There has been some activity in quartz mining, but it has not led to any important movement in this part of the District, though sufficient capital to develop the prospects discovered is apparently all that is needed.

Beavis Group.

On this property, which is situated within a mile of Atlin and is owned by the Gold Group Mining Company, Ltd., under the superintendence of C. E. Wynn-Johnson, systematic development was undertaken last year, in the course of which an existing shaft was sunk from a 65-foot level to a depth of 170 feet and lateral drifts were run—from the 60-foot level, 175 feet, and from the 120-foot level, 250 feet. Very good ore was encountered in those shafts and drifts and the results were said to be satisfactory, but the management was also led to believe that it was not developing the best ore-bodies on the property, and therefore decided to prosecute further prospect work by means of a diamond drill, so the works were shut down until such time as the drilling plant could be procured and installed.

On Taku arm of Lake Tagish there is a group of claims situated a few miles south of Golden Gate, which for some years has been known as the Engineer group. Two years ago the original holders allowed some of their properties to lapse and they were located by local parties, who have been doing some development work during the year and who are reported to have discovered some very rich ore. This rich ore is only found in small stringers, but I am informed that several larger and better defined ledges have been discovered on the properties.

On the Laverdiere property, situated at the south end of Atlin lake, the owners claim to have discovered some ore good enough to warrant shipping, and they have been building a road and making other preparations to that end for next season.

On the Vaughan property, on Fourth of July creek, and on other properties throughout the Division, more or less development has been performed.

On Tutshi lake the principal properties are being developed this winter, and along Lake Bennett the several properties held there are represented as being sufficiently advanced for shipping purposes; in fact, some of the owners talked of rawhiding the ore to the railroad, but I have not heard that this has actually been undertaken.

RAINY HOLLOW.

In this section, which is situated on the Klehini river, nothing more than the necessary assessment work to keep the claims in good standing was undertaken by any but the Alaska Iron Company, which, under the manngement of Walter S. Brown, has acquired interests in several properties and has been systematically prospecting the same by hand and core drills, and in every instance with most encouraging results. This company has packed (on pack horses) a gasoline and drill plant up to its mine and packed out two tons of ore, which was shipped to the Tyee smelter, and from which the returns were 25.36 % copper and 42.73 oz. of silver. Development work was being prosecuted there this winter and a tunnel was being driven, with the intention of placing ore on the dump for shipment next summer when the waggon road reaches an available point, but a sudden snowslide having covered up the tunnel, with the men in it, led them to think that, although they escaped in that instance without injury, they might not be so fortunate another time, and they decided to close down until they can take proper precautions against and prepare for all such contingencies. Capt. Brown has located land for a mill-site and other purposes, with a water right on Jarvis creek. He has the plant for a concentrator stored at Pleasant Camp to bring in to his mine when the waggon road will permit of it, and altogether appears determined to develop his prospects.

The failure of the other parties who held bonds on a number of properties in that District to complete was a disappointment to the owners, but the owners have moved for Crown Grants for as many of their claims as they could get surveyed this season, and some, at least, are preparing to mine and ship their best grade ore as soon as the waggon road is sufficiently far advanced to enable them to do so. Nearly 30 claims are now being or have been Crown. granted.

COAL.

I may mention the discovery of coal in this District in two places and the location of about a dozen leases, for which applications will shortly be made in due form. One of these applications is on the part of Capt. Brown (Rainy Hollow), who has located coal about 20 miles eastward from Rainy Hollow, on the old Dalton Trail and pretty well up toward the summit of the Chilkat Pass. He claims the quality to be good and the quantity in sight sufficient to warrant the expense of locating and prospecting it.

The other locations are on the east side of Sloko lake, at the south end of Atlin lake and easily accessible therefrom. The quality of the coal appears to be very good. What the extent or quantity may be has not been determined, as the snow covered the ground too soon after its discovery to permit of any extended or practical examination, but this will doubtless be undertaken as early in spring as the departure of the snow will permit.

Following is the statistical report for the year of revenue, etc.:—

OFFICE STATISTICS—ATLIN MINING DIVISION, 1908.

Free Miners' certificates (individual)	558
" " " special	1
" " (companies)	11
Placer records	50
" re-records (378) representing claims	392
Leaves of absence (105) "	295
Groupings	16
Abandonments	1
Permissions	9
Bills of sale, placer	100
" hydraulic	58
" mineral	63
Mineral records	105
Certificates of work	290
Filings	25
Abandonments	1
Gold reported for royalty	$158,156 90
Royalty paid	2,203 85

Revenue Collected, 1908.

Free miners' certificates (individual)	$2,565 00
" " (companies)	1,020 00
Mining receipts (lease rentals)	8,110 00
" (" deposits)	520 00
" (water records and rentals)	1,201 00
" (other sources)	4,844 75
Leaves of absence	737 50
Land sales	153 85
" revenue	10 00
Timber royalty	346 05
Carried forward	$19,508 15

Brought forward	$19,508 15
Licences (trade)	210 00
" (liquor)	1,612 50
Assessment Act real property tax	4,687 50
" personal property tax	206 40
" wild land "	35 65
" income "	46 95
" mineral "	2,203 85
" Crown-granted mineral claims	324 75
" interest	5 95
Small debts and magistrates' courts	127 00
Revenue tax	726 00
Law stamps	107 35
Game licence	100 00
Miscellaneous receipts	35 50
Total	$29,937 55

GOLD REPORTED, ATLIN DISTRICT, 1908.

Name of Creek.	Individual Miners.			Companies.		
	Ounces.	Value.	Royalty.	Ounces.	Value.	Royalty.
Birch				1,003	$15,046 60	$ 294 30
Boulder	161	$ 2,500 00	$ 10 00	819	12,700 00	214 00
McKee				1,744	27,900 00	518 00
Otter				269	4,160 00	40 00
Pine	1,041	16,260 00	211 15	1,965	30,458 75	519 25
Ruby	162	2,510 00	10 00			
Spruce	2,427	38,834 55	384 85	155	2,400 00	
Wilson	211	3,272 00				
Wright	135	2,115 00	2 30			
	4,137	$65,491 55	$618 30	5,955	$92,665 35	$1,585 55

Summary.

	Ounces.	Value.	Royalty.
Individuals	4,137	$65,491 55	$ 618 30
Companies	5,955	92,665 35	1,585 55
Total	10,092	$158,156 90	$2,203 85

STIKINE AND LIARD MINING DIVISIONS.

REPORT OF JAMES PORTER, GOLD COMMISSIONER.

I have the honour to submit my eighteenth annual report on mining operations in the Stikine and Liard Mining Divisions of Cassiar District for the year ending 31st December, 1908.

The improvement in the mining industry of this District, which has been hoped for from year to year, has not yet been realised and seems still to be in the distant future.

As far as placer mining is concerned, the season's operations show no advancement, and the output of gold, as shown by my monthly returns, is deplorably small, with little prospect of renewed activity in the near future.

I feel certain, however, that the present stagnation in placer mining in this District is only temporary, and that the future will prove such to be the case. This is a most extensive District and contains more unexplored country than is in all the remainder of the Province; there are hundreds of creeks and rivers which have been proved to carry fine gold, but which have not been further prospected for "pay diggings," while an equal number of streams have as yet not even been visited by white men.

I feel that the paying gold workings which have been operated in the District are very substantial guarantees that other such workings will be found, and, when conditions permit of it, the installation of dredging and hydraulic plants will follow in due course.

I have very little to report in the way of recent discoveries having been made, although some attention has been paid to the exploration and prospecting of the country lying around the headwaters of the Stikine and Turnagain rivers, two parties having been in this District. The first party left Telegraph creek in February last, and consisted of two men, backed by Mr. William Sloan and some local business men. The other party, consisting of only one man, left in the summer and returned early in the fall; he reported finding asbestos, but was unable to accomplish much in the way of prospecting for gold. The first party mentioned only returned during the latter part of December, and although they did not report finding any diggings, yet they appear to think favourably of the district, as they intend making another trip to the same section next year.

Iskut River.

There are nine mineral claims recorded on this stream, but nothing more than the assessment work necessary to hold the claim has been done on any of them.

Clearwater River—First North Fork—also Dease Creek.

There is nothing new to report of these sections; the conditions remain practically the same as previously reported.

Thibert Creek.

I regret to say that the Berry Creek Mining Co., which has for some time been operating on this creek, owing to sundry mishaps, such as mudslides, etc., in the pits, did not continue regular work this season. During the summer, however, a short run was made at the mine with a small gang of men, to prove the value of the ground to the satisfaction of parties who contemplate assisting in a re-organization of the Company's finances, to permit of the property being operated on a much larger scale than formerly. I have little doubt but that it would prove successful, as the ground carries sufficient gold and the company has an ample water supply.

One other hydraulic lease has been granted on this creek during the year.

Little Deloire Creek.

There are on this creek four creek leases of half a mile each. Two of these leases are held by the Mitchell Bros., who came in again this season and took up the work where it had been stopped the previous fall, but I regret to note that they met with a repetition of the misfortunes which they have had from year to year, and again lost the season without accomplishing much. As soon as they arrived on the ground in the spring they set to work with several men to sink a working shaft through solid rim-rock, from the bottom of which they intended to drift out

under the deep gravel channel. It appears that the concussion of the blasting in the rim-rock had loosened the gravels, so that when they "broke through" the gravels caved in on the workings, and further work was virtually abandoned for the season. It is now the intention of the owners to make another attempt next season; this time by bringing up an open bedrock drain from a falls in the creek, a short distance below the mine, and, as the ground is only 25 feet deep, with a good grade to the creek, the scheme seems practicable.

McDame Creek and Tributaries.

As regards the placer mining in this section, I have nothing of moment to report, the conditions remaining just about the same as last year.

Regarding mineral claims, in addition to the seventeen claims situated in this locality and mentioned in my last report as having been transferred to Messrs. James Rosenthal and Adolph Kurz, of Chicago, some seventeen other claims have been acquired by these gentlemen this past season, surrounding their previous holdings. These thirty-four claims have been protected for this year by assessment work done and recorded, or by cash paid in lieu thereof.

The other mineral claims of this section, situated to the south-east of McDame creek, have had the statutory assessment work done on them this year, but nothing more.

Rosella Creek.

The company operating on this creek had a few men at work during the summer, but I understand they did not recover much gold.

Office Statistics—Stikine and Liard Mining Divisions.

Revenue collected from general mining receipts	$4,469 50
" " other sources	1,707 36
Total	$6,176 86

SKEENA DISTRICT

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Report by Wm. Manson, Gold Commissioner.

I have the honour to submit herewith my annual report as Gold Commissioner for the Skeena and Queen Charlotte Mining Divisions, for the year ending 31st December, 1908.

Owing to the large increase of business on the Queen Charlotte Islands, it was found necessary to create a separate Mining Division, which took effect on the 15th of May, 1908. Mr. E. M. Sandilands, formerly Deputy Mining Recorder, was appointed Mining Recorder for the Queen Charlotte Mining Division, with office at Jedway, Moresby Island. This has proved of great convenience to the people on the islands, who are now able to record, and examine the records at the office at Jedway. Mr. Sandilands' report, which deals fully with the progress of mining on the islands, is enclosed herewith, and it is unnecessary for me to add to it.

SKEENA MINING DIVISION.

There are now in the Skeena Mining Division Deputy Recording Offices at Port Simpson, Port Essington, Unuk River, Stewart, or Bear River, Kitimat, Hartley Bay and Bella Coola. The offices of the Gold Commissioner and Mining Recorder, formerly at Port Simpson, were removed to Prince Rupert on the 15th of September, 1908.

Considerable activity has been shown, during the year, by prospectors and mining men at Portland canal and Goose bay, Observatory inlet, as well as other points in the District. With the assistance of the Deputy Mining Recorders, I am able to furnish you with details as follows:—

Portland Canal.

At no period in the history of the camp has greater activity prevailed than during the past season, owing principally to the important strikes made in the latter part of last season and the completion of the Bear river bridge, which gave a great impetus to prospecting, with the result that many important locations have been made.

Glacier Creek.

The greatest amount of work done in this section was by the Portland Canal Mining & Development Company, of Duncan, B. C., on its group of eight claims, the operations being confined to a continuance of the tunnels on the *Little Joe* and *Lucky Seven*, altogether amounting to 275 feet and about 50 feet of open cuts. This gold-silver-lead property was reported on by Mr. W. J. Elmendorf, of Spokane, Wash., his report being hereto appended.

The Stewart Mining & Development Company, Ltd., with a group of eight claims, concentrated its efforts on the main showing of the *George E.*, the character of the ore being exactly similar to that of the Portland Canal Mining & Development Company. A cross-cut tunnel was driven 50 feet, when the ledge was encountered, being about 5 feet wide, at a depth of 45 feet. No. 2 tunnel was driven on the ledge 70 feet; this tunnel will be continued a distance of 200 feet, with a raise to No. 1, giving a depth of about 150 feet. Numerous open cuts at different points on the ledge prove it continuous through four claims; this, with one and a quarter miles of graded trail and the necessary buildings, completed the operations to date.

On the *Lake View* group, held by McKay and Bibeau, the shaft, sunk last year to a depth of 25 feet, was continued to 43 feet, when, owing to the rain, they were unable to economically handle the water, and were obliged to abandon the work until the necessary pumps can be installed. A cross-cut was made of the ledge at a depth of 25 feet, at this point it being 5 feet wide and of high grade ore.

The *Copper King* group, held by Archie, Thebo and Brown, had the usual assessment performed with a mile of grade trail. On the North fork of this creek the *Columbia* group, held by Rush and Bagg, had considerable work done on it, by tunnels and open cuts, proving the ledge continuous through several claims; picked samples from this ledge carried 1,000 oz. of silver to the ton.

On the south fork of this creek a large number of new locations have been made. The *Excelsior*, held by Rush and Bagg, has a showing of two parallel veins, eighteen inches and four feet wide, of almost solid galena, with a percentage of grey copper. As this claim was located late, no assay is at hand, but it may be expected as being high grade.

Two claims held by Cook and Dobson have been bonded to W. J. Bowen, of Seattle, Wash., and it is his intention to open them up at an early date.

Five claims held by Gourley and Silverman had the usual assessment work performed upon them.

Altogether, assessment work was done on about 50 claims in this section

Bitter Creek.

The *Roosevelt* group of five claims was surveyed and an application will be made for Crown grant.

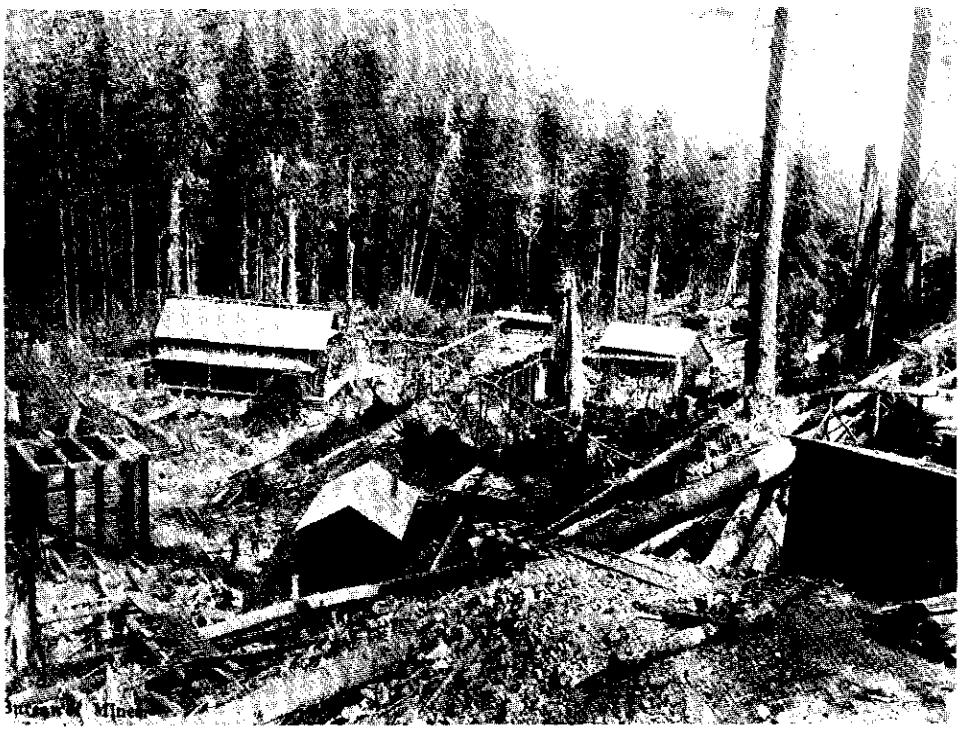
Many new locations were made on this creek, and, from the fact that they have large surface showings, it is anticipated they will prove of some importance.

Bear River.

At the junction of Bear river and American creek, five claims were located, the *Red Cliff*, *Mount Lyell*, *Montrose*, *Waterloo* and *Little Pat Fractional*, held by Lydden, Pederson, McDonald and Peardon. This appears to be one of the most important locations made in the district. A series of tunnels and open cuts, a distance of 500 feet up and about 40 feet across, disclosed a large body of copper ore; in some places solid chalcopyrite. An average sample, taken from a 10-foot tunnel driven on a parallel lead, gave $92 in gold. This property has been bonded to A. Erskine Smith, of Vancouver, B.C., and it is expected he will commence active operations with the opening of the season.

At the head of Bear river some important locations were made, particularly the *London* and *New York*, held by Ericksen and McNeill. This property, although known to exist from the fact that tons of float were strewn along the foot of the mountain, had never been located, owing to the inaccessable nature of the ground; this difficulty, however, has now been overcome. It is evidently high grade, as some of the samples are solid chalcopyrite. Numerous claims have been staked in the immediate vicinity. The Bear River Mining and Development Co. has been formed to operate the property and will commence with the opening of spring.

The *Franklin*, held by Messrs. Rainey, had the usual assessment done, besides *Main Reef*, *Nos. 1* and *2*, held by Ranch and Horstman.



IKEDA MINES, FROM UPPER TUNNEL.

DOCK AND BUNKERS, IKEDA MINES, IKEDA BAY, Q. C. I.

American Creek.

The *American Girl* group of four claims, held by Stewart, Conway and Brightwell, had the annual assessment work done and application posted for Crown grant. Adjoining claims, *Bandolier* and *Rangoon*, held by Stewart Bros. and others, limited their work to the annual assessment.

The *Ruby*, held by W. Noble, the *May Bee* and *Louise*, held by Stewart Bros., Deaville and Williams, had the usual assessment work done and was surveyed.

Five claims located were the *Lipton Nos. 1, 2, 3, 4*, and *Barney Fractional*, showing a strong, wide lead of copper, possibly low grade, and although considerable work has been done, it is not sufficient to fully determine this matter.

The *Big Casino*, *Little Casino* and *Jack of Clubs*, held by Neff, Carpenter and Raab, adjoin the *Red Cliff* group. A strong ledge runs through the three claims, and although little or no work has been done, it is anticipated it will prove of some importance, from the fact that samples taken across the face of about 100 feet gave an average of $20 in silver.

Salmon River.

Assessment work was done on the *Buena Vista* and *Nabob*, *Dominion* and *Rambler*, held by Lindeborg Bros., also the *Tiptop* and *Comstock*, held by Proudfoot and Stevenson.

Kitimat.

Iron Mountain camp is situated in the Kitimat valley, about twelve miles from salt water, on the south-eastern end of Iron mountain. The ore is magnetite, with iron pyrites scattered through it in places. Where work has been done, gold, silver and copper values have been obtained. The southern extremity of the outcrop is on a level with the valley; from there the showing runs over the eastern edge of the mountain and down again to the valley, the distance between the ends of the outcrop being 3,200 yards or nearly two miles. Its general direction is about 10° east of north, while its dip is about 75° west; the highest point on the outcrop is 900 feet above the lowest. The mineralised ground covers a width of 300 feet in places, consisting of solid bodies of magnetite, garnetite and a greenish rock, the two latter having small quantities of magnetite scattered through them.

On the *Bimetallic* group of claims, owned by Lindeborg Bros., the main tunnel is in 72 feet, the face showing magnetite with chalcopyrite.

On the *Magnetic* group, owned by C. Moore *et al.*, 11 feet of underground work has been done, with some surface stripping, disclosing four bodies of magnetite, 30, 10, 25 and 20 feet in width, carrying iron pyrites scattered through them with occasional indications of copper.

On the *Hillside* mineral claim, owned by A. Donaldson, at the extreme northerly end of the outcrop, there is a body of magnetite from 60 to 70 feet in width, in which, in one place, there is a small showing of iron pyrites and chalcopyrite, but as this claim was only recently staked, sufficient work has not been done to prove its extent.

The survey of the G. T. P. Railroad, Kitimat branch, crosses one of the *Bimetallic* group of claims. Since last year's report assessment work has been done for the current year. There are upwards of 165 feet of tunnel work, in addition to several open cuts and shafts, all showing ore. This property is deserving of special notice, on account of the good values and size of the vein. There is a true fissure lode 20 feet wide, cutting the foundation N. W. and S. E., approximately, which has a pay shute of about 4 feet wide giving values of $20 a ton, principally in gold and copper. The proximity to transportation makes this property easily exploited, as the distance is only 3½ miles by Government waggon road.

The *Caledonia* and *Drumlummon* group was located late last fall by Messrs. Sloan and McLennan, and lies about 20 miles from Kitimat, the main claims being about one mile from tide-water. It is intended to begin development work in the early spring. There are two well-defined fissure veins 75 feet apart, in the ordinary coast granite, averaging 4 feet wide. The clean ore, of which there is considerable in sight in both veins, assays on the average high in copper and 50 oz. per ton in silver, with a very small amount of gold.

BELLA COOLA.

Work has been proceeding on the North Coast Copper Company's property at Bella Coola No. 1 tunnel has been driven ahead considerably, being now in 190 feet. Two men have been working all winter and will continue to do so until spring, when the force will be considerably increased. Altogether, about 250 feet of tunnelling has been done, besides considerable stripping.

Six men were engaged on the property of the Bella Coola Copper Company, in stripping and cross-cutting ledges on the company's claims, for nearly four months last summer. It is expected they will do considerable work this year. They uncovered several good ledges of chalcopyrite last year and the company hopes to do a good deal of development work on the same this year.

GOOSE BAY, OBSERVATORY INLET.

At Goose bay, Observatory inlet, the Hidden Creek Mining Company has been doing considerable development work on its property, having installed a large plant and has for months past been employing a number of men. It is expected that the mine will soon be on the shipping list.

At Unuk river, Hartley bay, Port Essington and Port Simpson, the Deputy Mining Recorders have reported about the usual amount of business. A number of claims have been recorded, and the holders have been doing the necessary assessment work.

OFFICE STATISTICS—SKEENA MINING DIVISION.

Free miner's certificates issued	926
Mineral claims recorded	452
Certificates of work issued	341
Bills of sale, bonds, etc., recorded	134
Certificates of improvements issued	16

Revenue.

Free miner's certificates	$3,018 25
Mining receipts	4,829 90
Total	$7,848 15

QUEEN CHARLOTTE MINING DIVISION.

REPORT OF E. M. SANDILANDS, MINING RECORDER.

I have the honour to submit my annual report on mining operations in the Queen Charlotte Mining Division, comprising the Queen Charlotte islands. During the year 1908 less development was done on these islands than had been expected, due possibly to the low prices of metals and scarcity of money. The wonderful surface showings that were discovered last summer and fall should prove an inducement to capital, and there should be plenty of active work going on this coming year.

Collison Bay.

The *Maple Leaf* group is owned by J. H. Gordon and associates, and is easy of access, being situated at the mouth of Collison bay. During the summer the property was under bond to the Bellingham Bay Copper Company and considerable development work was done, with very favourable results, and a right-of-way for a tramway was also cleared to the beach About 8 men were employed during the past summer.

The *Collison Bay* group, situate in Collison bay and owned by Messrs. Carlyle, Leckie and others, was under bond last year to Trethewey Bros., when considerable work was done, but of late it has been idle. It consists of the *Meal Ticket*, *Cash Box* and *Treasure Vault* claims. I am informed that active work will again be prosecuted shortly.

The *Thunder* group, consisting of the *Thunder*, *Minnie* and *Spade Flush* mining claims, lies above the *Meal Ticket*, and is owned by Ike Thompson, C. T. Daykin and others and is a promising group having fine surface showings.

The *Vancouver* group of claims is situated between Collison and Carpenter bays, and although little work has been done, it is reported to be a promising property. It is owned by East Vancouver parties, and at the present time Mr. Alex. Smith is in charge of some development work on the group.

The *Iskroyd* group is situate at the head of Collison bay and Huston inlet, and is owned by Messrs. George, Simpson and others, who have this fall built a cabin and have some very encouraging showings.

Carpenter Bay.

The *Peerless* group is situate on Carpenter bay and is owned by the Young Bros., who have done considerable tunnel work on the property, and have built cabins and trails, etc. This is about the only property on Carpenter bay on which more than the necessary assessment work has been done, although quite a few promising locations have been staked there.

Ikeda Bay.

Ikeda Mines.

This mine is owned and operated by Awaya, Ikeda & Co., and is the only property which has done very extensive development, being practically at present the only shipper on the islands. This property has, this past year, shipped 6,000 tons of copper ore to the Tyee Smelter at Ladysmith, of which 2,000 tons was first class ore, carrying 14 % in copper, $6 in gold, and $2.50 in silver. The remaining 4,000 tons was the "run of the mine," and averaged 6 % in copper, $4 in gold, and $2 in silver. During the year 400 feet of tunnelling was run on the vein and 200 feet of stopes opened up, with an average of 100 feet of backs, the vein averaging from 4 to 16 feet in width. Very substantial ore-bunkers, with a capacity of 1,000 tons, have been erected, with all the "up-to-date" appliances for loading steamers quickly; 1,000 tons can be easily loaded in 10 hours. During the past summer a new Ingersoll-Rand 6-drill compressor with a 100 h.-p. Leonard boiler was installed; also a 25 h.-p. engine to haul up the empty cars. Three drills are running at the mine at the present time. Good houses for the Superintendent and compressor men, also new blacksmith and machine shops, have been erected this summer. In all about 70 men are employed. This Company owns about 26 claims around the Bay, quite a number of which were surveyed this past summer. The group on which it is now prosecuting most of the work is called the *Lily* group.

Harriet Harbour (Jedway).

Copper Queen.

During the past year about 220 feet of tunnelling has been done on this property, and all the claims have been surveyed preparatory to applying for Crown grants. The property is situate on Harriet harbour, at an

elevation of about 900 feet above sea level. Quite a quantity of ore is now at the mine. The property is owned by J. S. McMillin, of Roche Harbour, Wash., who also owns a number of other groups around the bay. On the *Reco* and *Modoc* a diamond drill was operated, under the charge of D. Lynch, and about 400 feet of hole was put down on this property. An average of six men were employed the past year.

Eight claims comprise the *Eagle Tree* group, which is owned by C. H. Park. About 200 feet of crosscut tunnel, 15 feet of shaft and surface work was done during the past year, but no ore was shipped. Buildings have been erected at the mine. On an average, four men have been employed.

The *Togo* group is situate on Harriet harbour, near the shore, and is owned by L. T. Watson. It comprises three claims, and during the year about $600 was expended; the claims have also been surveyed.

The *Harriet* claim lies on the divide between Ikeda bay and Harriet harbour and is owned by Trethewey Bros. *et al.* Considerable surface work has been done on the property and the claim surveyed.

Huston Inlet.

The *Ivan* group, consisting of three claims, is situated on Huston inlet, about three miles up, and is owned by Thompson and McKinnon. Considerable work was done this summer with very encouraging results, showing up some very good ore.

The *Gold Cliff* is owned by the Trethewey Bros., and is situated about 1½ miles up Huston Inlet. There is a very fine surface showing, and a short tunnel was run on it this summer.

Huxley Island.

The *Rambler* group consists of about 13 claims and is owned by a Victoria syndicate, with J. M. Carlyle in charge. A large amount of surface work has been done, showing a fair amount of copper ore, carrying some gold and zinc. Cabins and trails have been built; two men are employed.

Copper Islands.

The Skincuttle group of claims is situate on the Copper islands, just outside Jedway harbour, and is owned by A. Heino and others. These are the oldest claims in the Division, being staked in 1900. Mr. Heino is now preparing a small shipment.

Burnaby Islands.

On these islands quite a number of claims were located this past summer, but very little work has been done; some very good surface showings are reported. The *Euclataw* has a very fair showing of copper ore.

Gold Harbour or Mitchell Harbour.

The *Early Bird* group consists of 16 claims, and is owned by the Nuba Mining Company. About 125 feet of tunnel has been driven and a shaft sunk 60 feet. Ten tons of free milling gold ore have been shipped, averaging about $60. It was originally owned by J. McLellan. Eight men are employed. The property is reported looking very well. Gold harbour is an arm of Moore channel on the west coast of Moresby island, north of Tassoo harbour. The Government this summer built a trail into this harbour from the Narrows on Skidegate channel.

Lockeport and Tassoo Districts.

During the year 1908 great activity in prospecting was shown in the Lockeport and Tassoo districts, and several very important discoveries were made. During the year 1907

most of the prospectors confined their attention to the coast line, which is much indented, and did not do much prospecting in the high mountainous region which lies between Lockeport and the west coast of Moresby island. However, in 1908, as soon as the snow had sufficiently melted, many made their way over to Tassoo harbour by way of the Sewell trail and portage.

The Government detailed a foreman and four men to cut a trail into Tassoo harbour from Lockeport by way of Crescent inlet, and also to cut out the Sewell trail. Both these trails are now open, and it is expected that there will be considerable traffic on both during the coming year. The district being new and unprospected, nearly everyone was out in the mountains, and naturally it could not be expected that much development work would be done, the *Swede* group being the only property on which underground work was undertaken to any extent.

Swede Group.

The *Swede* group, owned by Messrs. Larsen, Pearson & Rogers, was the first mineral discovery made at Lockeport, and during the year under review was bonded to J. Wulffsohn, of Vancouver. The owner of the bond had a crew of men working for some time, during which 150 feet of tunnel was driven, besides minor works. After passing through a 12-ft. dyke, an ore-body was encountered bearing N. 80° W., with almost a vertical dip, and continued for 22 ft., where the last shots fired disclosed a highly altered limestone. This 22 ft. averaged 2.75 to 3 % copper, with small gold and silver values. On the surface there is a further 80 feet of mineral from the breast of the drive to another dyke, from whence 150 ft. of mineralisation is apparent on the surface. In the *Bornite* tunnel, bornite ore with gold and silver is shown. This property has a vast tonnage of low grade ore, if the mineralisation holds with depth.

The *Last Chance* group, owned by Messrs. McEachern, Wintermute and Jones, comprises a group of eight claims, on which two years of assessment work has been done. Sixty feet of ore was exposed on the surface, similar in character and value to the *Swede* group. This property adjoins the *Swede* group and is very easy of access for shipping, etc.

The *Surprise* is owned by Messrs. Bowser, Matson and Steves, and is on a contnuation to the east of the same ore zone as the *Swede* group.

The *Tiger*, owned by Messrs. Sullivan and Stevenson, lies to the west of the *Swede* group, showing the same ore zone, and its peculiarities and characteristics are again found in Crescent inlet.

The *Speculator* group lies to the south of the *Last Chance*, and in a gulch on this property a lead varying from 18 inches to 4 feet, carrying chalcopyrite, was exposed. Winter coming on prevented further work, but the owners intend developing it during the coming year.

The *Morgan* group, consisting of nine claims, is situate above and around Lake Anna, and shows 10 feet of nice ore. This lode can be traced a very considerable distance up and down the mountain, and it is understood that as soon as the snow leaves it development work will be started.

The *Apex* group is the property of Messrs. Davies, Bell & Harris, and is situated on a mountain 2,700 feet above sea level. The exposure is 100 feet of magnetite, showing chalcopyrite from wall to wall. This can be traced for nearly 500 feet, being exposed on two sides of a triangle. Should this continue, even to a moderate depth, there is quite a large tonnage available for immediate shipment. The southern wall of the lode is limestone, and the northern wall granitic in character.

The *Copper Belle*, adjoining the *Apex*, is owned by Messrs. Macguire and Langill, and shows 2 feet of chalcopyrite, associated with magnetite.

On the *Contact* group of claims, owned by Messrs. Connor, Fritz *et al.*, 7 feet of very nice ore is shown, but so far very little work has been done, owing to the claims being staked late in the fall. A trail and cabin, I believe, however, have been built with a view to work in the spring.

The *Warwick* group of 20 claims, owned by the Elliott Mining Company, is situate on the northern slope of Mount Moody on the southern side of Tassoo harbour, at an elevation of 1,250 feet above sea level, and contains some very large outcrops of magnetite, with chalcopyrite, very evenly disseminated throughout the matrix. Several small cuts have been put in, tracing up what are apparently three parallel veins, all within 300 feet, and the outcroppings may be traced on the surface nearly 1,000 feet. The management, up to the end of the year, was busy getting trails made and bunk-houses, etc., erected; consequently, sufficient mining has not been yet done to prove the width of the ore-bodies, but it is proposed to put in a drift to test their width and value at depth. Eight men are employed.

On the Corbett peninsula, and opposite the *Warwick*, is situated the *Ajax* group, staked by Chapman, Kitson and Husband. A nice showing of copper, gold and silver is shown close adjoining the tidewater.

Higher up the South Arm the *Hercules* group is situate, owned by J. F. Wilson *et al.*, and having a large showing of copper ore.

The *Sullivan* group is situate on the south arm of Tassoo harbour and in a good locality. Considerable work has been done on the claims, but nothing of very great importance has so far been uncovered, although a large vein is exposed. A cabin and trails have been built on the property. The claims are owned by Rand, McDonald and others. An average of two men have been working on the claims all fall.

Crescent Inlet.

On this inlet quite a few claims have been staked and assessment work done. A. Ikeda has a group of claims; also Mat Oledo and partners. Good specimens of ore have been taken from this locality.

Cumshewa Inlet.

On this inlet good gold and silver values have been discovered in small quartz veins, carrying zinc blende in a slate formation.

The *Go East* is situate on the north side of Cumshewa inlet and has on it a nice little vein of galena ore, carrying some very good values; this is about the only galena known on the islands at present. It is at the time of writing under bond to some Victoria people, who are erecting buildings and are to start work at once.

On the *Hawk's Nest* group of claims, situated on Tal-un-kwan island, east of Lockeport, considerable work has been done and they were all surveyed last summer. At the present time about six men are employed, doing some development work. The claims are owned by Messrs. Hemming and Magee.

The Tassoo harbour district is a large country; it is estimated that the shore line around the harbour is over 100 miles, so there still remains a large area totally unprospected. South of Tassoo and Lockeport, adjoining Echo harbour, there is a country so far unexplored. It would appear that the mineral zone extends as far south as Bigsbee inlet.

As it might be of some interest, I now mention the different trails made by the Government the past year on these islands.

A trail has been built from Jedway to Ikeda bay and continued on to Collison bay, thereby connecting the three harbours, and will be of great benefit to prospectors and others.

A trail has also been built from Collison bay to the divide between Huston inlet; also a trail from the Huston bay side to this divide. This enables people, when the weather is rough, to get to either of the neighbouring bays.

A trail has also been begun from Collision bay to Carpenter bay and the Rose harbour district.

From Lockeport a trail was built into Tassoo harbour *via* Crescent inlet, while another trail was built from Sewell inlet to Tassoo harbour, this latter being the shortest overland route from the east coast to Tassoo.

Another trail has been built from the Skidegate Narrows into Gold harbour, a distance of nearly 15 miles, so as to enable the Gold harbour people to come out in bad weather.

OFFICE STATISTICS—QUEEN CHARLOTTE MINING DIVISION.

Free miners' licences issued	190
Claims located (quartz)	564
" (placer)	5
Certificates of work issued	427
Bills of sale, &c., recorded	230

Revenue.

Free miners' certificates	$1,278 50
Mining receipts	4,297 45
Total	$5,575 95

OMINECA MINING DIVISION.

REPORT BY F. W. VALLEAU, GOLD COMMISSIONER. (OFFICE AT HAZELTON.)

I have the honour to submit herewith my annual report on the progress of mining in the Omineca Mining Division for the year ending December 31st, 1908.

This District came into prominence during the past year, owing to the report that gold in paying quantities had been found on McConnell creek, a tributary ef the Ingenika river. A large number of men went into that portion of the Division, and a greater number would have gone but for the difficulty last spring of getting provisions and supplies into that place. I will deal with this camp in that portion of my report devoted to placer mining.

Apart from the interest caused in the Division by the placer finds on the Ingenika river, the discoveries of coal deposits and mineral-bearing veins have attracted considerable attention from outside capitalists, and the development of these claims, as far as it has proceeded, is pronounced, by men competent to judge, as very encouraging.

Although railway transportation facilities may be said to be within sight—by the construction of the Grand Trunk Pacific Railway, which is located to run throughout the length of the Bulkley valley—these facilities have not as yet arrived, and the development of the mineral claims has as yet been confined to preliminary prospecting, such as can be carried on in advance of shipping facilities. As an indication of the amount of development work being carried on, the following lists give the amount and description of work done on the various claims in the several districts.

TELKWA DISTRICT.

On the *Anaconda*, *Alpha*, *Anaurus* group, *Black Jack*, *Brown Hill* and *Colo Central* mineral claims, some stripping has been done and open cuts made. *Copper Trust* group—Open cuts made on each claim. *Commodore*—Open cuts, all in rock. *Copper Queen*—Open cut, 7 feet long by 7 feet deep. *Dominion*—Open cut, 8 feet long by 6 feet deep, in rock. *Empire*—Open cut in rock. *Flat*—Open cut, 9 feet by 5 feet deep; rock work. *Gold Drop*—Stripping ledge, 25 feet; open cut, 25 feet by 6½ feet. *Gem*—Open cut, 11 feet by 10 feet deep, 4 feet wide; rock work. *Galena Queen*—Shaft, 4 feet by 6 feet by 5 feet deep; stripping ledge, 30 feet by 12 feet by 2 feet deep. *Humming Bird* group—Cross-cutting ledge. *Homerun*—Open cut, 20 feet long, 5 feet deep, 5 feet wide; rock work. *Josephine* group—Open cuts in rock. *Ivanhoe*—Two miles of trail; heavy grading. *Iron Mask*—Open cut in rock. *Lucky Strike*—Open cut in rock. *Lake View*—Open cut in rock. *Little Bear* group—Open cuts in rock. *Mineral Hill*—Open cuts in rock. *Maple Leaf*—Open cut and stripping. *Mountain Goat*—Rock cut and trenching. *Opher*—Open cut, 15 feet long by 4 feet by 12 feet face. *Pearl*—Shaft 12 feet deep, 7 feet by 4 feet. *Reno*—Open cut, 17 feet long, 5 feet by 7 feet; rock work. *Russell* group—Open cuts in rock. *Revenue*—Open cut. *Sampson*—Open cut, 12 feet long 3½ feet by 10 feet face. *Sun Rise*—Rock cut, 10 feet long. *Star* group—Tunnelling and open cuts. *Silver Heels* group—Open cut work. *Triumph*—Open cut, 10 feet by 4 feet by 10 feet face. *Venture* group—Tunnelling and open cutting. *Yellow Head*—Twenty feet open cut. *Cinderella*—One mile of trail work. *El Dorado*—Ten feet open cut. *Forrest* group—Tunnel and open cut work. *Rand* group—Open cuts and survey. *Homestead*—Ten feet open cut in rock. *Hunter*—Open cut in rock. *Idaho*—Open cut in rock. *King*—Open cuts. *Lake View* group—Shaft and open cut *Myrtle Fraction*—Open cut. *May Flower*—Open cut in rock. *Nelson*—Open cuts. *Rainbow*—Shaft and open cuts.

The claims owned by the Telkwa Mining and Milling and Development Company, and the Telkwa Mines, Limited, are all surveyed and Certificates of Improvement have been applied for. This also has been done by the owners of the *Rand* group.

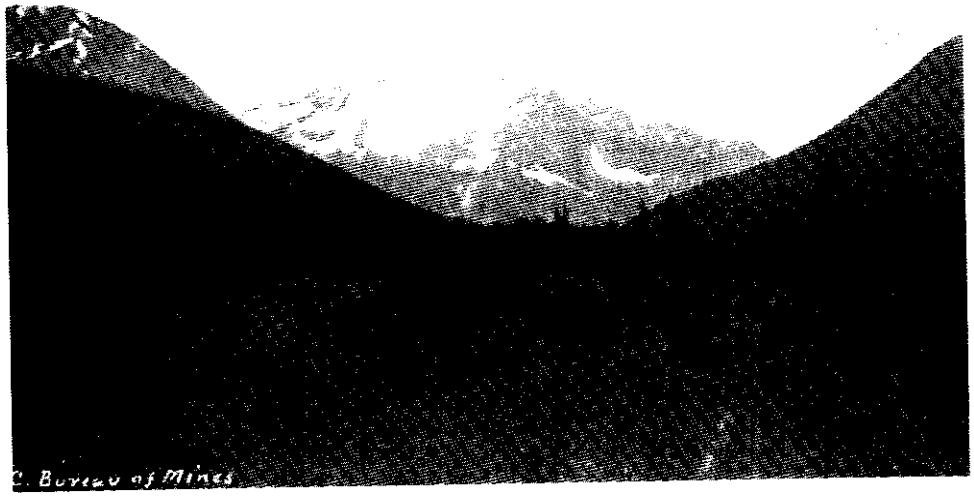
HUDSON BAY MOUNTAIN.

Anaurus group—Open cutting and stripping. *Dominion Day* group—Open cut. *Extension*—Open cuts. *Galena Queen*—Shaft five feet deep and stripping. *Humming Bird* group—Cross-cutting. *Iron King*—Open cut in rock. *Lucky Boy*—Open cut. *Raven*—Open cut and cross-cutting. *Baltic*—Open cut. *Empire* group—Trail work. *Henderson Fraction*—Open cut in rock. *Myrtle Fraction*—Open cut. *Northern Bell*—Open cut. *Oricle*—Open cut. *Silver* group—Open cut and stripping. *Victory* group—20-foot tunnel and open cutting.

BABINE RANGE.

Blue Bell—Stripping and open cut work. *Bonanza*—Stripping and open cut. *Commodore*—6-foot tunnel and open cutting. *Copper Queen* group—Tunnel, shaft and open cutting. *Dibble* group—12 miles trail work. *Eureka*—Cross-cut in rock, 10-foot face. *Eldorado*—Open cut in rock and stripping. *Highlands* group—Open cutting. *Homestake*—Shaft and two open cuts. *J. I. C.*—Open cutting. *Independence*—Open cut in rock. *Illinois*—Open cut in rock. *Kaiser*—Open cutting. *Lucky Strike*—Open cutting. *Last Chance*—Open cut in rock. *Mystery*—Drifting and open cut work. *Montana*—Open cutting. *Mineral Hill*—Open cutting. *Maple Leaf*—Open cut and stripping. *Melvina*—Open cutting. *Mountain Goat*—Open cutting. *Naomi*—Open cut. *Pathfinder* group—Open cutting. *Pack-Train* group—Open cutting and sinking shaft. *Silver Bar*—Open cutting. *St. Eugene* group—Shaft and open cut work. *Sunrise*—Open cut and stripping. *Venture* group—Tunnel 20 feet and open cut work.

SCOW FERRYING HORSES ACROSS TACLA LAKE.



HEAD OF BOWER CREEK, FINLAY RIVER.

Copper River.

Coronado group—Open cutting and tunnel. *Enterprise*—10-foot tunnel. *Homestead*—10-foot open cutting, rock. *Silver Creek* group—Open cut. *Silver Star* group—Open cutting. *Northern Belle*—Open cut.

Kitsilas.

Toulon group—Tunnel work, open cut and surface work. *Shamrock*—6-foot tunnel and stripping. *Snuff-Box*—6-foot tunnel and stripping. *Avon*—6-foot tunnel work. *Maple Leaf*—6-foot tunnel. *Valley View*—6-foot shaft, 15-foot open cut. *Noble Five* group—6-foot tunnel. *Lucky Jim*—Stripping and tunnel work. *Golden Crown*—6-foot tunnel. *Emma*—Open cutting. *Hazelton*—15-foot tunnel. *Nelson*—Open cutting in rock. *Portland*—15-foot tunnel.

A new camp, situate about nine miles north of Hazelton, has been opened up this fall, and some good samples of galena ore have been uncovered. This camp being within easy reach, development is looked for next spring.

Placer Mining.

As mentioned in the first part of my report, the Ingenika mining camp brought a large number of men into the Division. Two hundred and eighty-eight claims were recorded, and considerable development work done, considering the distance from steamboat navigation, the shortage last spring of food supplies, and the absence of a pack-trail into the camp. This coming season will see an amount of work being done on the Ingenika river and its tributaries. Already this winter a pumping and mining plant has left here by dog-train for that portion of the Division, and a number of men have started in or are preparing to do so. The amount of gold recovered last season was not large; the general opinion among the miners is that the diggings will generally be deep before bedrock is reached. The Jensen Brothers have sunk the deepest on the creek, so far, having gained the depth of 96 feet. They are now on their way to McConnell creek to continue the sinking.

A number of other creeks throughout that portion of the Division have been prospected, some of them showing promise.

A number of applications have been received for hydraulic leases upon the Peace, Finlay and Omineca rivers, as well as on Germansen, Manson and Lost creeks. Work is being carried on this winter on those leases on Manson and Lost creeks, by Messrs. Steele, Martin, and Mullon, who are developing their properties.

Tom Creek.

Work on the *May Flower* claim is still being carried on by the Messrs. Condit Brothers and J. J. May; this claim paid well this season, $10,000 being recovered, and as the pay has turned into the hill, work is being pushed this winter in a tunnel.

Coal.

Coal of good quality has been found in several parts of this Division, and the properties are being prospected. The principal localities are as follows:—Telkwa valley, Fraser lake, Kispiox valley, Bulkley valley, and the Peace river. Mining machinery was shipped to the mouth of the Skeena river for use on the property controlled by Mr. W. Ellis, but could not be brought up last fall, but will be used this coming season in developing his property.

OFFICE STATISTICS—OMINECA MINING DIVISION.

Free miners' certificates issued, individual	481
" " " special	1
" " " company	1
Mining receipts issued	845
Payment in lieu of work	9
Mineral claims recorded	166
Placer claims recorded	288
Certificates of work issued	241
Hydraulic leases	11
Water records	15
Bills of sale recorded	47
Powers of attorney	100
Application for certificates of improvement	47

REVENUE.

Free miners' certificates, individual	$2,072 50
" " company	100 00
Mining receipts (lease rentals)	995 00
Water rentals	278 50
Mineral claims recorded	415 00
Payment in lieu of work	900 00
Placer claims recorded	720 00
Mining receipts, general	4,110 80
Hydraulic leases	55 00
	$9,646 80

THE INGENIKA RIVER AND McCONNELL CREEK.

REPORT OF PROVINCIAL MINERALOGIST.

During the early part of the year 1908 numerous reports gained circulation that finds of placer gold had been made on the headwaters of the Ingenika river. As the discoveries had only just been made, the information concerning them was somewhat vague, and, as is usual in such cases, somewhat contradictory. These reports, however, were such as to render it desirable that more detailed and properly authenticated information be obtained as to the actual conditions. Since the district indicated was within a belt of country known to be gold-bearing and which had been found productive in numerous places along its length, there was a strong probability that other productive patches might at any time be found, and, if the then current rumours of the new discoveries should prove to be of importance, it was desirable that official confirmation be made of the fact and proper arrangements made for a rush of prospectors into the district, such as invariably follows a well substantiated placer-gold discovery. To this end the Provincial Mineralogist, acting under instructions, left Victoria on June 3rd for the district, accompanied by Mr. R. Fleet.

The existence of the gold-bearing belt already alluded to is indicated, in the first place, by the location of placer mining camps that have, at various periods in the history of the Province, been discovered and which have proved productive. Among the camps now existing, or formerly operated, situated in and indicating this gold belt, may be mentioned the Klondike—at its north-western extremity, as far as is yet known, and following in succession, in a south-easterly direction, Atlin, Dease Lake, Omineca, Cariboo, Big Bend and Upper Columbia River—with, at a wider distance apart, in an east and west direction, the camps of Wild Horse Creek in East Kootenay and Granite Creek in the Similkameen.

As has been already said, the occurrence of these camps first indicated the existence of the gold belt, which was further confirmed when more extended and detailed investigation showed an almost continuous line of gravel wash extending in a line, as indicated by these camps. This gravel wash occurs not only at the spots indicated, but, to a great extent, overlies the intervening territory and lends encouragement and hope to the belief that there still remain undiscovered in this great belt of gravel wash many spots which may yet be found to rival in richness any of the camps now known, some of which have already passed into history.

The probability of such future discoveries seems great, and is the star which leads the placer prospectors into the most remote and inaccessible parts of the Province, hardships and privations invariably being theirs, while fortune falls to the lot of few; but hardship seems unable to kill, or even diminish, the hope which exists and beckons them on.

An examination of the known placer fields shows that in each case the really profitable diggings were included in a very small area; for example, the rich diggings at Barkerville, which made Cariboo and British Columbia famous, were all pretty well within a circle of a radius of five miles, while, outside of this small area, gold occurred and was found, but not in very great quantities.

These small spots, where Nature's concentrator had been at work, were the only spots in a wide expanse of country where the prospector found substantial reward for his labour; consequently, in judging of the probable future importance of a newly discovered placer field, the absence of concentrations of gold, sufficient to be economically profitable, must not be taken as conclusive evidence that the field will remain unprofitable; but the finding of placer gold, even in small quantities, in a gravel deposit, if such occurrence is found with any marked persistency, must be taken as an indication of a flow of gold-bearing gravels, in which, should local conditions at the time of their deposit have been propitious to such, a concentration of values may, with some probability, be expected and hoped to be discovered at any time. Therefore, in reporting upon a newly discovered gold field in which profitable concentrations have not, as yet, been developed, it is impossible to speak with any degree of certainty of its future importance; the most that can be done is to give the facts as to the finds and the developments already made, and to point out the possibilities and probabilities of such indications, together with the surrounding geological data.

Location of Gold Discoveries.

The Ingenika river is a tributary of the Finlay, into which it flows from the west at a point some 20 miles above Fort Grahame, or about 80 miles above the junction of the Finlay and Parsnip rivers, which, when united, form the Peace river. On most of the maps heretofore published the Ingenika is shown as having a supposed length of 40, or at most 50, miles, but the recent work of prospectors and investigations made during the past summer would indicate that the river is at least 150 miles long, its source being within a mile of the headwaters of a short creek flowing into Thutade lake, which is the source of the main Finlay river.

The main Ingenika river has a general flow nearly due east, but there are important tributaries flowing into it from the north-west and south-west; of these tributaries, the most westerly, flowing in from the north-west, has been called McConnell creek by the prospectors in recognition of the work of that explorer of the Geological Survey who first mapped the Finlay river. It was on McConnell creek that, during the summer of 1907, prospectors found gold in the surface gravels, which gave rise to the excitement in the district.

ROUTES TO THE DISTRICT.

These prospectors had reached the creek by following up the Ingenika river from its mouth, up which they were able to take canoes about 100 miles; above that point the bed of the stream becomes too rough to admit of taking even a canoe, and the rest of the distance had to be made on foot, carrying all provisions and supplies. This route into the district is probably the "line of least resistance" for a prospector travelling light, but as a route for taking in supplies in quantity it is not found as desirable as an entirely overland trail direct from Hazelton, a distance, over a poor trail, of about 260 miles.

As an indicator of the feasibility of these alternate routes, the current freight rates charged by packers during 1908 may be taken as a fair comparative guide; the initial point of supply in both cases is Hazelton. Supplies for Fort Grahame are hauled, so far, exclusively by the Hudson Bay Company, which company provides a regular route of transportation, *via* Babine lake, Stuart lake, McLeod lake, down the Parsnip and up the Finlay rivers, the cost of transportation to Fort Grahame by this route being approximately 20 cents a pound. From Fort Grahame to the head of canoe navigation on the Ingenika river there is no organised transport service; it is estimated that the cost for this part of the route would be about four cents a pound.

From this point up the river the cost of transport would depend upon the distance the goods had to be taken—there are prospects at various points on the river—but it would in any case be high, as there is no trail up the river valley fit for horses; in fact, there are no horses in the country or means of wintering them if brought in, and the packing would have to be done on men's backs, for which work the Indians of the district do not seem to be inclined.

The time required to reach Fort Grahame from Hazelton by this route, for supplies or for men taking with them their own supplies, would be not less than 30 days under the most favourable conditions; a start from Hazelton could be made about May 15th at the earliest, arriving at Fort Grahame about June 15th. In the ordinary course of transportation by Hudson Bay Company, the season's supplies do not reach Fort Grahame before September.

As to the trail route into the district from Hazelton, the first 100 miles or so of the distance is over the long-established and much-used trail from Hazelton to Tacla lake, *via* Babine, but from Tacla lake onward the trail used followed old Indian hunting paths and was only blazed out in 1908, and, while passable for horses with light loads, it is not fit for a heavily loaded pack-train, but is capable of being much improved as to location and condition.

During the season of 1908 the packers took in supplies from Hazelton to McConnell creek for 25 cents a pound, but, being unable to make wages for their horses at that price, they would probably demand 30 cents per pound in all future contracts.

The time required by a pack-train from Hazelton to McConnell creek, loaded not to exceed 200 lbs. to a horse, is about 30 days, and such a train cannot leave Hazelton before the first half of June, on account of snow on the summits and lack of food for horses on the trail earlier than that date.

A canoe route into the Ingenika is from Quesnel, up the Fraser river to the Giscome portage, and thence down the Crooked, Pack and Parsnip rivers and up the Finlay river to Fort Grahame; this route was formerly used by the Hudson Bay Company in transporting supplies to interior points. One advantage of this last route is that, with the exception of a short portage of four or five miles over a waggon road, on which horses and waggon are usually to be had, the route is entirely by water, which enables a party of men, handling their own boat or canoe, to make the journey with considerable less outlay of cash for equipment or transport than is required *via* Hazelton. As points of supply, Quesnel and Hazelton are practically on a par as to prices and selection from which to choose.

The route taken by the Provincial Mineralogist into the district was *via* Hazelton and thence by pack-train.

About the middle of May, A. M. Irish, who was to accompany the Provincial Mineralogist, was sent ahead to Hazelton to secure a pack-train and equipment. This proved somewhat difficult, as the season was not sufficiently advanced to admit of horses arriving over the Telegraph Trail from Quesnel—the first horses from there only arriving at Hazelton after the middle of June—while the local supply of horses was very heavily drawn upon by the work connected with surveys of the G. T. P. Railway, the ordinary demands of the prospectors for the Bulkley River and the extraordinary demand of the gold seekers desirous of going to the Ingenika. A train was, however, secured at an advanced price, and the Provincial Mineralogist, accompanied by Mr. R. Fleet, of McGill University, Montreal, left Victoria on June 3rd, by the Union Steamship Co.'s steamer "Camosun," arriving at Essington on the evening of June 6th.

On June 9th, the Hudson's Bay Co.'s steamer "Port Simpson" was taken up the Skeena river to below the Little Canyon, that being as far as the steamer ran at that season. It might be explained, in that connection, that the canyons of the Skeena are not navigable by steamers at high water, but in the spring, say during May and the first part of June, before the melting of the snow in the high interior of the watershed, and after the ice is out of the lower portions of the river, when the river is in moderate water, steamers have no difficulty in running up as far as Hazelton, which they continue to do until the water rises above a certain safety point. In 1908 the high water was on by the 1st week in June, so the steamer only ran to the foot of the Little Canyon, where the Provincial Mineralogist and other passengers, freight and baggage were landed and left on the shore some 14 miles below Kitsilas. Here, fortunately, Mr. J. D. Wells, a prospector, was met, who undertook to go up the river, some six or eight miles, to get five Indians and a big canoe in which to transport the baggage of the Provincial Mineralogist and three other men as far as Kitsilas, but the transportation of passengers was out of the question at that stage of the water.

On June 11th, the party of the Provincial Mineralogist, with two other parties who had joined him in the hiring of the canoe, portaged their baggage, etc., overland around the Little Canyon, where, shortly after noon, it was put into the canoe by the Indians, the would-be passengers taking a trail up the river, which, after joining a railway construction road, led to the townsite of Copper City, that point being reached before supper time, and the night very comfortably spent at a small hotel, kept by Mr. Creatch and wife, the nucleus of the expected town.

On June 12th, the combined party of five set out up the bank of the river, to make its way, as best possible, in the absence of any trail, to Kitsilas. The canoe with the baggage waited at Copper river and Gold creek, ferrying the party across the mouths of these streams, which would otherwise have proved barriers to the trip.

The country is rough, much cut up by sloughs extending in from the river and heavily covered with brush, so the trip was a rough one, while a gentle rain, beginning about noon, did not add to the comfort of travelling through the brush and heavy undergrowth. Kitsilas was reached about 3 P. M., where, by good fortune, it was found that the steamer Hazelton, which the Hudson Bay Company had kept above the canyon during high water, was to start the next morning at 7 o'clock, and, as the hotel at Kitsilas was full, the Hudson Bay Company's officials allowed the party to go aboard the steamer that night.

June 13th and 14th were spent in travelling from Kitsilas canyon to Hazelton, that point being reached about 3.20 P.M. on Sunday.

On Monday, the 15th, camp supplies for six men for 100 days' trip were purchased, packed, etc., and all arrangements completed for an early start the next day, but, as usual, some of the pack-horses could not be found in the brush, and it was June 17th, at 12.30 P.M., before the party, consisting of six men and sixteen horses, drew out of Hazelton, and that night camp was made six miles out on the Babine trail.

June 18th, breakfasting at 5 A.M., an early start was made and camp was pitched that night at "18-Mile Camp," where, owing to a heavy rain, the party was obliged to remain all the following day.

On the 20th, starting at 9 o'clock, S. O. B. creek was reached at 2 P. M., and there camp was made for the night.

On June 21st Stump camp, on the summit of the divide between the Suskwa river and Babine lake, at an altitude of 4,150 feet, was reached.

June 22nd—Leaving Stump camp at 9 o'clock, Babine post was reached at 2 p. m. and camp pitched on the flat on the south side of the lake.

June 23rd was spent at Babine, resting the horses and "washing up."

June 24th—Leaving Babine lake at 9 A. M., the old trail to Tacla lake was followed and camp made about twelve miles out from Babine.

June 25th—The pack-train started at 10 A. M. and at 4.30 camp was made at Mary lake, near the summit of the divide between Babine and Tacla lakes, at an altitude of 4,000 feet.

June 26th—Tacla lake was reached about 2.30 and camp pitched at the ferry, about midway of the length of the lake. Tacla lake is about two miles wide and fifty miles long, in a N. W. and S. E. direction, receiving the waters of the Driftwood river from the N. W. and emptying to the S. W., by a short connecting stream, into Trembleur lake, which, in turn, empties through the Tatchi river into Stuart lake, and by the Stuart river into the Nechaco river and thence into the Fraser river at Fort George, which is on the line of the G. T. P. Railway. These connecting waterways are navigable by boat or canoe, and if some little work was done, could be navigated by a small, shallow draft steamer.

The trail so far followed is the regular route into the Omineca Mining District, and after crossing Tacla lake bears off to the east. The route to the Ingenika river—after crossing Tacla lake—follows along its north-eastern shore to the head of the lake, and thence up the Driftwood river.

June 27th—The horses were ferried across Tacla lake by an Indian, who had constructed and operated a ferry, capable of carrying about twenty horses at a trip. As the trail along lake-shore had not, at that time, been completely cut out, the horses were sent over light—as were those of Johnson's pack-train, also destined for the Ingenika—and proceeded to the head of the lake, a hard two days' trip. The Provincial Mineralogist and party, taking all baggage, freight, etc., took the ferry scow, and by using a tent-fly as a sail, with a favouring wind, reached the head of the lake on June 28th, where camp was pitched.

June 29th—In camp at the head of Tacla lake at the mouth of the Driftwood river, awaiting the arrival of the horses, which had been delayed on the trail. It was at this point that Colonel Charles S. Bulkley, in charge of the surveys for the Overland Telegraph Company, wintered, in 1865-6, with several men; the remains of his house are still to be seen, and gave the name to the place, "Bulkley House." At present the place is quite uninhabited, although there is standing a very good log-house and barn, erected as a trading post, but long since abandoned.

June 30th—Leaving Bulkley House, the trail was followed up the left bank of the Driftwood river for a distance of ten miles to the mouth of Lang creek, where camp was made on a

fine flat of several hundred acres, affording excellent horse-feed. From this point the present trail continues up the valley of the Driftwood for some fifteen miles, to Cotton's camp, when it turns to the north, following up a creek valley and over the summit. The Indians and certain trappers familiar with the district say, that the better route to the Ingenika would be to follow up Lang creek to the summit, joining the present trail at the crossing of the Omineca river.

July 1st and 2nd were spent travelling a distance of fifteen miles up the Driftwood; on the latter day only five miles were travelled, as the trail proved very soft, with numerous swamps wherein the horses were mired and could only be gotten across by covering the trail with brush. In order to make this portion of the trail serviceable for pack-trains it would have to be corduroyed.

On the evening of July 2nd camp was pitched at Cotton's camp, at the point where the Driftwood is left, and which has an altitude of 2,600 feet.

On July 3rd it rained heavily and camp was not moved, but the time was fully occupied in the usual occupations of a "rest day" in camp, patching, washing clothes, fighting flies and in replacing some half-dozen horse-shoes which had been pulled off in the swamps on the previous two days.

July 4th—Leaving the Driftwood river, a small unnamed creek was followed up to the northward for ten miles, when camp had to be made on a stony ridge between two swamps, which afforded the only available feed for horses, and very poor it was.

A trail gang of three men had preceded the party and they blazed out the trail to a certain extent, but, as they travelled about ten miles a day, they could do little selecting of ground and less of clearing.

July 5th—Poor feed at this camp had induced the horses to wander, so it was nearly 11 o'clock before the train was in motion, and only seven miles was travelled when camp (No. XV.) had to be made on the bank of Beaux Jours creek, nearly up to the summit of the divide, and at an altitude of 3,800 feet.

July 6th—A drive of six miles brought the party to a magnificent meadow of several hundred acres, situated near the Summit, at an altitude of about 4,000 feet.

July 7th—A drive of ten miles, through a dense forest of small spruce for the most part, and down a steep incline, brought the party to the Omineca river, which at this point was just sufficiently shallow to admit of being forded by pack animals. After crossing the river, Camp XVII. was made on the north side, which point was afterwards found to be within about 100 yards of the 302-Mile post on the trail put through by the R. N. W. Mounted Police in 1906.

July 8th—Camp was not moved, owing to a heavy rain which continued all day. The distance from the Driftwood to the Omineca river was estimated at 33 miles. Johnson's pack-train again caught up to the party.

July 9th—The Police trail was followed west for about four miles to a point in a heavy clump of timber where, following up a small creek valley, the Ingenika trail branches off to the north.

The Police trail continues to the westward through Fort Connelly (Bear Lake) to the Yukon Telegraph trail, near the 4th cabin north from Hazelton. An alternative route into the Ingenika from Hazelton would be *via* Telegraph trail and Police trail as far as this point. The distance by either trail is about 175 miles.

Leaving the Police trail at the 306-Mile post (306 miles from Fort St. John or 98 west of Fort Grahame), the Ingenika trail was followed to the north, up the creek valley for some six miles, where Camp XVIII. was made about three miles below the summit, at an altitude of 4,450 feet. On this date, at this elevation, there was frost and snow at night, so the grass was scarcely sufficiently grown to serve as horse-feed.

The summit of the pass was crossed about noon, at an altitude of 5,000 feet, the surrounding peaks and ridges rising to about 7,000 feet. Snow still lay on the summit and vegetation had hardly started. About six miles past the summit, and still on a high watershed, "Bates Cabin," a trapper's winter quarters, was reached and Camp XIX. made, at an altitude of 4,450 feet.

July 11th—Leaving the Bates Cabin, the trail still continues to the north-east along the height of land; after a drive of 14 miles, Camp XX. was made in a small basin, at an altitude of 4,750 feet, nestling in among a sea of mountain peaks which towered to over 7,000 feet, and containing a number of small lakes, the sources of streams flowing in all directions.

July 12th was Sunday and the camp most comfortable, with good feed for horses, so a day of rest was proclaimed, one of the party being ill enough to cause some anxiety.

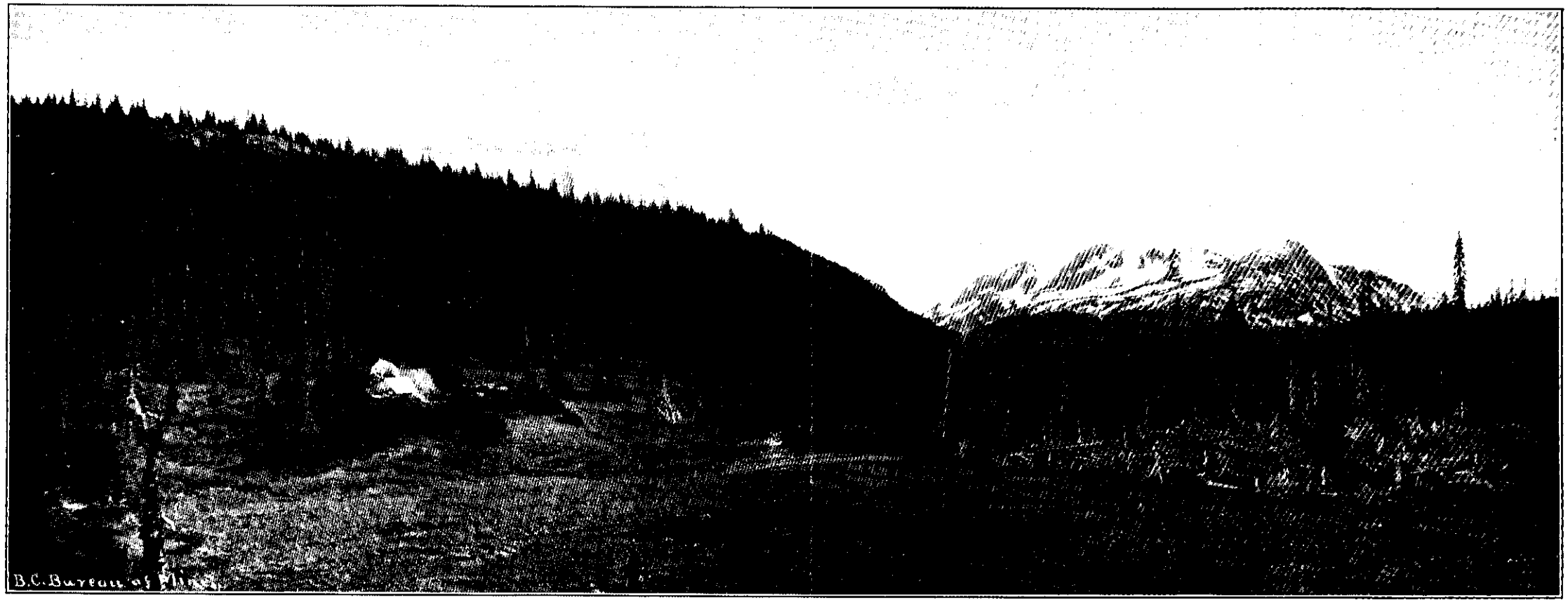
The writer and Mr. Fleet climbed to the summit of an adjoining mountain, altitude 6,750 feet, from which an extended view was obtainable, disclosing nothing but mountain peaks and ranges as far as the eye could reach.

July 13th—Travel was continued for seven and a half hours in a general northerly direction, over a very bad trail, the distance covered being not much over 10 miles, during which a gradual descent had been made to an altitude of about 4,000 feet, where a gently flowing stream, about 30 feet across and 18 inches deep, was crossed. This stream was flowing to the west and was taken to be a tributary of the Sustut river, which flows into the Upper Skeena river. Camp XXI. was made on a large burned-over gravel flat to the north of the river.

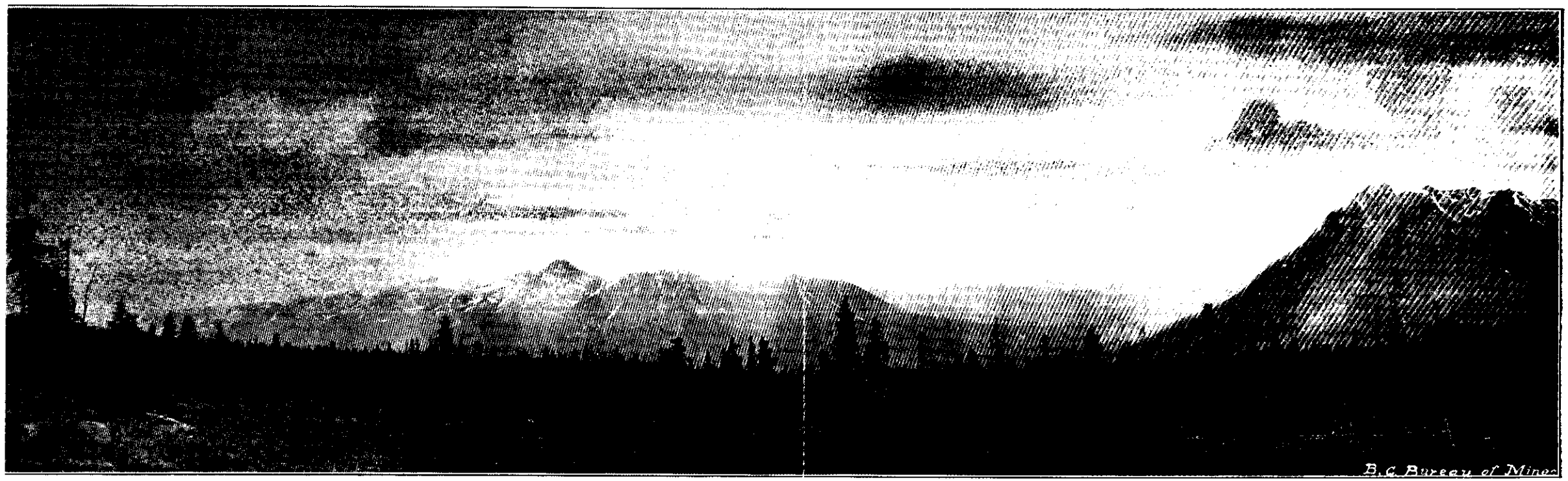
July 14th—Starting at 8 A.M. and travelling six hours, a distance of only eight miles was made, as the trail followed an Indian foot-trail which dodged in and out of steep-sided valleys, sometimes so steep that the horses had to slide down the banks. The location of this portion of the trail should be altered as the saving of half a day's time to a pack-train could be made at small expense.

July 15th—After following up the basin for three miles, the headwaters of a large creek, flowing west, was forded, when the trail struck over a ridge composed of large boulders three to four feet in diameter, on which it was nearly impossible for the horses to keep their feet and very dangerous. The country had been burned over and the fallen tree trunks caused about three miles of travel to be made for each mile of advance; the so-called trail is a disgrace and not fit to put a dog over, let alone a pack-train. To add to the discomforts, an unusually bad thunderstorm set in, accompanied by heavy rain and hail, so that it was with difficulty the horses were forced ahead.

After climbing over this hill of boulders for some miles, the trail dropped abruptly from a cut bank to an impossible crossing of a deep mountain torrent flowing west—Boulder creek, so called, as its headwaters were composed of nothing but huge boulders giving no foothold for horses. The selection of this crossing evidenced such a lack of common sense that the writer, refusing to follow it, halted the pack-train, and with Jack Graham, the packer, prospected out a new trail; this was easily found, on the bench on the left bank of the creek and after about a mile, the stream was crossed, on a perfect ford, where it flows gently through a plateau on



BATES' CAMP, ON SUMMIT, NEAR HEADWATERS OF OMINECA RIVER.



VIEW FROM CAMP XX., ON SUMMIT, NEAR HEADWATERS OF SUSTUT RIVER.

the summit. This plateau is about six miles long by one mile wide, lying at an altitude of 5,700 feet, and later in the season must form a magnificent meadow, but, in July, the snow had just melted off and the grass was only starting, so that the turf was not strong enough to support the weight of a horse, consequently, the pack-train had to follow the surrounding side-hills. Camp XXIII. was made on the margin in some scrub balsam, which marked the highest limit of timber growth, about 5,700 feet.

July 16th—The trail this day followed this high plateau for six or eight miles, the ground being so boggy that it was only by great care in the selection of the trail that the horses were not all helplessly mired; probably, later in the season, no trouble of this sort would be experienced.

This plateau is the source of the Ingenika river, which, towards the latter part of the afternoon, was forded where it was still only a small creek. Soon after crossing the Ingenika Camp XXIV. was made, at an altitude of 5,250 feet. The country rock in this district is chiefly of sedimentary origin, but it was evident that much granite was present as intrusions, as the boulders, etc., of the creek bed were almost entirely of granite.

July 17th—A drive of eight miles, following down the south fork of the Ingenika, brought the party to the mouth of McConnell creek, where Camp XXV. was made, a short distance below Jansen's Discovery Claim and four miles from the mouth of the creek. The Camp remained here until July 21st, the writer being engaged in the examination of the various claims in the vicinity; the result of this examination is given in another portion of this report.

The distance from Hazelton to McConnell creek was estimated at 260 miles; the time occupied in making the trip was thirty-one days, and out of these on six days camp was not moved, either on account of rain or for the rest and feed required by the pack animals, so that the trip was made in twenty-five actual days, averaging a little more than ten miles a day, which is about all that can be expected of a loaded pack-train on such a trail.

July 21st—After the inspection of claims on McConnell creek and adjacent portions of the Ingenika river, the party, having been increased by an Indian, Thomas Charles, who was hired as a guide to the country ahead, over which he had hunted in the winter, moved up McConnell creek to its head, and followed over a low divide on to the drainage area of Thutade lake, the source of the Finlay river.

McConnell creek proved to be not more than ten or twelve miles in length, heading in a wide and low flat pass in which are several lakes, the waters from which flow each way, to McConnell creek or northward into Thutade lake.

After five hours spent in travelling about ten or twelve miles, Camp XXVI. was made on the summit between the two watersheds, at an altitude of 4,700 feet.

Finlay River.

July 22nd—From this point onward there were no trails, or even blazes, to serve as guides, and the way had to be "felt," one or two of the party going ahead to search out a possible passage, being followed by two men clearing it for the horses, the remainder keeping the horses together and on the trail—not an easy matter. The course selected was toward Thutade lake, and after travelling a short distance, a creek was found flowing towards the lake, the valley of which was followed down. This creek is called by the Indians At-ty-chica and heads near the source of McConnell creek, flowing, however, in an opposite direction, namely, to the north-west. The bed of the stream looked promising, the wash consisting of slate, porphyry, conglomerate, quartz, granite, jasper, etc., with numerous boulders of white

marble, and a pan soon showed "colours." Consequently, although only having travelled about six miles, Camp XXVII. was pitched, at an altitude of about 4,500 feet. In the afternoon the creek was roughly prospected, and was found to yield some "twenty colours to the pan," but the gold was very fine and flaky, not even a colour showing otherwise. The character of the gold found was identical with that of McConnell creek, and, as far as it was prospected, seemed to be more abundant than on that creek. It seemed probable that the wash came from the north-west, and, flowing over the low flat divide, went down McConnell creek to the Ingenika.

July 23rd—At-ty-chica creek was followed down over a very trying trail for about seven miles, when camp was made and the stream bed again panned; the results obtained, however, were not nearly so satisfactory as higher up the creek, the colours being smaller and not so plentiful.

July 24th—Two men left camp to blaze out a trail in advance of the pack-train, which started at 10 A.M., and, after travelling seven miles, Camp XXIX. was made at the junction of At-ty-chica creek with Kemes creek, the latter flowing into Thutade lake, about two miles farther down. There was a heavy frost during the night. Panning in Kemes creek, at this point gave a considerable number of colours to the pan, but again the gold was very fine and flaky.

July 25th—After travelling for five hours, in which time about nine miles was made, Camp XXX. was pitched at an altitude of 4,450 feet and about two miles east of the north end of Thutade lake. The day was cold and rainy and the trail difficult, the high benches having to be followed, as the land immediately to the east of the lake is low, marshy, and heavily timbered.

July 26th—A drive of five hours' duration, covering about ten miles, brought the party to the Finlay river, at a point about three-quarters of a mile below the Great falls and five miles below the outlet of Thutade lake, where, on the bank of the river, Camp XXXI. was made, the party remaining there all the next day. There was little or no horse-feed at this camp and the horses had to be sent up to the benches, a couple of miles eastward.

The Finlay river, for the first four miles after leaving Thutade lake, is in a canyon which ends in a falls having a sheer drop of from 50 to 60 feet, with swift water both above and below; for some distance below the falls the banks are more gently sloping, with a little bottom land. The river, below the falls, is from 75 to 100 feet across, and is "swimming water" for a horse, being six to eight feet deep and flowing at an average rate of about ten miles an hour, with numerous rapids, rushing among large boulders, a combination which renders rafting dangerous and canoeing difficult, even for experienced canoemen. The "wash" of the river bed consists of small, well rounded boulders of sandstone, quartz, conglomerate, slate, porphyry, jasper, granite, etc., with very little gravel; panning of such gravels as could be found did not give any visible colours of gold. There is little soil on the hills, which are composed of boulders covered with a small quantity of decomposed vegetable matter and moss. The timber is poor and scarce, chiefly spruce, while very little food was to be had for the horses, except in an occasional swamp, which provided a coarse, rank grass.

On the afternoon of the 26th, a wild looking Swede suddenly appeared in camp; he was soaking wet and led an equally wet horse, having swum the river to beg some horseshoe nails, without which he could not proceed. After his horse had been re-shod, he tried four times to swim the horse back across the river, failing each time and nearly drowning, when the horse, displaying more sense than the rider, refused to enter the water again. The pair were kept at the camp all night and in the morning the man made a raft, re-crossed the river, drifting down stream half a mile in so doing, secured his baggage and partner, also a Swede, built another

raft away up near the falls, and after almost capsizing twice, managed to get across again; an example of how men of inexperience may disappear in that north country. These two men had been prospecting on the west side of the Finlay river for about 20 miles below the Falls, and said that they had been unable to obtain even prospects in that section.

It was only after reaching the Finlay river that game fish were found, although the streams at each camp along the trail had been tried; here, however, they were plentiful, and a couple of hours fishing, with one fly rod, more than supplied the camp with trout of from ten to fifteen inches in length, and Arctic trout (Alaska greyling) of from twelve to twenty inches. The latter fish are, for eating, by far the best fish of the country, and take a fly more readily than does a trout, but, after a couple of deep hard-pulling runs, do not offer much sport.

July 28th—It had been found impossible to find a trail down stream near the river, as the banks were precipitous, so a course had to be taken inland, with the object of striking the river again at the mouth of Canyon creek, some 15 miles lower down. The trail taken led up to a bench, about 300 feet higher than the river, and this was followed over rough country for nine miles, when Camp XXXII. had to be made in an opening where fire had made a clearing sufficient to permit a little grass to grow among the fallen timber—the only feed met with during the day—this point being about eight miles below the Falls, two miles east of the river, and at an altitude of 4,250 feet.

To the east of the river, about five or six miles, the solid formation rises to a considerable height, but the intervening area is covered with benches, or ridges, composed of washed boulders and gravel, which occur in succession, sloping to the south and evidently forming the remains of an immense glacial talus which filled the valley of the Finlay.

July 29th—After continuing for five miles along these stony ridges through a forest of small jack-pine—fortunately, free from underbrush—Canyon creek was reached, and, as the banks were too steep to admit of the passage of horses, the creek was followed for a mile down to its junction with the river, where it was crossed on a bar at its mouth. After crossing the creek the trail was laid through a stretch of bottom land, which had been reclaimed from the river by the beaver, and in this were several fine meadows, but, as these meadows graded into swamps, they had to be abandoned and the route again taken over the stony ridges. No horse-feed could be found on the benches, so a deflection had to be made to the river, where, after *five and a half hours travel and covering about ten miles, Camp XXXIII. was made in a* narrow draw near a slough from the river, along the edge of which grew a little wild and goose grass; into this the horses were turned, and kept with difficulty, as the feed was so poor. The weather was rainy and cold, the trail hard to locate, and the day proved a most exhausting one.

July 30th—It rained all night, and in the morning, after some hours' search in wet swamps, it was found that one of the horses had run back to the meadow passed on the preceding day, and it was noon before she could be recovered and a start made. Travel was resumed along the ridges, which here flattened out with numerous level bench-lands on which were small, grass-surrounded lakes, but the whole country was destitute of soil. After travelling for six hours in a rain-storm and covering about twelve miles—for much of which a trail had to be cut through brush—Camp XXXIV. was made at the mouth of Delta creek.

July 31st and August 1st—Camp remained at the mouth of Delta creek for these two days, during which a compass survey was run up the creek from its mouth to above the main north fork. Private information obtained before leaving Victoria had indicated this creek as prospecting very rich in gold; consequently the creek was most carefully panned, but the results were disappointing, as only a few colours could be panned near the river, but the flat from which they were obtained bore evidence of having been overflowed by this river in earlier

days, which rendered it a question whether the gold was river or creek borne. About two miles up, a bed of schist, running north and south, crossed the creek, above which few, if any, colours could be obtained. No gold could be found on the main creek above the north fork, but a little was found all the way up the north fork. The gold found was all fine and flaky, no rounded particle was seen at any place, although the banks and benches were dug into and bedrock reached in several places.

There is an old Indian hunting trail leading directly from the head of McConnell creek to the mouth of Delta creek, which is much shorter than that taken by the writer, and over this several parties travelled to the Finlay during the summer of 1908, their destination being Porcupine and Ruby creeks, which flow from the north into the Finlay at the Canyons. They crossed the Finlay at some distance below Delta creek or proceeded down the river on rafts, to the lower end of the Fishing lakes, shortly below which the river is an impassable canyon.

It was evident that much difficulty would be found in searching out a passable trail down the Finlay from Delta creek, and, as it seemed possible to strike eastward through a pass in the mountains and thus on to the headwaters of some creek flowing into the Finlay below the canyon, it was decided to attempt it, although the Indians knew of no one ever having gone through there.

August 2nd—Camp was moved up Delta creek to near the headwaters of the North fork, a distance of about seven miles, where Camp XXXV. was made beside a beaver meadow near a fork in the creek, where successful prospecting had also been reported.

August 3rd and 4th—The camp was not moved. One of the party, L. M. Bower, who had spent a couple of seasons on the Finlay river, was sent out with the Indian to explore for a pass through the mountains; this they were unable to find the first day, but Bower was certain a pass could be found, so the following day he went out alone, with better results, only returning to camp at 9 P. M., after having been out all day on the mountain in an exceedingly heavy rain and hail-storm.

During these two days the remainder of the party thoroughly prospected the ground around the headwaters of the creek; it was found that the ground had at some previous time been pretty thoroughly tested by pits and trenches, but who the prospectors were was not known. Some of these old trenches and pits were cleared out and new ones dug in several places to bedrock, which here is but lightly covered. The result of the work was to satisfy the writer that on this creek gold did not occur in any serious amount, and that what little there was, was exceedingly fine.

August 5th—After a drive of seven miles, following up the north branch of the North fork, Camp XXXVI. was made, at an altitude of 5,000 feet, on a long flat summit forming the divide between Delta creek and a creek flowing into the Finlay two miles below the lower end of the Big Canyon, This was the creek that Bower had picked out from the mountain, and which he recognised as one he had been on the lower reaches of some years before; the creek was, therefore, named Bower creek. Two of the horses having by this time about played out, owing to rough trails and poor feed, were not fit to attempt the hard trail ahead, and, as at this camp there were extensive meadows of upland grass, it was decided to leave them here, to be picked up by the packer, Jack Graham and the Indian, on their return trip, it having been decided that the writer, accompanied by Messrs. Fleet, Irish and Bower, should proceed by water down the Finlay river, and that the horses should return overland to Hazelton.

August 6th—Bower creek, for the first two or three miles from its source, while perfectly practicable for foot travel, proved impassable for horses, as its valley is composed of great

sheets of volcanic rock which drop off in steps of six or eight feet; so it was found necessary to take the pack-train over the shoulder of the mountain, at an elevation of some 1,000 feet higher than the pass, and to descend into Bower creek below the rocks mentioned. This proved more difficult than was expected, but was accomplished after nine and a half hours steady travel, when Bower creek valley was again reached only four miles below the summit, where night overtook the party and camp had to be made in the dark, beside a slough, with only a little feed on its edge.

August 7th—Three men were sent ahead to cut out a trail, while the remainder picked up camp and packed the horses. After travelling nine miles, Camp XXXVII. was made at the mouth of a large creek coming into Bower creek from the right (south) and at an altitude of 4,000 feet.

August 8th—The camp was not moved, but two men were sent out to cut trail, of which they managed before nightfall to clear about three miles.

August 9th—Three men were kept ahead all day cutting trail, and by nightfall a distance of eleven miles had been travelled, when camp was made about two miles above the mouth of the west fork of the creek.

August 10th—After travelling down the valley for six and a half hours and making possibly eleven miles, Camp XL. was pitched in a bunch of jack-pine, about two miles from the junction of Bower creek with the Finlay river, below which the creek was in canyon and there was no horse-feed.

August 11th—The horses having had to be sent back some miles on the trail for feed, it was 11.15 A.M. before they were gathered in and a start made; it was, however, a drive of only two miles to the banks of the Finlay at Bower's cache, where Camp XLI. was made. The packer and Indian having been supplied with food for the return trip, left with the light pack-train at 3 P.M., with instructions to meet the party again at Babine post on September 11th, which meeting took place within one day of the time then arranged.

Two of the men with the party had been on the Finlay river the two previous years, and Irish had a log cabin on the left bank of the river about a mile and a half above Camp XLI., where the previous fall he had left a large canoe, in which it was expected the party would proceed down the stream. A raft was, therefore, built and Irish and Bower crossed the river to bring down the canoe, returning towards evening with the news that the canoe had been stolen, probably by the Indians in the spring.

August 12th and 13th—The expected canoe being gone, it became necessary to provide some means of descending the river as far as Fort Grahame, a trip of 120 miles, with some swift water. Fortunately, Irish had at his cabin a few boards which he had whipsawed for sluice boxes; these were requisitioned and in two days a flat-bottomed, straight-sided boat, eighteen feet long, was built and pitched with resin from trees, five paddles made, and everything was in readiness to proceed. The boat proved capable of carrying four men with abou 800 pounds of baggage, etc., and did not leak.

For some distance below the canyon the right bank of the Finlay is steep, but the left shore consists of wide, low gravel benches, and these had been prospected by Irish and Bower, proving to be sufficiently rich in gold to justify serious investigation, for, while they are scarcely rich enough to permit of being worked by hand, in so remote a district, they present distinct possibilities for dredging, or steam shovel work, when, at some future time, the district becomes more accessible.

August 14th—Camp XLI. was left at 11.15 A.M., all the party and baggage being comfortably accommodated in the boat, and by evening a distance of thirty-five miles down stream had been travelled, when camp was made on the bank about fifteen miles below the mouth of the Quadache river, a large stream flowing in from the north.

A few miles above the Quadache another large stream, known as Fox river, also enters from the north and is navigable for canoes for some distance up to a point from which there is an Indian trail leading to the headwaters of Porcupine and Ruby creeks, where, as previously mentioned, several parties of prospectors were at work, having gone in there *via* McConnell creek. Should these creeks prove profitable, they are more easily accessible *via* the Finlay and Fox rivers than overland from Hazelton.

August 15th—The party was under way by 7.30 A. M., and by nightfall had travelled thirty-five miles downstream, when Camp XLIII. was made, five miles above Deserters' canyon, at "Barge camp," so-called, as it had been the camping place of large parties in 1897 during the days of the Klondike rush, when a large barge, still pulled up on the bank, was constructed to ferry the parties across the Finlay, as the Klondike trail crossed here and went up the valley of the Fox river. It is estimated that during that "rush," over 100 prospectors, headed for the Yukon, wintered on the Finlay, and, as might be expected, the river and neighbouring streams were thoroughly prospected.

August 16th—Starting at 7.30 A.M. the upper end of Deserters' canyon was reached at 9 A.M., where all baggage and supplies were landed and portaged to below the canyon, a distance of about half a mile. The boat was with some difficulty "roped" over the first rapids and paddled light through the second. Camp XLIV. was made on the shore below the canyon.

August 17th—Starting at 8.30 A.M., the mouth of the Ingenika river was reached at 11.30 A. M. The valley of this river at its mouth is wide and the river flows in several channels; the gravel of the present watercourse is small and rounded, but the formation of the valley suggests the probability that the old channel might not have been where the present flow is.

Fort Grahame was reached at 4 P.M. and camp pitched near the Hudson Bay Company's trading post. Fort Grahame is an "outpost" of Fort St. James, on Stuart lake, receiving its supplies from there *via* McLeod lake post, and is in charge of William Fox, who also acts as a Deputy Mining Recorder for that district.

The Royal North-West Mounted Police trail from Alberta and Fort St. John, B. C., passes through Fort Grahame on its way to the Skeena and the Telegraph trail. A large detachment of police wintered at this post in 1905-1906 and built winter quarters. Irish's canoe, stolen from up the river by the Indians, was found here, where they had left it, having no further use for it, as they find it easier to proceed up the river again by trail.

August 18th was spent in "pitching" and caulking the canoe, as it would have been impossible to take the improvised boat up the Parsnip river.

August 19th and 20th were occupied in paddling down the Finlay to its junction with the Parsnip, the head of the Peace river. The mouth of the Omineca river, the headwaters of which the party had forded on July 7th, was passed, as was the mouth of Manson creek. A stop was made at Pete Toy's bar, where, in earlier days, that prospector is credited with having obtained a considerable amount of gold. Properly speaking this is not a "bar" at all, but a low gravel bench on the right side of the river, some six or eght feet above high water, and shows evidence of having been extensively worked by shallow workings, not extending more than about five feet deep. There were several deeper pits seen, but no records are avail-

able as to what depth the profitable ground continued, nor as to the character of the gold obtained, but the panning done by the writer at various points on the river, and the evidence of recent prospectors, would indicate that the gold to be found on the river is fine and flaky.

Camp XLVII. was made on the evening of the 20th about two miles up the Parsnip river.

August 21st to 28th, inclusive, were spent in poling and tracking the heavy canoe up the Parsnip and Pack rivers to McLeod lake post of Hudson Bay Co. During these eight days it rained almost every day, and the work, from which there was no escape for any one, was exceedingly hard and fatiguing. McLeod lake was reached on the evening of the 28th, at 5 P.M., and Camp LV. pitched.

August 29th—L. M. Bower, who had accompanied the party from Hazelton, desiring to remain on the Finlay all winter, was here given his discharge and paid off. A party of Indians who had been sent from Stuart lake to McLeod lake to build a scow for the Hudson Bay Company, wherewith to transport supplies to Fort Grahame, had their horses with them, and arrangements were made with the Indians for the transportation of the party, now numbering three, to Fort St. James. Leaving McLeod lake at 3.30 P. M., with seven horses and an Indian packer, Fort St. James was reached at 3.15 P.M. on August 31st, a distance of about eight-five miles, and here Camp LIX. was made in the Hudson Bay Company's school-house.

Sept. 2nd, 3rd and 4th a heavy head wind from the west for three days rendered progress up the Stuart lake impossible.

Sept. 5th—The party started for the Babine portage in a Hudson Bay Company's scow, camping halfway down the lake, the portage being reached at 5.30 P. M. on the 6th.

Sept. 7th—The party and its baggage were taken over the portage by Hudson Bay Company's teams, and Camp LXII. was made on the shores of Babine lake.

Sept. 8th—No arrangements could be made with the Indians for transportation to Babine post, as a heavy run of salmon was on, nor could a canoe be hired. The officials of the Dominion Government Hatchery, located at this point, came to the rescue, and loaned the party their large canoe, which, however, it was found had been "borrowed" without leave by some Indians, who had taken it to the mouth of 15-mile creek.

Sept. 9th—Passage was arranged for in an Indian boat returning for a load of salmon to 15-Mile creek; here the hatchery canoe was found and taken from the Indians, none of whom could be induced to accompany the party, which was able, however, to "paddle its own canoe," and at nightfall Camp LXIII was made eighteen miles down the lake.

Sept. 10th, 11th, and 12th were spent in travelling the remaining length of the lake, some eighty-eight miles, fortunately with a favouring wind, which, however, became a gale of such strength as to render it necessary more than once to seek shelter.

Babine Post was reached on the evening of the 12th, when Camp LXVI was made in a Hudson Bay Company's shack. Jack Graham, with the pack-train, had arrived two days before and was awaiting the party on the Flats to the south of the lake.

Sept. 13th.—Camp was moved to the Flats and the horse-packs once more adjusted.

Sept. 14th, 15th and 16th were spent on the trail between Babine and Hazelton, a fall of three inches of snow on the night of the 15th rendering travelling next day anything but pleasant.

The time absent from Hazelton was ninety-one days, in which time camp was moved seventy times.

Sept. 17th was spent in Hazelton settling up accounts, etc., of the trip. The Hudson Bay Company's steamer, it was found, had left for Hazelton on the 14th, and, as the water was low, it was doubtful when it would make the next trip; consequently, in conjunction with two other parties who were desirous of going down the river, a large canoe and three Indians were hired.

Sept. 18th—The party, in a canoe carrying fifteen men and a ton of baggage, left Hazelton for Essington, which latter point was reached on the evening of Sunday, September 20th, after an uneventful, though at times exciting, trip down the Skeena and through its canyons.

Sept. 22nd—The party left Essington by S.S. "Princess Beatrice" for Victoria, which city was reached on the night of September 24th, after a trip of 2,626 miles, of which distance 1,455 was made by steamer, 559 by pack-train, and 612 miles by bateau or canoe.

McConnell Creek.

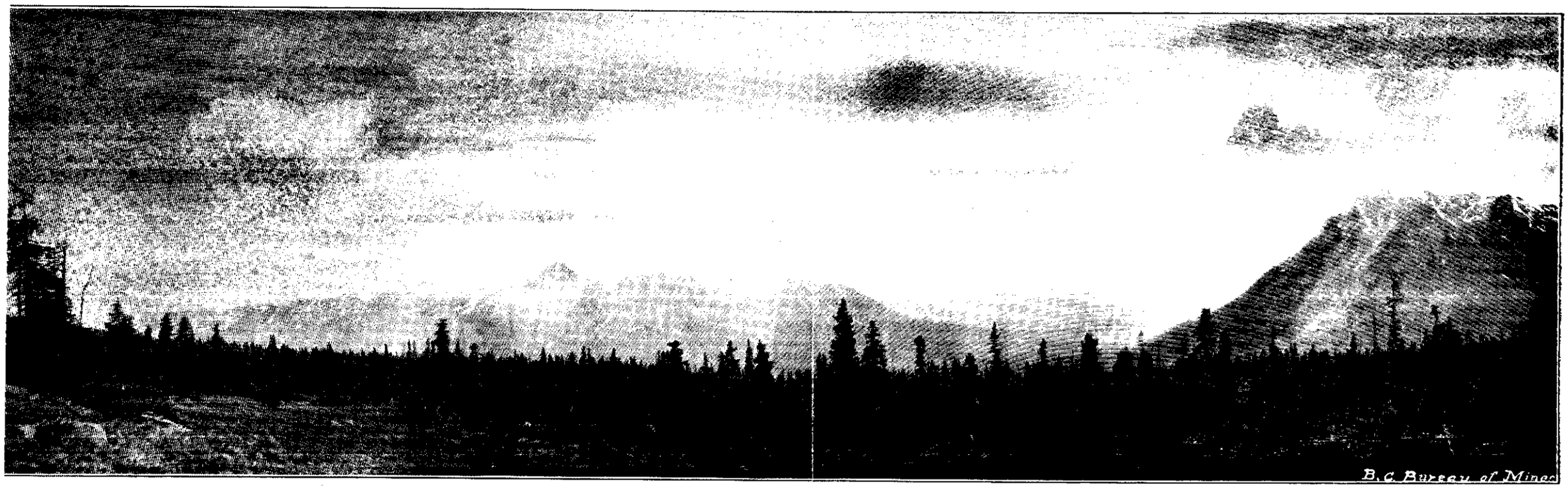
McConnell creek is about ten miles long, flowing in a general south-easterly direction into the Ingenika river at a point from 100 to 120 miles up from the mouth of that river. From its junction with the Ingenika, McConnell creek for the first two miles up, or as far as the mouth of Meadow creek, is confined to a narrow valley, the gravel benches rising from the water's edge and exhibiting one or two terraces, indicating a higher flow; back of these benches, on the higher ground, the solid formation of the country appears, consisting chiefly of diorite and granite; ridges of these intrusive rocks cut across the valley, appearing at one time to have formed barriers, or dams, which restrained the flow of the stream, but these were eventually broken through by the creek in making its present channel.

For the second two miles above the mouth, the creek flows through a low-lying open flat, composed of gravel, with, in places, well-defined benches against the hillside. It is in this flat that the greater number of the claims have been located.

At four miles up, the valley contracts again for a quarter of a mile, a large intrusion of granite apparently cutting across the valley, showing in the hills on either side but covered by the wash in the valley. Above this the valley again widens until it gradually merges into a low, flat summit, on which there are some small lakes, the waters from some of these flowing down McConnell creek, while others discharge to the north-west into a creek flowing into Thutade lake, the headwaters of the Finlay river. A branch of the creek flows into this flat pass from the higher ground to the east, and, for purposes of locating another "discovery" claim, the prospectors have designated this branch as a separate creek, Snowslide creek, although in reality it is only the upper portion of McConnell creek. The grade of the creek is fairly uniform, having a fall of about 10 to 15 feet to the mile, except in the upper portion, where it is somewhat greater.

At the mouth of the creek there is a bedrock of solid, well worn granite, which shows up distinctly in the Ingenika river, but, on the creek proper, no bedrock could be seen, nor had any of the prospectors succeeded in reaching it, although, at Bates' claim, No. 4 Below, and about four miles up from the mouth, a shaft had been sunk some 90 feet, which, when visited, was in a fine clayey silt, impervious to water and evidently a large deposit; later reports from the camp, however, say that at the bottom the shaft was in coarse sand, or fine gravel, with considerable black sand, but with no appreciable amount of gold and no bedrock visible. It would appear, therefore, that this shaft is now down about 40 feet lower than the granite rim which cuts across the mouth of the creek, and still no bedrock, which renders it doubtful if the bedrock will be found to slope in the same direction as the flow of the creek.

BATES' CAMP, ON SUMMIT, NEAR HEADWATERS OF OMINECA RIVER.



VIEW FROM CAMP XX., ON SUMMIT, NEAR HEADWATERS OF SUSTUT RIVER.

In the absence of a bedrock, it follows that any gold that may have been obtained has been taken from the upper, or surface, gravels, or, at most, from such a "bedrock" as the silt mentioned would form. The gold thus found is of small size, flattened and flaky, the writer being unable to see one piece, however small, which presented a rounded appearance; this is equally true of the gold found on the Ingenika river, from which district a couple of lots, aggregating between 60 and 70 ounces, were brought to the Government Assay Office. A few grains of rounded gold—not flattened—were reported to have been obtained by a prospector on a much higher bench near Snowslide creek, but the report could not be verified. In the surface gravels, with the gold, there is a considerable amount of black sand—in fact, it is abundant in the present creek bed—while the samples of gold taken from the Ingenika show an appreciable amount of platinum.

The district being so far from the base of supplies and so difficult of access, the Gold Commissioner of the District declared "a close season" for the camp, that is, as the season was not "open," a prospector staking a claim was under no obligation to stay on his claim and work it, as would, otherwise, be required by the "Placer Mining Act." The result was that the creek was "staked" from end to end, and, with a few exceptions, the prospectors did not work or even prospect their claims, but passed on to make as many other stakings as time would permit. Consequently, the development of the creek may be said to be almost nil, and very little more is now known about it than when it was first prospected. If any of those who stayed with their claims should discover gold on bedrock, or in any appreciable quantity, the absent owners would flock back, but, in the meantime, they were engaged in prospecting over a large area, which may prove to be of great advantage to the district.

Claims on McConnell Creek.

When the creek was inspected, on July 18th and 20th, the whole length of the creek, for five or six miles up from the mouth, had been staked solid—about 21 claims to each mile—in addition to which, about 50 bench claims had been recorded. Meadow creek, a small tributary, had also been staked for some distance up from the main creek.

The following is a list of the work done on the various claims up to the date mentioned, as far as could be obtained:—

Jansen's "Discovery" Claim.—A shaft, 44 feet deep, sunk in silt, at the base of the bench on the right bank of the creek; no gravel was struck by the shaft nor was bedrock reached, and no gold was found in the shaft.

Drainage Tunnel (made in 1907).—Two hundred feet long; depth at face, eight feet, cut through gravel with silt, from which was obtained some fine gold, with black sand and ironstone.

A ground-sluice and number of prospect holes dug, from which some fine gold was recovered.

No. 1 Above.—Owned by A. M. Kirby; no work done.

No. 2 Above.—Condit Bros.; drained ditch 175 feet long through gravel, driven to strike silt, in which a shaft might be sunk; no gold as yet found.

No. 11 Above.—Mark Carr; an open cut in gravel run into bank looking for rim-rock; there was a small quantity of fine gold in the gravel, but the rim was not found. Pit 9 feet, on bench, in gravel, some fine gold.

No. 14 Above.—Purvis; high channel on bench claim, opposite. Ground-sluiced, open cut 50 feet in 10 feet of gravel; some fine gold and reported to have found a small quantity of coarser gold.

No. 1 Below.—Staked for M. B. Franklin by Peter Jansen; no work.

No. 2 Below.—Staked for Thos. Olsen by Chris Jansen; no work.

No. 3 Below.—No work done.

Nos. 4, 5, 6 and 7.—Bates, Olsen *et al.;* a shaft had been sunk in silt on the right bank of the creek and was, in July, down 22 feet, work having been suspended on account of surface water, to be resumed in drier weather. This shaft is now reported to have been sunk to a depth of 92 feet, and, while still in the silt, with no direct indication of bed or rim-rock, a layer of coarse sand or fine gravel was encountered in the bottom, containing much black sand, but no gold.

On a bench claim opposite these claims, a Swiss—Raverie—was building a dam for Bates and Olsen, for the purpose of sluicing a bench, in which an amount of fine gold showed in the surface gravel.

Peggy of Cork Claim.—Situated about a mile above the mouth of the creek, on a bench about 35 feet higher than the creek, and separated therefrom by a ridge of diorite, Wm. Johnson had sunk a pit 10 feet deep in what was evidently an older high channel, about 100 feet wide; a small quantity of gold had been recovered, but not "pay."

Perry's Discovery.—Situated at the mouth of the creek, a ditch 900 feet long had been sluiced out to divert the creek, and a number of small pits dug; no work was in progress at the time the property was visited, but the water in the creek was not down to summer level. On the Ingenika, at the mouth of the creek, a granite bed, or rim-rock, is visible, which, it is expected, can be followed on these claims. It is understood these claims have been bonded to a syndicate represented by Mr. Marks, who was later seen in Hazelton, where he had a sectional boiler, pump, etc., which he was to endeavour to take in over the snow, to handle the water and enable the claims to be worked.

This list of work done might be supplemented by saying there have been a number of cabins built, land cleared of trees, etc. The work actually done on the ground is small, as the locators have been free to leave their claims, and the amount of gold actually taken out of McConnell creek is also small, exactly how much is not known, but it is estimated not to exceed 50 ounces, all told.

INGENIKA RIVER.

On the Ingenika river, opposite the mouth of McConnell creek, Stark, Stanier and Drake held a property on which they had done a little work, and reported having obtained a certain quantity of fine gold in the shallow surface diggings, but they abandoned the property on July 18th to move farther down the river.

A. Menard—with whom there was interested Wm. Wadhams and Murray, of Essington—held three claims about three-quarters of a mile below the mouth of McConnell creek. In this vicinity the whole valley of the river is composed of a massive flow of granite, the surface being worn smooth, although uneven, and through fissures in this the stream now makes its way, as is shown in an accompanying photograph, taken at the claim.

This granite mass is reported by Menard, and other prospectors, as continuing down the river for a distance of 10 miles, when schists come in. In the inequalities of this smooth granite bed-rock, in small irregular areas, gravel, sand and boulders have collected, lying in depths varying from a foot up to six or eight feet. Menard was found working in one of these pockets, which had an area of about 50 by 100 feet and an average depth of deposit on the granite of from three to four feet; there are two or three other apparently similar pockets on these claims. The pocket being worked by Menard prospected very well, although the gold was very flat and flaky and, could water have been brought on to the ground, would, in all probability, have paid good wages, but Menard was working alone, with such tools as

he had carried into the country and could only get water for about an hour a day. The small amount of water that he had was surface seepage from higher ground, which he managed to collect and conserve in a small swampy basin, 50 or 60 feet in diameter. Although the river at the claim is probably 30 feet below the level of the gravel to be washed, there is just above this point, the falls shown in the photograph, from a short distance above which a flume could be taken out and water brought on, in any desired quantity, but this is work he could not accomplish alone. The ground being worked is full of large boulders, very difficult and dangerous for one man to handle. Despite these difficulties, Menard had, in July, managed to accumulate about six ounces of gold, of which a sample was obtained, showing it to be, without exception, very much flattened, and in this quantity of dust not one rounded piece could be observed; with the gold as saved, there is an appreciable amount of platinum, a search for an accumulation of which was urged. The work done by this man, single-handed, is much to his credit, a tribute to his industry being paid in the remark by another prospector on McConnell creek: "He has done more real work than all the rest of us put together."

During the writer's stay at McConnell creek a small "stampede" took place down the Ingenika river to points ten miles and more below the creek mouth. From descriptions subsequently received, it would appear that these newer finds were below the granite area and in the schist, and that most of the mining done in the district, in the latter part of the season, was in this section of the Ingenika river. Stark, Stanier and partner brought out, in the fall, about 70 ounces of gold, which, being assayed at the Provincial Government office, proved to be 822 parts fine gold in 1,000, with 105 parts of silver, giving value of $17 per ounce.

Review of the District.

Reviewing the camp as a whole, it may be said that:—

1st. Coarse, or rounded, gold has not been found.

2nd. Fine gold, in flattened particles or flakes, has been found over the entire length of McConnell creek, in the surface gravels, extending to the benches some height above the present stream, and that the flow of such gravels appears to have been to the south-east or down the creek.

3rd. Similar gold is found on the Ingenika, below the mouth of McConnell creek, but there is no record of gold having been found above the mouth of that creek. Some gold has been found on Meadow creek, which flows into McConnell creek from the south, but this stream is entirely contained within the wider valley of McConnell creek.

4th. The upper portion of the Ingenika flows northerly and comes from a higher basin than does McConnell creek, which latter creek flows south-east and heads in a wide, low pass on the other side of which, on the Lake Thutade water slope, similar fine gold occurs over a wide area.

5th. There is evidence of comparatively recent geological movement, within an apparent line of faulting following the course of McConnell creek.

The evidence, therefore, would seem to point out that the gold found on McConnell creek was brought in from the north-west, or Thutade, direction, and through the pass at the head of the creek. The size, flatness and general shape of the particles of gold, combined with its uniform character, would indicate that it has been carried for a considerable distance by a heavy flow of water; this is confirmed by the present lack of evidence of the existence there of any coarse or rounded gold. The gold found is in the superficial gravels and not on any bedrock, and these gravels overlie a fine silt, of great depth, which is evidently a deep lake deposit; these conditions are not evidence of the existence of coarse gold or gold in

paying quantities on bedrock, at whatever depth that might eventually be found. The indications are that, after the lake period on the creek, there was a heavy flow of water from the northwest, depositing flake gold, and that the gold may have been brought from a considerable distance. This flow would, probably, have dropped any coarse gold it might have contained at some place to the north-west of McConnell creek, so that the most promising field to search for such coarse gold would be to the north-west from McConnell creek, but how far in this direction it is impossible to say. Following to the north-west brings one to Thutade lake; thence to a chain of mountains, through which are a number of low passes, the north-west slope of this range forming the drainage area of the Stikine river, a tributary of the Liard. Access to these latter districts can best be had from the Stikine river, where there is steamer navigation as high up as Telegraph Creek.

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 1908.

The following table shows approximately the number of mineral claims held during each year since 1899:—

Year.	Held under Crown Grant or Certificate of Improvement.	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	280	169
1905	189	193	181
1906	241	235	160
1907	254	160	115
1908	264	150	100

Mineral Claims.

There is a little mining activity in the vicinity of Moyie, development work having steadily progressed on the *Aurora*, *Cambrian* and *Society Girl* groups, and several new locations have been made, but in the remainder of this Mining Division only sufficient assessment work has been recorded to keep the claims alive.

Placer Claims.

Very little progress was made with placer mining, owing to the scarcity of water in the creeks.

Coal Claims.

The only shipping collieries are those of the Crow's Nest Pass Coal Company, at Coal Creek and Michel. As returns are not made through this office, I must refer to the Provincial Mineralogist's report.

Development work has been carried on at the Carbonado Collieries of the same Company, and shipments from that point will probably be resumed in 1909.

The Hosmer Mines, Limited, a colliery subsidiary to the Canadian Pacific Railway, has continued development work on a large scale. Machinery has been installed, coke ovens have been built, and shipping on a large scale will soon be commenced.

The Corbin Colliery on the south fork of Michel creek, in Block 4,593, consists of seventeen claims held under lease and eight under licence. A railway, connecting with the Crow's Nest Pass Railway, has been built and shipping from these mines on a small scale has already commenced.

NOTE BY PROVINCIAL MINERALOGIST.—The following description of the new plant of the Hosmer Colliery and the photographs of the same have been kindly furnished by Mr. Lewis Stockett, General Manager of the company :—

"THE HOSMER MINES, LTD., AT HOSMER, B. C.

"The property consists of six sections of coal lands, and two sections of surface, on which the town of Hosmer and the improvements connected with the plant are located. The seams, of which there are thirteen in number, varying from four feet to thirty feet, are being opened by tunnels, driven at right angles to the measures, and starting at a point about 600 feet higher than the Canadian Pacific railroad track at Hosmer station. Two tunnels are being driven parallel with one another, the larger tunnel consisting of three compartments, two of which are used for haulage purposes and the third as a travelling and pipe way; and the parallel tunnel, consisting of one compartment, is used as a return air-course, in connection with the ventilation of the mine. The tunnel is in at the present time 4,300 feet, and has cut nine of the seams, and ultimately will have to be driven in a distance of 5,400 feet to cut all the thirteen seams. These seams vary in dip from sixty-five degrees to twenty-five degrees. The tunnel was started in the 'Fernie shales' underlying the coal measures, reaching the latter at a distance in of 847 feet, and the first seams cut are, therefore, the lower ones of the series. The quality of the coal is bituminous, rich in hydro-carbon, and, therefore, an excellent cooking coal, as well as a steam coal.

"The ventilation of the mine is produced by a 20 x 9-foot Walker fan, running as an exhaust fan, but so fixed that, if necessary, it can be run as a blow fan. This fan is driven by a pair of 16 x 30-inch engines, supplied with steam by three 80 horse-power boilers, and connected up to the fan with a rope drive. The fan is of steel with concrete setting, and the engine-house of brick. The other buildings at the mouth of the mine will be a concrete lamp-house and timekeeper's office, locomotive house for the compressed air motors, and wash-house, with baths and lockers for the use of the miners.

"The coal is lowered from the tunnel mouth to the level of the tipple by a steam actuated double-track incline, each track being an independent incline. The mine cars, holding two tons of coal each, are lowered in trips of ten cars, and the empty cars are hoisted in convenient numbers. The haulage engines are a pair of 28 x 48-inch first motion engines, with 8-foot drums, fitted with clutches and breaks, which, with the reversing gear and throttle, are all handled by steam working through cataract cylinders.

"From the foot of the incline the cars are hauled to the tipple by a compressed air locomotive, and are dumped by a 'cross-over tipple,' the coal passing over shaking screens to remove the slack for use at the coke ovens, and over picking bands for the purpose of picking the refuse from the larger size coal. The tipple is of steel construction on concrete foundations, the general design of which was that of the management, and the details and carrying out of the same by the Roberts & Schaefer Co., of Chicago, Ill. Storage bins are provided to hold 2,600 tons of coal, 200 tons of rock and 3,000 tons of slack for the coke ovens. The rock in the rock bin is drawn out into iron self-dumping cars and hauled to the refuse dump by a compressed air locomotive. The coal in the coal bins is loaded into box cars by a 'box car loader,' and into open cars from chutes. The slack for the coke ovens is loaded into seven-ton larries, and is hauled by a compressed air locomotive over the coke ovens.

"There are 240 'Bee-Hive' coke ovens, twelve feet in diameter and seven feet high, which will give an output of 300 tons of coke a day. 'Belgium ovens,' with by-product recovery and distilling plant, are in contemplation for the next ovens required.

"The power-house building, of re-enforced concrete, with steel floor joists and steel roof trusses covered with corrugated iron, contains two low-pressure and two high-pressure compressors, the former to furnish air at 100 pounds for the rock drills, inside hoisting engines, and various other purposes around the plant, the latter to furnish air at 1,000 pounds for the five compressed air locomotives. Two 75 K. W. alternating current generators, for the purpose of lighting the town and plant, are driven by two 125 horse-power engines. All of these engines are fitted with cut-off valves, the purpose being to carry steam at 120 lbs. pressure, cut off early, and use the steam expansively. The exhaust steam from all of these engines is connected into two 20-inch pipe lines, one known as the 'atmosphere line' and the other as the 'heater line.' By means of valves, the steam from any or all the engines can be turned into either of these lines. When turned into the heater line, the steam passes through a 1,500 horse-power Hoppes exhaust steam heater, heating the boiler feed water to 200 degrees F. A ten-ton travelling crane has been installed for the convenient handling of the machinery.

"A boiler-house, also of re-enforced concrete, with steel trussed roof covered with corrugated iron, and a cement floor, contains four 250 horse-power Babcock & Wilcox boilers, with chain grate stokers, with appliances for the convenient handling of coal and ashes.

"The town on the company's property at the present time consists of a general office, mess-house, three officers' residences, several foremen's houses, a large boarding-house, sixty miners' houses and an hospital, all neatly painted, and supplied with water and electric light. Quite a large and progressive town has been built across the C. P. R. tracks, on property not owned by the company, where are located the stores, hotels, etc., necessary for the maintenance of a miners' camp."

Office Statistics—Fort Steele Mining Division.

Mineral claims recorded	100
Placer claims recorded and re-recorded	6
Certificates of work	150
Certificates of improvement issued	10
Conveyances and other documents of title	32
Partnership agreements	3
Gold Commissioner's permits	7
Documents filed	20
Affidavits filed	204
Records of water grants and permits	2
Mining leases issued	5
Mining leases in force	32
Free miners' certificates (ordinary)	316
" " (company)	4
" " (special)	5
Crown grants issued	13

Revenue.

Free miners' certificates	$1,611 50
Mining receipts	3,025 80
Total	$4,637 30

NORTH-EAST KOOTENAY DISTRICT.

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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 1908.

A considerable amount of work was done on the *Monarch* mine during the past summer and it is the intention of the company to commence work again next spring as early as possible.

Development work has been carried on in the *Shining Beauty* mine all summer. No ore has yet been shipped.

Giant Mine.

The Elmore vacuum plant which was installed on this property early in the year proved a success, as far as the separation of lead and baryta was concerned, but the cost of oil and acid made the treatment too expensive for use on such low grade ore as that of the *Giant*. Several cars of concentrates were shipped to Trail, which averaged 65 % lead and 10 oz. of silver. Tests with dry concentrating tables have given far better results, and two of these are being added to the present plant, which will then have a capacity of 80 tons a day. Development has shown the ore body to extend to a depth of at least 300 feet. Mining operations will, however, be confined to the open cut, which now has a face of 60 feet in height by 60 feet wide, the whole carrying about 12½% lead with 4 oz. of silver to the ton. The mill is expected to run continuously all next summer.

All other work in this Division consists, practically, of assessment work only.

OFFICE STATISTICS—GOLDEN MINING DIVISION, 1908.

Free miners' certificates	146
Company "	4
Mineral claims recorded	39
Placer claims "	3
Certificates of work	54
Notices to group	6
Conveyances	10
Crown-granted mineral claims in the district	102

Revenue.

Free miners' certificates	$1,001 45
Mining receipts	1,235 30
Acreage tax	439 75
Total	$2,676 50

CAMP XXXV, HEAD OF DELTA CREEK, FINLAY RIVER.

BUILDING BOAT AT IRISH'S CABIN ON FINLAY RIVER.

WINDERMERE MINING DIVISION.

Report of E. J. Scovil, S. M., Mining Recorder.

I have the honour to submit herewith a brief report upon the Windermere Mining Division for the year 1908:—

The condition of the metal market has had a tendency to dampen the efforts of the different "Prospector's Shipping Propositions," during the past season, inasmuch as only two of them made shipments, namely, the *Hot Punch* and the *B. C. and Tilbury*. The former leading shippers, such as *Paradise* and others, are presumably awaiting improved transportation facilities, by which is meant the completion of the Kootenay Central Railway, now under construction.

Next season the *Tecumseh* (on a branch of McDonald creek, a tributary of Horse-Thief creek), the *B. C. and Tilbury, Outcrop* group, *Deserter* group, *Hot Punch* and the *Comstock* group (all on the north fork of Toby creek) expect to make shipments.

The *Lead Queen* group and *Steele* group, adjoining properties on a branch of No. 3 creek, have been under bond of sale for some time, but it has not yet been closed. Both properties have been sufficiently developed to prove an amount of shipping ore; while the *Lead Queen* group, from a prospector's point of view, is unquestionably one of the best developed properties in the Division. It is to be hoped that a sale will be consummated in time, that extended development may be well under way early in the coming season.

All of the recorded mineral claims in the Division have been represented by assessment work during the season, but, with few exceptions, nothing more has been done.

Office Statistics—Windermere Mining Division.

Free miner's certificates	83
Locations	30
Assessments	90
Conveyances, etc	13
Certificates of Improvements	8
Water records issued	33
Revenue	$ 3,023 25

NORTH-WEST KOOTENAY DISTRICT.

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REPORT OF ROBERT GORDON, GOLD COMMISSIONER.

I have the honour to submit herewith my annual report on the progress of mining within the Revelstoke and Lardeau Mining Divisions, for the year ending December 31st, 1908.

During the year mining has been almost at a standstill throughout this District, due principally to the general depression throughout the country.

In the Big Bend district there has been a small amount of work carried on in connection with the hydraulic leases, principally on French creek, McCulloch creek, and the benches on the Columbia river in the vicinity of Smith creek and Camp creek, employing from 25 to 30 men.

Only a small amount of gold was taken out, as far as can be learned, McCulloch creek having made by far the best showing for the amount of work done.

Several of the older companies have recently been reorganised, and indications shew a more systematic attempt to work their leases.

The mica mines, farther north in the Big Bend, have remained untouched, owing to the lack of transportation.

In the southern portion of the Big Bend country the mines have remained unproductive, although development work has been done and has demonstrated that the quantity of ore is much greater than at first supposed.

The owners of claims in the Carnes creek and Downie creek districts are very hopeful of being able to induce enough capital to come in to open up some of the claims having the best showings.

Here, also, the want of a railway or other means of shipping out ore is a great hindrance to development.

In the Lardeau Division mining is also at a very low ebb.

In the Camborne Camp, although there seems to be a large amount of good grade ore in the mines, the several companies producing during the previous year succumbed to the general depression and closed the mines and mills.

The accompanying reports of the Revelstoke and Camborne Mining Recorders show the office statistics in their districts.

REVELSTOKE DIVISION.

REPORT OF W. C. 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, 1908.

There has been very little improvement in quartz mining, the necessary annual assessment work being kept up.

Considerable work has been done in the placer claims on French, McCulloch and Smith creeks.

A strong company has been formed to work a group of mica claims on End creek, in the Big Bend district.

Office Statistics—Revestoke Mining Division.

Free miner's certificates issued	188
Company's certificates issued	9
Locations recorded, mineral	25
" placer	1
Certificates of work recorded	32
Certificates of improvements recorded	3
Bills of sale recorded, mineral	20
" " placer	9
Money paid in lieu of work	7
Powers of attorney recorded	2

LARDEAU MINING DIVISION.

Report of B. E. Drew, Mining Recorder.

I have the honour to submit herewith a short report of the progress made by the Lardeau Mining Division during the year 1908:—

Throughout this Division very little work outside of assessment has been done this year. It is believed, however, that 1909 will see a great improvement in mining conditions in the Camborne camp, since, from reports received, the greater number of the mines which have been inactive during the past year will again be in operation just as soon as favourable weather conditions will permit; and I have it on good authority that the necessary capital is now available to install the necessary additional machinery, without which, in the past, it has been almost impossible to more than cover expenses. This remark does not apply to the Eva Gold Mines, Ltd., which has always been an exception and has more than made expenses.

The number of locations and bills of sale recorded is greater than last year, but the number of certificates of work recorded and of free miner's certificates issued have fallen somewhat short.

Office Statistics—Lardeau Mining Division.

Locations recorded	31
Certificates of work issued	101
Money in lieu of work	1
Free miner's certificates	50
" " special	1
" " company	1
Agreements and transfers	16

SLOCAN DISTRICT.

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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 1908.

Notwithstanding the average low price of silver and lead during the year, there has been an increase over 1907, not only in the quantity, but in the total value obtained for the ore mined. While the conditions were not as favourable as was expected in the early part of the year, yet the work accomplished may be considered as fairly satisfactory.

AINSWORTH MINING DIVISION.

The most notable work done in this Division in 1908 was at the old *Bluebell* mine on Kootenay lake, and at the amalgamated *Whitewater* and *Whitewater Deep* mines on Kaslo creek.

Bluebell.*

The *Bluebell*, situated on the east side of Kootenay lake (Riondel P.O.), is owned by the Canadian Metal Co. and controlled in France. Little underground work was done during the first half of the year, pending the completion of the concentration plant. No development was carried on, there having been made previously available for milling some 300,000 tons of ore. About the 1st of June the lead concentrator was ready for work, and, from that time to the end of the year, about 19,000 tons were milled. During September and the greater part of October operations were suspended, while a new conveyor system was being installed. Except for this interruption, operations were continuous, and about 55 men, all told, have been regularly employed. The conditions under which work is carried on at this property are exceptionally favourable to low costs, and the experience of the past six months has shown that, under these conditions, a profit can be earned from lead alone. The magnetic separation of the iron and zinc sulphides is about to be undertaken, and it is hoped that, early in 1909, the experiments in this direction will have resulted in a manner favourable to the earning of further profit, so important to the encouragement of the necessarily large capital involved. The ore of this mine consists of about one-third lead and zinc sulphides, one-third pyrrhotite and other iron sulphides, and one-third quartz and limestone, the whole, carrying about two and a half ounces of silver to the ton, chiefly associated with the lead.

AINSWORTH CAMP.

In the old Ainsworth camp proper, in consequence of the low price of silver and the slow recovery from the depression of the previous year, the operations were of a limited nature. The following work may be noted:—

Gallagher.

The *Gallagher*, owned by A. D. Wheeler, has kept four men constantly employed. The output was about 75 tons, which is stored at the mine awaiting snow for rawhiding. The work accomplished consisted of 70 feet of shaft, 100 feet of continuous drifting on the vein, as well as numerous other subsidiary

* (See also, following this Report, notes by Provincial Mineralogist.)

drifts which are peculiar and irregular in construction, interlacing each other in a honeycomb manner. The development of the year has shown a much higher grade of ore as greater depth has been obtained, one of the ore chutes showing a constant value of 200 oz. to the ton.

Maestro.

The *Maestro* was worked steadily all the year by Giegerich and King; 360 feet of drifts were run; some stoping done, and 150 tons of silver-lead ore have been shipped, avaraging 65 % lead and 28 oz. of silver to the ton. The property expects to work continuously and the showings are encouraging.

The *No. 1* mine, under lease, worked two men during the year and shipped 50 tons of ore. The *Black Diamond* and *Spokane*, also under lease, have to their credit, respectively, 10 and 12 tons of ore shipped.

On development alone, the *Banker* has worked two men continuously; 180 feet of tunnel has been driven on the *Sunlight* and 250 feet of an upraise has been made on the *Tariff*. Considerable dead work in the way of development has also been done on the *Star* and *Tiger*. The *Krao*, *Highlander* and *Highland* (Kootenay, B. C.) properties were not operated.

Woodbury Creek.

The *Pontiac*, under lease, has worked three men, who extracted 30 tons of ore and made 75 feet of raises and cross-cuts.

The *Jessie-Blue Bird* worked three men about seven months of the year and shipped 30 tons of ore, which netted $2,500.

The King Solomon Mining Company worked three men about two months on assessment work.

South Fork of Kaslo Creek.

Montezuma.

The *Montezuma* worked, on an average, five men continuously until the 28th October, when the concentrator was destroyed by fire, since which time development work only has been carried on. Three cars of concentrates were shipped and one was consumed in the fire.

Province.

The *Province*, under lease and bond to Messrs. Whittier and Pratt, has been carrying on development work almost exclusively. A drift of 100 feet has been run on the third level, and from thence a connection has been made to a winze above; this makes connection with the surface a distance of 360 feet from the lower workings. Sixty tons of concentrates were shipped.

Cork.

The *Cork* mine has been operated since about the 1st of May; 175 feet of drifting and 120 feet of raising on the vein has been accomplished and 75 tons of lead concentrates have been shipped. The recent work was done in the No. 2 tunnel. The ore chute is 60 feet long and 5 feet wide; two feet of this is clean silver-lead ore, averaging 65 oz. of silver and 75 % lead. The remaining portions supply a valuable concentrating product. In the lower workings of the mine a deposit of zinc has been exposed, but under present conditions cannot be marketed to advantage.

Bismark.

The *Bismark* has been under lease and bond to Messrs. Sampson & Johnson. Since about the 1st of October considerable drifting on the vein has been done and an upraise made; 100 tons of silver-lead ore have been mined and sacked and is ready for shipment. Six men were employed. A large body of a good grade of silver-lead ore has been opened up, and the force of men will be increased at the beginning of the year.

A small force was employed on the *B. N. A.* and *Silver Bell* mines, and a small shipment of high-grade silver-lead ore made from each.

Flint.

The *Flint* has worked continuously during the year and has constantly improved as development has been carried on. An average of five men were employed during the year. A raise of 110 feet and a drift of 400 feet were made. Sixty tons of ore were shipped, averaging 80 oz. silver and 60 % lead. A substantial cabin, for the accommodation of eight men, was erected, and a combined blacksmith shop and ore-house, 30 by 40 feet, built.

KASLO CREEK.

At Bear lake the *Silver Glance* worked two men and shipped 20 tons of silver-lead ore. One man has worked continuously on the *Empress* and shipped eight tons of high-grade ore, which amply repaid him for his labour.

The *Wellington*, near Whitewater, was worked under lease by two men during the year. About 400 feet of stoping and drifting accomplished and 25 tons of ore shipped.

Whitewater.

During the year 1908, the *Whitewater*, and the upper portion of the *Whitewater Deep* mines, were operated under lease, as before. About 50 men were employed, and from each mine was produced, approximately, 1,000 tons of silver-lead concentrates, and from the two mines about 5,000 tons of zinc concentrates. This tonnage, together with an accumulation of zinc, amounting to about 2,500 tons, was shipped during the year. About 1,050 feet of development work was done.

Deep Mine, Ltd.

During the year, that portion of the property of the Erl Syndicate, commonly known as the *Whitewater Deep* mine, not under lease as before-mentioned, was transferred to a company named as above. This company has built a new flume and pipe-line, and has put the power plant at Whitewater in working condition, and has commenced to drive, by contract, a tunnel from the level of the railway to tap the *Whitewater* vein at that level. It is estimated that such tunnel will be about 1,500 feet long, and will give an additional depth of 600 feet below any mining at present done on said vein.

HAMILL CREEK.

No work was done on any of the properties on Hamill creek during the year, except upon uncrown-granted claims, upon which the assessments have been kept up.

DUNCAN RIVER.

On Hall creek 50 feet of tunnel were driven on the vein of *Red Elephant*, which showed a marked improvement, both in the width of the ore chute and its value. An average sample across 21 feet of the vein gave returns of $12 in gold and 2½ % copper. The ore taken out has been stored on the dump until an economical method of transportation can be obtained.

Some development was done on the *Wagner* group and on the *Old Gold* and *Guinea Gold* properties, but data has not been supplied. For the reason given above, no ore has been shipped.

OFFICE STATISTICS—AINSWORTH MINING DIVISION.

Free miner's certificates (personal)	222
" " (company's)	3
New claims recorded	105
Transfers recorded	49
Certificates of work issued	393
Water records issued	27
Pre-emptions issued	18
Certificates of improvements—land 17, mines 38	55
Certificates of purchase	156

AINSWORTH MINING DIVISION.

Notes by Provincial Mineralogist.—The following notes, descriptive of the new plant erected during the past year at the *Blue Bell* mine, have been kindly contributed, as have the photographs of the plant:—

"Concentrating Mill at Blue Bell Mine.

"The erection of a concentrating mill, embodying in its equipment the latest methods for the separation of lead and zinc from the iron and other gangue of the ore of the Canadian Metal Company's *Blue Bell* mine, was commenced in March, 1907, and completed late in the spring of 1908. As the *Blue Bell* probably possesses more historic interest than any other mine in British Columbia, a digression to admit of its history being briefly reviewed may be permissible. The earliest information relative to this property was that given by David Douglas, a Scottish botanist, who, in 1825, made an examination of the flora and fauna of Kootenay lake, in the course of which he discovered the big mineral outcrop of what is now the *Blue Bell* mine; later, the Hudson Bay Company's trappers used the surface ore for making bullets, and, on their departure, left several old drills behind them. For about twenty-five years afterward no one appeared to have visited the place nor communicated to the outside world anything about it. About 1864, flattering reports having been received from prospectors, George Hearst, of California, a mining man of wealth, afterwards United States Senator from that State (father of the present owner of the 'New York Journal' and numerous other newspapers), made a trip to the property. He encountered great hardships on the way, but persisted in his journey, and, on reaching the *Blue Bell*, erected a small open-hearth furnace, and proceeded to reduce some ore to bullion. The remains of this old furnace are stated to still exist on the property. The low grade of the bullion, the distance from transportation, and the supposed inability to market the product within his lifetime, led Mr. Hearst to abandon the project. Nothing more was heard of the embryo mine until 1878, in which year R. E. Sproule located all the available ground on the peninsula on which the property is situated; later Thomas Hamill relocated several of the claims and litigation resulted. Sproule succeeded in retaining the *Blue Bell*, but it was afterwards sold by the Sheriff for costs of the Hamill-Sproule case, and Hamill bought one-third of the property for the Ainsworths, of Portland, Oregon. The next year Hamill was shot by Sproule, and the crime having been discovered, the latter was hanged at Victoria, B. C., for the murder. The neglect of the Ainsworths' attorneys afterward led to their losing their interest in the claims, possession of which passed to Dr. W. Hendryx and his associates—Minnesota and Connecticut capitalists—and thereafter the development of the property was undertaken. The Hendryx Company made a 'tote' road from Sand Point, Idaho, to the Kootenay river, and brought in a small tow-boat for use on Kootenay lake, which boat was superseded the following year by the now historic steamer 'Galena,' which transported hundreds of the prospectors of the early nineties to the Kootenay lake mining camps. Work at the mine was slowly advanced until, eventually, a smelter was erected at Pilot Bay, eight miles lower down the lake; financial difficulties resulted in the mine and smelter passing to the Bank of Montreal, which held them unworked for about twelve years, when they were purchased—in 1905—by the Canadian Metal Company and development on a considerable scale followed until, finally, the provision of plant for concentrating the ore became necessary for the profitable operation of the mine. The old smelter was taken down and part of the plant and material used at the mine and the new mill.

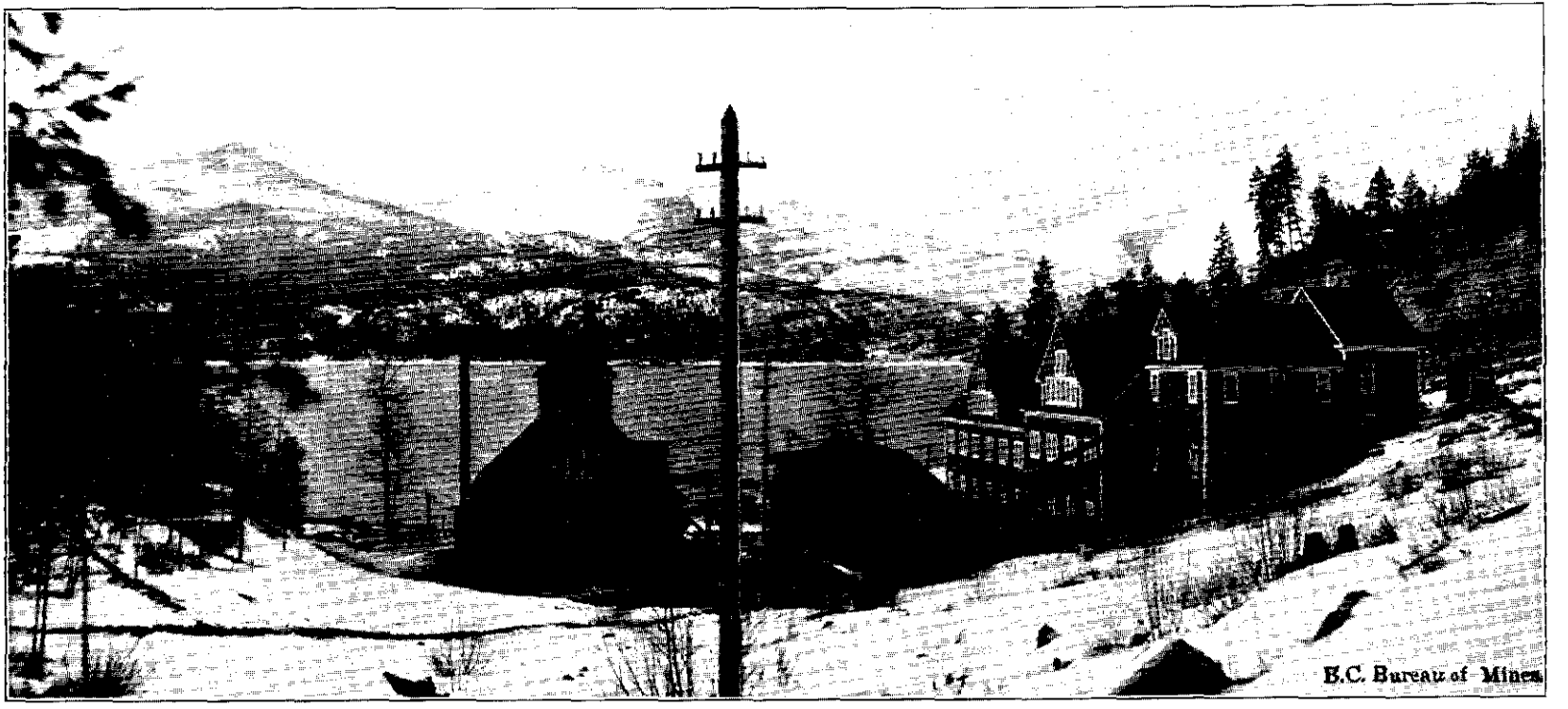
"Reverting to the erection of the concentrating mill—there being a sufficient tonnage of ore available and probable to justify expenditure that would ensure the stability of the plant—

this was provided for by making the foundations of the mill of concrete and its frame of heavy timbers. The general arrangement of the plant is such as to permit of large increase of capacity at relatively small expense. In detail, the planning of the mill, which was designed by Mr. S. S. Fowler, M. E., general manager for the company, has not involved any radical departures from well-established lines of ore-dressing, although there have been introduced numbers of minor innovations. As a corollary, the general scheme of development of the mine adopted has been such as to make practicable its exploitation at low cost, thereby ensuring the extraction of the ore under conditions especially favourable to profit-earning results. At the time construction of the mill was undertaken, it was estimated that about 300,000 tons of ore were available for stoping—about five years' supply for the mill. This ore is lead-zinc, with low silver values. It lies above the adit level, so no hoisting or pumping will be necessary for several years. The distance the ore has to be hauled from the faces to the mill is not more than 1,000 feet, and haulage is by mules. The only power machinery in use for the mine is a 5-drill air compressor, driven by water, conveyed in a 16-inch rivetted spiral steel pipe three miles from a mountain stream and affording a static head of 725 feet.

"The main building is 156 by 50 feet and about 60 feet high; other mill buildings are a magnetic separator house and a machine shop. The following outline of the ore-dressed process also gives an idea of the mill equipment:—The ore is hauled in cars from the mine to the mill, where, after being weighed, it is dumped into a pocket which feeds a 20 by 10 Blake crusher, which crushes it to not larger than four inches in size. An incline belt conveyor takes it thence to a storage bin, capacity 150 tons, situated at the top and back part of the mill. Next it is fed automatically to a second Blake crusher, and then it passes through three sets of Cornish rolls which reduce it to three-eighths of an inch in size. A 60-foot bucket elevator then lifts it to the top of the mill, whence it goes to the trommels, in which it is sized from 10 mm. down to 1 mm. The coarser material, that passing through the 5 to 10 mm. screens, is next taken to eight two-compartment jigs (commonly known as 'bull jigs'), where the coarse lead is extracted. The middlings from the jigs is again passed through rolls and once more elevated to the top of the mill and thence through the trommels, after which, together with the fines from the 1 to 5 mm. screens, it is treated in four double five-compartment Hartz jigs. All the ore under 1 mm. and the zinc and lead middlings from the Hartz jigs go to a Ferraris ball mill and a Huntington mill for finer grinding. The pulp from these mills is elevated by two centrifugal pumps to the top of the mill, where it is discharged into a Callow dewatering tank. The thickened pulp is then passed over two Callow screens which separate the coarser from the finer part of it, the latter going to three Callow settling tanks. These Callow screens and tanks classify the pulp and distribute it to ten No. 5 Wilfley tables, which separates the lead, zinc and iron, the lead going to bins for shipment. The lead concentrate made, which contains about 60 per cent. lead and some value in silver, is from time to time shipped to the smelter at Trail. During six months—July to December, 1908,—the output was about 2,220 tons of lead concentrates. As the proportion of ore to concentrate is about 8 to 1, the quantity of ore milled may be placed at, approximately, 18,000 tons.

"The ore contains about 30 per cent. pyrrhotite, which, with the zinc blende, leaves the tables and finer jigs and, after being dewatered, is conveyed to a drying furnace, cooled and elevated to a magnetic separator installed in another building, the dimensions of which are 50 by 70 feet. The zinc separation plant was not, at the close of 1908, in full operation, but it was expected to make a product of about 40 to 45 per cent. zinc. No arrangements had then been made for marketing the zinc concentrate, the lack of interest shown by buyers making it advisable to proceed slowly.

"The mill plant is run by four 50 horse-power Doble water-wheels, set up in the roof trusses and supplied with water from the system previously mentioned. The waste water from



CANADIAN METAL CO.'S CONCENTRATING PLANT, BLUE BELL MINE, KOOTENAY LAKE.

these wheels is used as wash water throughout the mill. Not only is the mill plant complete—having, besides the machinery already mentioned, machine shops equipped with power, tools, etc., and electric light and heating system, the latter including two 60 horse-power boilers which heat all the buildings in the camp, and, as well, provide an auxiliary power in case of a break-down in the water system—but being located near the water's edge, it is consequently favourable to low operating costs. There are some 50 men employed at mine and mill.

"*Other buildings recently erected are commodious boarding and bunk-houses; men's* change and wash-house; superintendent's and assay offices; residences for manager, superintendent and assayer respectively; and seven cottages for married men. All construction work was done under the supervision of Mr. J. C. Dufresne, construction engineer."

Marble Quarry on Lardo River.

The quarrying of marble on an extensive scale began in the Province early this past year, although previously a small amount of marble had been quarried, for use in Nelson, on Kootenay lake.

A marble quarry has been opened on the West coast of Vancouver Island, and is described under that District, while the other quarry now in operation, situated on the Lardo river, in the Ainsworth Mining Division, is described in the following notes, which have been kindly contributed:—

Canadian Marble and Granite Company's Quarry.

"The Canadian Marble & Granite Company's Kootenay marble quarry is situated on the Canadian Pacific Railway Company's Lardo-Trout Lake branch, about eight miles from Lardo, which is near the head of Kootenay Lake. The marble lies at an angle of about 45 degrees, pitching towards the railway, which passes immediately in front of the quarry. It is estimated that the deposit of marble is approximately 700 feet in thickness. The top layer is about 50 feet thick, of a light-colored, crystalline marble similar to the Georgia 'Cherokee' marble. Then there is about 10 feet, also crystalline, like the Georgia 'Dark Creole.' Next follows six feet of light blue, and then two feet similar in appearance to Italian statuary marble. Other layers include various shades of blue marble, from light to very dark.

"The marble is described as being somewhat harder than the average Vermont marble, but it takes a better polish, and retains it. The deposit is large, free from flaws and cracks, and so unbroken that blocks can be taken out in size up to any dimensions that it is practicable to get machinery to lift the blocks with. The quarry has been worked about two years by the Canadian M. & G. Company.

"The marble is shipped from the quarry in what is known to the trade as 'gang-saw blocks' to either Nelson, B. C., or Edmonton, Alberta, in which cities the company operates marble works, and is there worked up for monumental or building purposes, both interior and exterior, as required. The finished building material has been used for fronts or trimmings of buildings at Nelson, Lethbridge, Calgary, Edmonton, Strathcona, Regina, and other cities, while for lavatory and other interior fittings, tiles, etc., it has also been in good demand.

"Nine men were employed all last summer at the quarry, and when the works at Nelson are running in full order some 50 men are employed. The value of the material sent out last year was about $50,000, and the indications are there will be a substantial increase over that output in 1909."

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, 1908:—

During the year considerable interest has been manifested in mining operations in the Division, and indications from various parts give promise of much development during the year on which we have just entered. There was, approximately, 8,600 tons of silver-lead ore shipped from the Division during the year just closed, averaging in values, 100 ounces in silver and 30 % lead; there are 14 mines in this district which ship in car-load lots and 10 in smaller lots, of from one to ten tons. The small tonnage for the year is accounted for by the very low price paid for silver during the latter part of the year in the world's markets, and the financial stringency during the first part caused many of the mine managers to curtail expenses to a considerable extent. I am pleased, however, to say that the results of the year's development have been such as to inspire increased confidence in the mines of the district, and I am assured by the managers of some of the big shippers that the year on which we have just entered will see a very large increase in tonnage and in development work.

Reco. This mine is situated near Sandon and is at present under lease to Michael Zattoni, and, under his management, has proved a bonanza. He has had an average of 45 men employed and has shipped during the year 17 cars of high-grade ore, averaging 25 tons to the car, and there are still 30 car-loads, already sacked at the mine, awaiting more snow, so that it may be more cheaply transported to the railroad in rawhides, while there is still a quantity of ore in the mine blocked out and being held in reserve. The ore of this mine is very high grade, averaging 140 ounces to the ton in silver and 40 % lead. The property is owned by the Reco Mining Company, with head office at Sandon.

Mollie Hughes. This property is also under lease and bond to M. Zattoni. It is situated on the shore of Slocan lake one-half mile from New Denver; it is a "dry ore" proposition and gives great promise of being a big mine. The ore in this property runs from 200 to 500 ounces in silver and averages $10 in gold. For the last four months 15 men have been employed driving a long tunnel, starting from high-water mark on the lake shore, to tap the rich vein at a depth of about 200 feet; the tunnel will be 300 feet long and will be used as a working tunnel, through which the ore from the upper workings can be run in cars aboard the steamer, which will be a great advantage and saving in the handling.

Vancouver Group. This group, situated on Four-Mile creek, near Silverton, has, during the year, shipped 2,500 tons of silver-lead ores and has 20 men employed at the present time, but it is expected the force will be greatly increased in the early spring. There is a large tonnage of concentrating ore blocked out and also a good showing of clean ore. During the year the management installed a very fine air compressor for the more economical working of the mine, and the building of a large mill, the plans of which have already been prepared, is contemplated when spring comes. The operations at the mine are carried on under the management of Mr. Douglas Lay.

Hewitt. This property is also situated near Silverton and was actively worked during the first part of the year by a New York syndicate, under the management of Mr. Alcot Payne, who shipped 400 tons of ore and built a fine tramway costing about $20,000. The company took over the property about eighteen

months ago from a local syndicate but, owing to the depression in the price of silver, it was decided to close down and wait a more favourable metal market.

The *Standard* and *Emily Edith* are owned and operated by Messrs. Finch and Campbell, of Spokane, and Mr. George Aylard, of New Denver. During the year a large amount of development work has been done, 30 men on an average were employed, and 1,200 tons of silver-lead ore shipped principally from the *Standard*. Mr. George Aylard is general manager.

The *Richmond-Eureka* is situated above Sandon and opposite the *Slocan Star*. It is owned and operated by the Consol. M. & S. Company, of Trail, and employed 15 men constantly, and during the year shipped 2,500 tons of silver-lead ore of good grade. Mr. A. W. Davis is general manager.

The *Last Chance* mine, managed by Mr. Louis Pratt, who is also a part owner, employed 15 men, and I am informed by Mr. Pratt that the development work this year has proved satisfactory.

The *Sunset*, owned chiefly by George Hughes, of Spokane, and managed by Tony Becker, has been considerably improved in the way of developing the mine, during the year, and sold 250 tons of silver-lead ore.

Owing to prolonged litigation, the once famous *Slocan Star* has been for the last four years only working a few men, and this past year shipped 440 tons of ore. Oscar W. White is general manager.

The *Rambler-Cariboo*, situated in the McGuigan basin, under the management of Mr. W. E. Zwicky, shipped this year about 1,200 tons of very rich ore.

The *Sovereign* mine is under lease to Mr. George Ransom and others, who have been working a small force and shipped three cars of ore during the year.

The *Treasure Vault*, owned and operated by Byron N. White and Oscar V. White, is situated adjoining the *Richmond-Eureka*, about one mile above Sandon; the *Richmond* vein runs through a corner of it and is being operated through a joint tunnel with the *Eureka*. Mr. O. V. White is manager.

The *Ruth* is also near Sandon and is managed by George Alexander, of Kaslo, who during the year shipped 700 tons of silver-lead ore. Mr. Dan McKenzie is manager.

The *Canadian* group, owned and operated by Messrs. W. H. and Dan Brandon, of Silverton, has been, for the last year or two, only worked during the summer months, but shipped three cars of ore during the year.

Besides the properties mentioned above, the following claims in the Division have had more or less development work done on them:—*Alps, Lone Batchelor, Elkhorn, Rio, American Boy, Blue Bird, Ruby Silver, Mountain Con, McAllister, Queen Bess, Silver Bell.*

OFFICE STATISTICS—SLOCAN MINING DIVISION.

Free miner's certificates issued	193
" " " company	4
" " " special	1
Claims located	41
Assessments recorded	165
Conveyances and agreements	19
Traders' licences issued	40
Certificates of improvements	7

SLOCAN CITY MINING DIVISION.

REPORT OF H. R. JORAND, MINING RECORDER.

I have the honour to submit my report for the Slocan City Mining Division for the year ending December 31st, 1908.

The diamond drill installed on the *Arlington* at the beginning of the year was in operation for the greater part of 1908. The mine shipped some 144 tons of ore.

On the *Ottawa* mine operations were carried on by the owners for the first half of the year and, as a result, 45 tons of ore were shipped. Later the mine was leased to Messrs. Tipping, McPhee and McVicar, who are at the time of writing shipping their first car-load of ore.

A long cross-cut tunnel is being driven on the *Howard Fraction* to tap the two parallel veins, known to exist on this property, at depth. The tunnel is now 1,000 feet in and the first vein has been cut, but no drifting will be done until after the second vein is reached.

The *Westmont* has been the most active mine in this Division during 1908. A substantial bunk-house, to accommodate 50 men, was completed in November and a waggon road connecting the mine with the ten-mile road was built. Over 160 tons of high-grade ore was shipped from the stope above No. 2 tunnel. A new tunnel, to be known as No. 3, is being driven on the vein, which will give some 200 feet additional depth; this tunnel is now in over 200 feet. Ore is not expected on this level until the tunnel has been driven another 150 to 200 feet.

On the *Neepawa* some work was done this last year and three tons of ore shipped.

OFFICE STATISTICS—SLOCAN CITY MINING DIVISION.

Free miner's certificates (ordinary)	92
" " (company)	5
Certificates of work recorded	159
New locations recorded	57
Conveyances recorded	35
Certificates of improvement recorded	17
Cash paid in lieu of work	$400

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 1908:—

Although there has been no marked activity in mining in this Division during the year, yet the output of high-grade silver-lead ore has increased from 885 tons shipped during 1907 to 1,720 tons shipped during 1908. This has, with the exception of 120 tons from the *True Fissure*, all come from the *Silver Cup* mine. An average of about 65 men have been employed in productive lode mining in this Division during the year, in addition to which assessment work has been performed on 290 mineral claims. Two new properties have passed into the hands of development companies, who have commenced active operations; so the general outlook is somewhat brighter than at the date of my last report.

Silver Cup.

The *Silver Cup*, situated on the south fork of Lardeau creek, is the property of the Ferguson Mines, Ltd., and has been worked continuously during the year, employing an average of 50 men. Development work to the extent of 1,632 feet has been done, consisting of 1,530 feet of drifting and 102 feet of

sinking. About 1,593 tons of clean high-grade silver-lead ore have been shipped, and the ore on the second grade dump, which will be available for milling purposes at some future date, considerably increased. This mine now has opened up ore bodies at a depth of 1,150 feet below the original outcrop.

True Fissure.

This property, consisting of the *True Fissure*, *Blue Bell*, *St. Elmo* and six other adjoining claims, is owned by the True Fissure Mining & Milling Co., Ltd., and is situated on Great Northern mountain, about three and a half miles north-west of the town of Ferguson. The company operated the property with a force of eight men from January to about the end of June. The work done consisted of driving a 100-foot tunnel on the *St. Elmo* lead (a diagonal vein to the main *True Fissure* lead) and stoping out the ore encountered, from the tunnel level to the surface. On the *Blue Bell* considerable exploratory work was done by drifting, cross-cutting and raising on the main or *True Fissure* lead. In the course of this work two lenses of galena ore, carrying gray copper, were encountered. An open cut was run on the course of the *True Fissure* lead, about 150 feet south of the *Blue Bell* workings. From this cut some 20 tons of ore was mined, and about 122 tons of silver-lead ore, carrying small gold values, was shipped from these claims in April and May. In July this property was leased to Messrs. Craig & Parisian, who employed four men up to the end of the year, and mined about 125 tons of ore. This ore has not yet been shipped.

On the *Baltimore & Brooklyn*, situated near Ferguson, on the north fork of Lardeau creek, about 200 feet of tunnel was driven, with very encouraging results.

In August Mr. A. G. Merrill, of Tacoma, Wash., acquired the *Winslow Group*, situated near the head of Seven-Mile creek, and has erected suitable buildings on the property, built a trail to Trout lake, a distance of about five and a half miles, and driven about 150 feet of tunnel on the vein. Six men are at present employed on the property.

On the *Handy*, situated near Gerrard, five men have been employed the greater part of the year. A small hoist and pump have been installed, a double-compartment shaft sunk 105 feet, and a crosscut tunnel driven 85 feet.

Development work has been carried on almost continuously on the *Homestead* group, situated near Rapid creek. This has consisted of 260 feet of tunnelling and 70 feet of shaft. Seven men are now employed on the property, which has been acquired by an American company.

On the *Crown King*, adjoining the *Swede* group, on Poplar creek, a contract for 100 feet of tunnel has recently been let, and work commenced.

One hundred and forty feet of tunnel was driven on the *Pluto*, also on Poplar creek, with, I am informed, satisfactory results.

Office Statistics—Trout Lake Mining Division.

Free miner's certificates issued to individuals	147
" " " companies	4
Mineral claims recorded	56
Certificates of work issued	293
" improvements recorded	5
Bills of sale, agreements, etc., recorded	22
Grouping notices filed	50

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 1908.

During the past year the mining operations were carried on principally by the companies operating on Red Mountain, viz.:—The Consolidated Mining and Smelting Company of Canada, Limited; the Le Roi Mining Company Limited; the Le Roi No. 2, Limited, and the Giant-California Mining Company. In addition to the foregoing, eleven different small properties were worked under lease during some portion of the year.

The shipments of ore were in excess of those of the previous year, to the extent of 16,496 tons, the output being approximately 302,419 tons, of an approximate value of $3,673,392, as compared with an output of 285,923 tons, valued at $3,049,702, for the previous year, showing an advance in the average value of ore produced since 1904. The increased tonnage is to some extent accounted for through the ample supply of fuel delivered at the smelters, thereby allowing the continuous working of the mines.

The average number of men employed during the year was 826, which is an increase of 75 over the previous year.

SW-94 SW-97

Centre Star, War Eagle, Idaho, and Iron Mask.

These properties are situate on the eastern slope of Red Mountain, are adjoining, are owned and have been continuously operated during the past year by the Consolidated Mining and Smelting Company of Canada, Limited, the shipments during such time consisting of 186,983 tons of ore, which was shipped to the company's smelter at Trail for treatment. Of the above tonnage, 104,913 tons came from between the twelfth level and the surface of the *Centre Star* mine; 46,969 tons came from the different levels of the *War Eagle* mine; 11,806 tons came from the *Idaho* mine, and 23,295 tons from the *Iron Mask* mine. The development work on these properties is now being carried on in the lower levels, that on the *Centre Star* being on the fifteenth and sixteenth levels, the policy being to keep the advance work well ahead, owing to which there is ore enough in sight in the group to keep up a large production for months to come. Development work during the year was as follows, viz.:—*Centre Star*, driving and cross-cutting, 5,191.5 feet; raising, 346 feet; winzing, 358 feet; sinking, 315 feet; diamond drilling, including that on the *Idaho*, 10,897 feet. *War Eagle*, driving and cross-cutting, 4,471 feet; raising, 685.5 feet; winzing, 76.5 feet; diamond drilling, including that on the *Iron Mask*, 6,260.2 feet. *Idaho*, driving and cross-cutting, 3,927.5 feet; raising, 193.5 feet; sinking, 102.5 feet. *Iron Mask*, driving and cross-cutting, 990 feet; raising, 71.5 feet; making the total amount of drifting, raising, sinking, etc., on this group of mines during the year 15,728.5 feet, or, approximately, three miles, together with 17,157.2 feet, or three and one-quarter miles of diamond drilling.

The average number of men employed during the year was 450, being an addition of 70 over the previous year.

W-93

Le Roi, Black Bear.

These properties, also situate on Red Mountain, are owned and operated by the Le Roi Mining Company, Limited the shipments of ore, during the year being 73,127 tons, taken from the different levels throughout the mine, and shipped for treatment to the company's smelter at Northport, in the State of Washington. Development work during the year, which was carried on principally on the 1550, 1650 and 1750-foot levels, consisted of driving and cross-cutting, 6,026 feet; raising, 269.5 feet, and winzing, 6 feet, making a total of 6,301.5 feet, together with 4,251.5 feet of diamond drilling. The average number of men employed during the year was 207, being somewhat less than the previous year.

Note by Provincial Mineralogist.—The following extract is from the Report of the Directors of the Le Roi Co. for year ending September 30th, 1908 :—

"The following table gives the comparative costs for operating expenses at mine and smelter including realisation charges and depreciation for the last three years.

	1906. Tonnage Shipped. 110,042. Cost per ton.	1907. Tonnage Shipped. 131,696. Cost per ton.	1908 (15 months). Tonnage Shipped. 100,444. Cost per ton.
Mining, including depreciation and amount written off exploration and development.....	4.46	4.04	5.73
Smelting and realisation (direct and indirect) including freight, interest, depreciation, etc.	6.04	5.98	5.98
	$10.50	$10.02	$11.71

"During the year $123,773.49 was expended on the exploration and development of the mine, while $130,019.37 was written off capital on account of expenditure incurred under this head during 1908 and previous years."

Le Roi No. 2, Josie, Annie, Annie Fr., Poorman No. 1.

These adjoining properties, situate on the west slope of Red mountain, are owned and operated by the Le Roi No. 2, Limited, and during the year the shipments of ore consisted of 29,732 tons, in addition to which 14,604 tons were milled on the premises of the company, producing some 1,100 tons of concentrates. Development work during the year consisted of driving and cross-cutting, 4,636 feet; raising, 438 feet; winzing, 12 feet, together with 7,454 feet of diamond drilling, the average number of men employed during the year being 120.

Note by Provincial Mineralogist.—The following is an extract from the Report of Directors of the *Le Roi No. 2* and for year ending September 30th, 1908 :—

"Mining Operations.—The following statements show the operations of the company for the year and the financial results :—

"The total amount of ore and waste raised from the mine was 57,702 tons, made up of :—

Mixed ore	40,034 tons.	
2nd class and mill ore	5,453 "	
Actual waste	12,215 "	
		57,702 tons.

"After handpicking, the output resolved into :—

Shipping ore	29,648 tons.	
Concentrating ore milled	13,139 "	
Concentrating ore placed on dump	2,700 "	
		45,487 tons.
Waste		12,215 "
Total		57,702 "

"About 4,000 tons of first-class ore have been left broken in stopes, as against 3,400 tons last year, an addition of 600 tons. 2,700 tons of milling ore have been placed on the dump, and about 800 tons of mill ore have been added to reserve underground.

"The stoping costs for the year amounted to $175,765.68, the details are as follows:—

	Cost per ton.
Ore production:	
Labour	$1 04
Explosives	50
Illuminants	03
Sundries	06
Ore sorting:	
Labour	19
General expense	36
Power plant:	
Labour	08
Supplies	44
Mine general:	
Labour	41
Supplies	13
Diamond drilling:	
Labour	14
Carbon	15
Sundries	07
Cost per dry ton of ore mined	$3 60

"There has been written off for depreciation $83,145.61, averaging $1.71 per ton, as follows:—

	Cost per ton.
Mine machinery and plant	$ 03
Mine equipment	06
Surface improvements and buildings	03
Mine exploration and development	1 59
Other accounts	....
Total depreciation per dry ton mined	$1 71

"The total writing off for depreciation is therefore $1.71 bringing the total costs, calculated on the above tonnages, to $5.31 per ton.

"Returns from ore shipments.—29,648 tons were shipped during the year, the contents of which were as follows:—

Gold	28,452.931 ozs.	Average per ton	.9597 ozs. gold
Silver	20,408.93 "	" "	.691 " silver
Copper	910,354 lbs.	" "	30.705 lbs. copper
			or 1.535 per cent copper.

"The gross value of the ore was $699,740.77, or $23.601 per ton.

Gold	.9597 ozs. @ $20.00	$19.194
Silver	.691 " @ 54.8 cents per oz.	.379
Copper	30.705 lbs. @ 13.12 cents per lb.	4.028
		$23.601

"The receipts from the smelter amounted to $535,245.55, or $18.053 per ton.

"The total smelting charges on the above, direct and indirect, have been $5.548 per ton.

"As a result of mining operations for the year, $260,000 has been remitted to London."

Giant-California. These properties lying to the west of and adjoining the properties of the Le Roi No. 2, Limited, are owned by the Giant-California Mining Company, Limited, and have been worked continuously during the year, during which time the main shaft was deepened some 200 feet, and about 1,000 feet of cross-cutting done, together with 3,000 feet of diamond drilling. The object of this work being to locate the ledges in *California* territory which have been found up to its side-line in the *Annie*, owned by the Le Roi No. 2 Company. During the year, an average number of 18 men were employed, and some 300 tons of ore shipped.

Inland Empire. This property, which is owned by the Inland Empire Mining and Milling Company, Limited, is situate on Grenville mountain, in the extreme western portion of this district; although not on the list of shipping mines, is a very favourable looking property and is equipped with all the necessary requirements, such as hoist, pump, boiler, blacksmith shop, bunk-houses, etc., etc.; also with a saw-mill of a capacity of 10,000 feet a day. Development work during the year consisted of deepening the shaft to the 200-foot level, and driving a cross-cut to tap the ledge. It is the intention of the management to extend the shaft to the 400-foot level, and if sufficient ore is found, it is probable that a stamp-mill will be installed. During the year some five or six men were employed.

The leasing system has been carried on to a larger extent than at any time during the history of the camp. During the year the *Olla Podrida*, *Nest Egg*, *Bluebird*, *I. X. L.*, *Evening Star*, *St. Elmo*, *Homestake*, *Curlew*, *Red Eagle*, *Sunset* and *Iron Horse* have been under lease for different periods, and some of the leases are still in existence. The output of the *Evening Star* being 877 tons; that of the *Bluebird* 158 tons, one car of which netted $80 a ton, the average value of the ore shipped being $35 a ton; the *I. X. L.*, shipped 6 tons, valued at $500; *St. Elmo*, 76 tons; *Curlew*, 6.7 tons; *Homestake*, 14 tons; *Red Eagle*, 7.7 tons; *Sunset*, 18.7 tons; and the *Iron Horse*, 36.6 tons, the ore from some of the latter properties being of rather low grade.

In addition to the foregoing, very little work was done, other than the necessary assessment work, which is comparatively the same as that of the previous year, as shown by the accompanying office statistics.

Office Statistics—Trail Creek Mining Division.

Mineral claims recorded	43
Certificates of work	57
Certificates of improvement	6
Bills of sale, etc., recorded	8
Free miner's certificates (company)	5
" " (individual)	167
" " (special)	6

NELSON DISTRICT.

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NELSON MINING DIVISION.

REPORT OF HARRY WRIGHT, GOLD COMMISSIONER.

I have the honour to submit my annual report on the Nelson Mining Division for the year ending the 31st December, 1908.

Throughout the division there has been an increased activity in all branches of mining; the increased production from the older mines has been accompanied by steady development of newer properties, while the fact that new locations are twice as numerous as in the preceding year indicates that the prospector has discovered profitable fields of exploration. The introduction of foreign capital into the district is largely responsible for this development, and the results accruing from recent investments have been so encouraging as to presage a continuance of the present activity. It is important to note that the development has been general, and that in almost every section of the district there has been increased development of the mines and prospects. Although one or two sections have made more marked progress than others, none have entirely stood still, the result being that there is a reasonable expectation of a steady production of ore throughout the district, and not from one or two camps only.

In the immediate vicinity of Nelson, the *Queen Victoria* mine, at Beasley, has been the centre of the greatest interest, in consequence of the large sum which has been expended on its development during the year. In the early part of 1908, Mr. F. A. Erlund secured a bond on this property on behalf of New York capital, and during the year has expended some $40,000 on development, including diamond drill exploration. He has also secured options on several adjoining properties traversed by the same copper-bearing formation. Attention has, however, been entirely directed to the systematic development of the property and no commercial shipments have been made during the year.

Messrs. Gough, Guille and Swedberg, the lessees of the *Granite-Poorman* mine, six miles west of Nelson, have had a very successful year. In addition to the mill returns from the average ore, they had the good fortune to strike several of the valuable pockets characteristic of the *Poorman* mine. From one of these pockets, containing only four or five cubic feet, several thousand dollars' worth of auriferous quartz was taken, which can only be classified as "specimen" rock. Several pieces weighing one pound contained half that weight in gold, and the specimens (valued at $1,500) sent down to the Spokane Interstate Fair were easily the most remarkable in the display, and attracted widespread attention. The total output from the mine during the year was over 8,000 tons and the gross value nearly $60,000. In the operation of the stamp-mill the average value saved on the plates was about $5 per ton, and in the concentrates $2 per ton, making a total extraction of about $7 a ton.

At the *Eureka* mine, where, in former years, the highest grade copper ore produced in British Columbia was mined, no shipments were made in 1908, but work was confined to the driving of a long tunnel to tap the shaft. This tunnel, which is now in about 600 feet, has, approximately, 200 feet more to go to reach the old workings.

The *Fern* mine, at Hall, was operated by lessees during a few months of the year, and produced bullion and concentrates to the value of about $2,000.

In the same neighbourhood the American & B. C. Hydraulic Placer Co., which has about 700 acres of ground covered by hydraulic leases, erected a small saw-mill for the purpose of cutting lumber for the large flume which it is proposed to construct to bring water from Hall creek to the flats under lease.

Work was resumed at the *Silver King* mine in May, under a lease to the Kootenay Development Syndicate, Ltd., of London, England, of which M. S. Davys is Managing Director. Mr. Davys had himself operated the mine under lease during several past years. Stoping has been carried on from No. 3 and No. 5 levels, and some very good ore opened out in the open cut at No. 3. The total tonnage shipped during the year was 748 tons, averaging 15 ounces silver and 3.75 % copper. The product was all sent down over the aerial tramway to Nelson, and thence shipped to the Trail smelter. Preparations have been made for further development of this well-known property. A pole line has been carried up the tramway right-of-way, and the mine electrically installed by the West Kootenay Power and Light Co., of Bonnington. All the motors, pumps and other necessary machinery and plant are in place, and the work of unwatering the mine from No. 5 down will commence at once.

The completion of the construction of the Canada Zinc Works has inaugurated a new industry for Nelson, although the mines from which it will draw its principal supplies of ore for treatment are mostly situated in the Ainsworth and Slocan mining districts. The installation of the zinc reducing plant was finally completed in the late fall, but at the end of the year only trial or experimental runs had been made. The efficiency of the plant was fully demonstrated by these experimental runs, which served their designed purpose by indicating several important adjustments and alterations necessary to the economical operation of the plant.

Ymir Camp.

The *Yankee Girl* and *Yukon* mines, situate on Bear creek, about two miles from Ymir, have been the scene of extensive developments during the year. In the early part of the year H. L. Rodgers bonded the *Yankee Girl* and entered upon a scheme of systematic development of the property by means of a long tunnel. This tunnel, the portal and first 700 feet of which are on the *Yukon* claim, has now been run about 1,350 feet, and, at a point almost exactly under the fine showing of ore obtained on the *Yankee Girl* tunnel 350 feet above, has encountered a fine body of ore. Mr. Rodgers has also secured a bond on the *Yukon*, and is now working the two properties in conjunction. Two other tunnels have been started below the main tunnel above mentioned, and in both of these good chutes of ore, of various lengths, have been passed through, while the upper, or *Yankee Girl*, chute, which has just been tapped by the long tunnel, has a length of some 300 feet, and is now demonstrated to persist to a depth of at least 400 feet below the surface, giving a very large body of developed ore. A short aerial tramway connects the No. 2 tunnel with a point on the waggon road about one mile from Ymir, and preparations are now being made for shipments on a considerable scale. Several thousand tons of ore have been shipped from these properties by former owners, the general average being in the neighbourhood of $24 in gold and a few ounces of silver to the ton.

Mr. Rodgers has also secured a bond on the *Iona* group of claims on Porcupine creek, owned by Price and Burgess.

Persistent development and exploration has been maintained throughout the year at the *Ymir* mine. The New vein, above the old workings, has not yet been picked up, but the manager reports that very promising indications have been encountered, and that small

isolated bunches of pay ore have been passed through, believed to indicate the proximity of the main body. In addition to a large amount of drifting, explorations are now being carried on by means of the diamond drill.

Messrs. Schofield and Bennett have this year prosecuted development of the *Free Silver* group, on Quartz creek, a property Crown-granted eight years ago, but which has lain idle ever since. In the early part of the year J. H. Schofield secured an interest in the property and put a force of men to work, with very encouraging results. The group is traversed by eight parallel veins, from 2 feet to 10 feet in width, and carrying average value of 60 % lead, 30 ounces silver and two or three dollars in gold. One vein of "dry" ore runs 40 ounces silver and 3½ % copper, and in another molybdenite has been found in considerable quantities.

North Fork of Salmon River.

The mines on the north fork of the Salmon river, commonly known as the Erie Camp, have maintained the usual rate of production. At the *Arlington* mine, while the total amount shipped was rather less than in the previous year, the average value was higher. Altogether 1,190 tons were shipped, of an approximate gross value of $65,000, or $55 per ton, these values being entirely in gold and silver. The ore carries a small percentage of lead, but not in commercial quantity. In new development work, about 1,150 feet was accomplished during the year.

In addition to the operation of the *Arlington* mine, the Hastings & B. C. Exploration Co. is operating the *Canadian King* mine adjoining, and during the year shipped therefrom 88 tons of ore, of the gross value of $5,409.

In the same vicinity small shipments of high grade ore, averaging about $100 a ton, were made from the *Keystone* and *Ida D.* claims.

The *Second Relief* mine was worked under lease by Wm. Hudson and John P. Bell, and considerable progress was made in the development of good bodies of ore. The mill was only run a short time and crushed 1,660 tons of ore, producing a gross return of $15,700.

Considerable prospecting has been done in a comparatively new district, situated on Boundary creek and the Pend d'Oreille river, near the point where it crosses the International boundary. One group of claims, known as the *International*, has been held for a number of years, with comparatively little development. It consists of a series of immense veins of hematite iron ore, carrying also considerable lead. This group has been bonded to Messrs. McLeod and Shallenberger, of Spokane, who have been prosecuting development during the year. A large number of locations were made in the vicinity during 1908.

Sheep Creek.

The activity in the Sheep creek camp during the year 1908 recalls the early days in Rossland. Over 200 new locations were made during the summer months, practically all within an area of four square miles. Locations made in former years have in nearly all cases been thoroughly prospected and more or less developed, and during the year 34 claims have been surveyed.

In connection with these facts, the following are extracts from an interesting report on the district by J. L. Warner, E. M., who was one of those who made the first ore shipments from the Rossland camp, and is now operating some of the largest properties on the creek. The figures given are substantiated by the smelter returns:—

"This gold area, five miles in width and twenty-five miles in length, extends north-easterly from the Salmon river. Along the high range of mountains, the formation is exposed to

Mount Laska, ten miles from Proctor, on Kootenay lake. It is commencing to attract interest by reason of the recent results from large shipments, coming from the new development work, on properties at some distance from the first established mines. The mountain range is easily approached by the narrow valleys of the tributary streams of the Salmon river, the moderate altitude of the main creek, about 3,000 feet, being a distinguishing feature, in contrast to the mountain ridges, which rise rapidly to elevations of 6,000 feet, while many peaks attain altitudes of 7,500 feet and some even greater. The abundance of timber for mining requirements and the unusual water supply, furnishing cheap power for mining and milling of ores, make most exceptional conditions. Simultaneous shipments the past winter, 20 car-loads averaging over $100 a ton, have established the very general occurrence of high-grade ore in the many veins of this section. This production, coming from different properties and from widely separated veins, is making its own record for the camp, requiring no expert endorsement of its future.

"Mining on the north side of Sheep creek is producing oxidized ores at a depth of over 100 feet; while on the south side of Sheep creek, mining of the unaltered sulphides is progressing by hoisting from shafts 300 feet below the creek bed, a difference in altitude of over 2,500 feet, thus establishing the permanency with depth and their fixed character as true fissure veins.

"The sulphides in the quartz ore consist of iron pyrite; occasionally a little galena and zinc blende are present; very rarely copper pyrite. The ores are treated in stamp-mills and the values saved on tables as concentrates, after the free gold is extracted on amalgamated plates in the usual way.

"A singular occurrence which has much to do with the exceptional richness of the ore is the rare element tungsten associated with the gold in the veins. It occurs in the heavy black mineral wolframite, which has a specific gravity of 7.1, and the yellow oxide alteration product tungstite, specific gravity 5.5."

The total production from the camp during the year has been very considerable, as will be seen from the following particulars of the individual mines.

The *Nugget* group has been acquired by a company known as the Nugget Gold Mines, Ltd., and is under the superintendence of A. H. Gracey. Work has been continuous since the middle of the year, when the company acquired the property. The group is traversed by three known veins, on one of which a considerable amount of development has been done by means of three tunnels, with drifts and raises aggregating 648 feet. Up to the present time the ore extracted has been sorted into two classes, the first class for shipment to the smelter and the second class for milling on the property.

In No. 2 level high-grade ore is developed for a length of 60 feet and a width of from 6 inches to 3 feet. From this level 192 tons were shipped last winter which averaged $98.50 a ton, and also 111 tons of the second class ore which averaged $23.50 a ton. The latter was mined for a width of 7 feet.

In No. 3 level the same ore chute is 140 feet long. The high grade ore is from 10 inches to 4 feet wide, averaging from $100 to $325 a ton. The second class ore is from 3 to 8 feet wide and averages from $20 to $40 a ton. The general average of the full width of the level, 5 feet, for the length of 100 feet is $63 a ton.

At present ore is being taken from No. 2 level. The stope is from 9 to 14 feet wide, all ore, and is averaging in the mill from $20 to $25 to the ton, after the high grade ore has been sorted out. From approximately 1,000 tons milled a total of $17.068 or $17 a ton, has been

recovered, and owing to lack of concentrating machinery (which is now being installed) the tailings averaged from $5 to $7 a ton. These are impounded, however, for future use. Under the old management, in the first half of the year 303 tons of crude ore were shipped to smelters, producing a gross value of $23,354, while shipments of crude ore have now been resumed at the rate of 200 tons per month, the ore averaging $100 a ton, net. The present equipment consists of a four-stamp mill, two Frue vanners and an aerial tramway 1,500 feet long, of 50 tons daily capacity. SW-46

SW-41 The *Mother Lode* and *Kootenay Belle* mines were both bonded in the early spring to J. L. Warner and associates. The properties have been energetically developed since then, with excellent results. At the *Kootenay Belle* mine, a small stamp-mill of four stamps has been operated during the latter part of the year and has crushed a total of 1,980 tons, from which $22,937 was saved by amalgamation. Concentrates shipped, together with a small quantity of crude ore, produced $14,023, making a total production of $36,960 during the year, with an average of $18 per ton. The greater part of this production was all made during the last few months of the year, and the mine has been developed to a stage where a regular production of both high grade shipping ore and of second class milling ore can be steadily maintained.

The *Mother Lode*, also under the management of J. L. Warner, has made a succession of shipments of high-grade ore, and a body of similar ore has been opened up which assures a continuance of shipments of the same grade. The general average of the last shipments made is $140 a ton, and an exhaustive series of assays taken from the ore now opened up and in sight, gives the same general average. Shipments commenced on the winter snows, the ore being rawhided to the *Yellowstone* waggon road and thence teamed to the railroad at Salmo. Altogether, 124.9 tons were shipped and a total value of $14,078 returned. Considerable development has been made on the property, some 500 feet of drifting having been accomplished since the acquisition of the property by the present operators.

SW-48 The *Queen* mine is, perhaps, the best known property in the Sheep Creek camp, and during the two or three years previous to 1908 has practically been the only shipping mine on the creek. In May last, Mr. William Waldie, the former owner, disposed of the property to a Minneapolis syndicate for the sum of $175,000, nearly one-third cash. The mill, which has been increased to 20 stamps, was in operation throughout the year, with the exception of one or two months. The total crushings amount to, approximately, 9,000 tons, of a gross value of over $100,000. The mill practice shows an average value of $7.50 saved on the plates and of $5 in the concentrates. The development has been kept well ahead of production and the average values are reported to be increasing. The mine is under the management of Chas. Lewiston.

The *Emerald* mine, owned by John Waldbeser, produces a different class of ore from the other properties mentioned. The product here is similar to the characteristic ore of the Slocan, being a galena carrying 60 per cent. lead with a few ounces of silver. During the first quarter of the year 388 tons were shipped, producing $6,000, but owing to the decline in the price of lead, shipments were discontinued during the summer. This winter shipments have been resumed, and the total production for the year is 426 tons, valued at approximately $7,000. Mr. Waldbeser has bonded two adjoining Crown-granted claims which are traversed by the *Emerald* vein, and is working them in conjunction with his own property.

From the above particulars it will be seen that four properties in the Sheep Creek gold belt produced during the year approximately $195,000, from a total tonnage of ore crushed and milled, and crude ore shipped, of 11,600 tons, or an average of $17 per ton. With the exception of the *Queen* mine, all these properties have practically been developed and brought

to the shipping stage within the year. At the present time shipments are being made which, together with mill crushings, represent an output from the camp of $60,000 per month.

OFFICE STATISTICS—NELSON MINING DIVISION.

Mineral claims located	494
Certificates of work	373
Certificates of improvement	11
Transfers	101
Free miner's certificates, individual	630
" " company	16
" " special	4

Revenue.

Free miner's certificates	$4,504 25
Mining receipts, general	3,540 70

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, 1908.

On the *Millie Mack*, situated on Cariboo creek, 16 miles east of Burton, H. E. Foster has kept a force of men working all the year, and shipped 120 tons of ore to the Trail Smelter, which gave returns of $45 to the ton in silver, lead and gold.

On the *Big Ledge*, situated at Pingston creek, and comprising 25 claims, no development has been done this season beyond the ordinary assessment work. This vein shows a large deposit of zinc ore, averaging 30 per cent. zinc.

OFFICE STATISTICS, ARROW LAKE MINING DIVISION.

Free miner's certificates	26
Certificates of work	22
Certificates of improvements	2
Mineral claims located	3

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 on mining operations in the Greenwood Mining Division during the year 1908.

The progress of mining in the Boundary District will be evident from the following statement of annual copper production:—In 1904, 22,066,000 lbs.; 1905, 27,670,000 lbs.; 1906, 32,227,000 lbs.; 1907, 31,521,000 lbs.; 1908, 40,178,000 lbs.

B. C. Copper Co.

The British Columbia Copper Company, Limited, which resumed operations on 1st June, 1908, after a close down of seven months, has made general improvements at both its mine and smelting plants. The shipping capacity at the *Mother Lode* mine, one of the company's principal properties, was increased to 2,000 tons a day, by doubling the air compressor plant, installing a Canadian Rand 35-drill compressor, driven by a 705 horse-power induction motor, connected with it by a rope drive; a 20,000 volt sub-station was erected, a 35,000-gal. reservoir built, a number of new self-dumping ore tram cars installed, and, at the *Oro Denoro* mine, a new ore crushing and conveying plant was put in operation, while at the smelter a sampling plant was installed, and many other less important improvements have been made at the company's mines and smelter. At the *Mother Lode* mine the shaft is being sunk to the 500-foot level and the known body of ore reserve there has been considerably increased. A total of 249,280 tons of ore was shipped from this property during the seven months of 1908 in which the company was working. At the company's smelter, which resumed operations on the 1st June, the entire blast furnace plant was kept in constant use during the balance of the year. Additional ore-bin capacity, an electrically driven crusher and conveying plant, doubling the capacity of the sampling mill, and another 25-ton slag car, have been added.

NOTE BY PROVINCIAL MINERALOGIST:—The following is an extract from the Manager's Annual Report to the Directors of this Company for the year ending November 30th, 1908, which shows copper to be produced at less than 10 cents a pound.

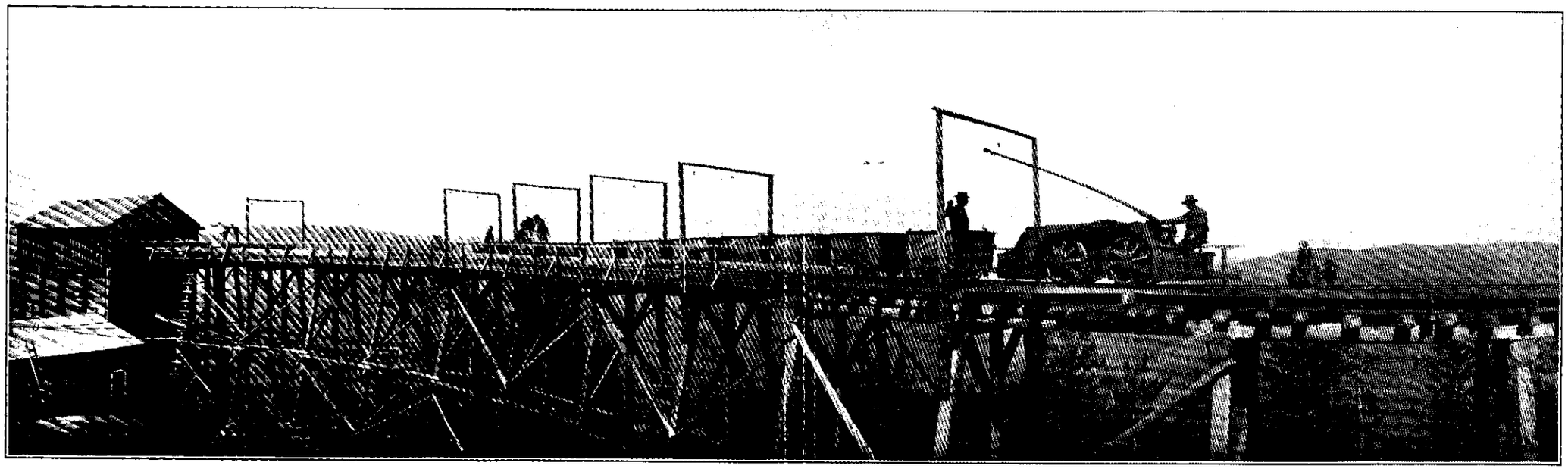
"MINING.

"Ore shipped from the mines for the seven months amounted to—

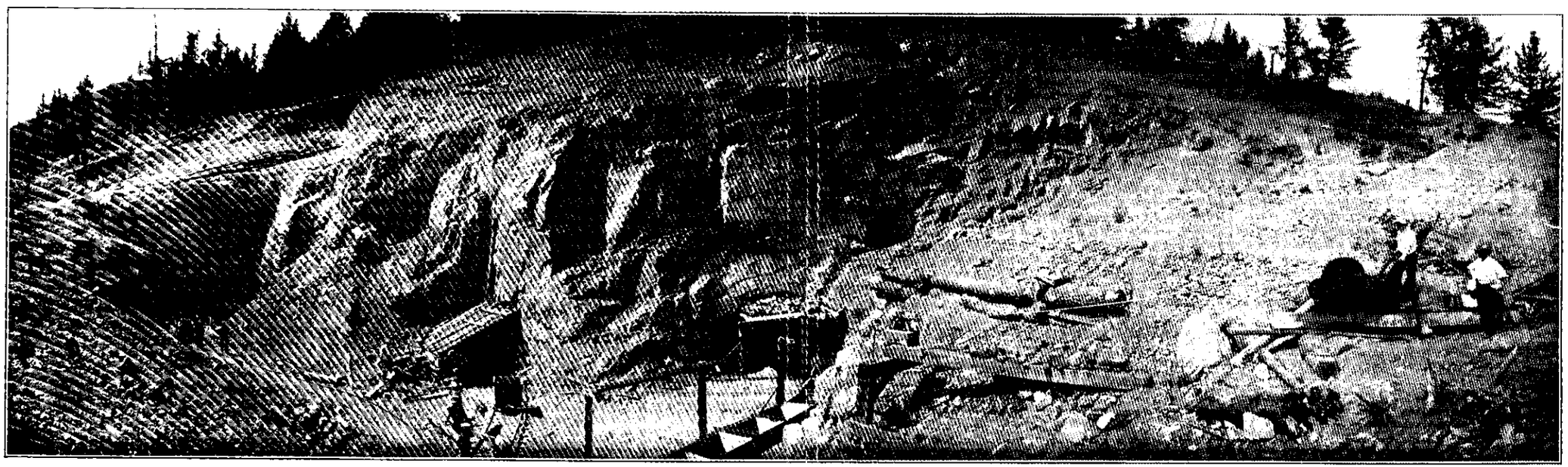
Mother Lode	249,280	tons.
Oro Denoro	56,796	"
Napoleon	13,451	"
Total	319,527	"

"Of the *Napoleon* tonnage, 9,794 tons were smelted at our own plant, the balance being sold.

"Development work during the year in general, has considerably increased the known ore reserves, especially in the *Mother Lode* mine, where sinking to the 500-foot level is now in progress.



UPPER TERMINAL OF INCLINE AND END OF TRAMWAY YALE MINING CO., HEDLEY OSOYOOS M. D.



GLORY HOLE NICKEL PLATE MINE, YALE MINING CO., HEDLEY OSOYOOS M. D.

"At this property, during the year, a new 35-drill air compressor has been added, electrically rope driven by a 600 horse-power induction motor, and also a large jaw crusher of 42" x 30" opening, make the surface plant capable of handling an ore production of 2,000 tons daily.

"Surface development and ore extraction at the *Oro Denoro* mine have been somewhat interfered with by the railroads which cross the property, and during the latter part of the year, operations have been chiefly confined to underground work.

"The work at the *Napoleon* mine during the year has augmented the known ore reserves to such an extent that it is now assured we have in the property a sufficient tonnage of this class of ore to fill our requirements for years to come.

"At the *Lone Star* mine, diamond drill exploration was commenced February 1st, and continued throughout the balance of the fiscal year, 680 feet of surface shaft being sunk through glacial drift and 3,590 feet of diamond drilling in solid rock. The ore-body has by this means, been partially explored, approximately 300,000 tons of ore having been located, but mining and shipments have not been resumed awaiting transportation facilities.

"SMELTING.

"From the time of starting smelting operations, the entire blast furnace plant was in constant operation. Construction work at the smelter has consisted of the installation of additional ore-bin capacity for custom ores; a crushing and conveying plant electrically operated, which has doubled the capacity of the sampling mill, and another large slag car of 25 tons capacity of molten slag.

"Material handled through the three blast furnaces in six months operations, exclusive of coke, was—

B. C. Copper Co.'s ore	312,471 tons.
Custom ore	4,829 "
Converter slag	3,846 "
Custom matte	281 "
Total	321,427 tons.

"Included in the item of converter slag is 1,390 tons of custom ore and clay used in converter linings.

"The converter production from the above material smelted consisted of 5,802,638 lbs. of blister copper, containing 5,767,355 lbs. of fine copper; 13,597.118 oz. of gold; 58,204.23 oz. of silver.

"OPERATING COSTS AND FINANCIAL STATEMENT.

"A feature of the work during the past year has been the co-operation of the different departments in endeavouring to secure the results which are herewith submitted, and this opportunity is taken of expressing appreciation of the same, and acknowledgment of the credit due to those in charge.

"In arriving at the operating costs for the year, the total expenditure has been taken from May 1st, thereby including all expense of opening up the properties after the shut-down, although production did not start until June 1st. Upon this basis—

"Cost per ton of ore handled, including all charges from ore in place to sale of the contained metals, $2.6322.

"Cost of producing, refining and marketing per pound of fine copper, after crediting expenditure with gold and silver values, 9.996 cents.

"The net profits from operations from June 1st, when production commenced, to November 30th, amounted to $238,413.41
From which has been deducted expenditure in re-opening the property during the month of May of 37,929.67

Leaving balance of profit from operations from May 1st to November 30th, of $200,483.74

"The year has closed with the mines and reduction works in excellent condition, and the outlook for the ensuing year very satisfactory."

Granby Con. M., S. & P. Co.

At the Granby Consolidated M. S. & P. Co.'s mines at Phœnix no important construction work was done during 1908, though the constant addition of improvements included the increasing of the number of crushers to four, each with a capacity of 1,500 tons daily, the reconstruction of No. 3 tunnel outlet with new conveyor, the installation of automatic dump-cars on the 400-foot level and the general improvement of shipping facilities, so that the mines are now equipped for a daily output of 5,000 tons. Development work at the mines has been kept well ahead of the requirements, the average number of men employed last year being about 500. In July last the company bought the *Golden Eagle*, an adjoining claim, and they have also recently purchased the building in which their local offices are located. The Granby company's mines are in a particularly fortunate position for shipping purposes. If one of the openings should, by any reason, be blocked, the regular output could be easily maintained from other openings, the convenience of which has been quite recently demonstrated. The advantage of having two railways, the C. P. R. and the V., V. & E., to haul the ore to the smelter at Grand Forks has also been proved.

Dominion Copper.

The Dominion Copper Co. closed down its mines, in common with other copper producers, in 1907, resuming operations in July, 1908. After the furnaces had been only a few weeks in action the smelter was overtaken by a fuel shortage, resulting from the great fire in the Fernie coal district, and was again forced to close down. The company was working largely on borrowed money, and being unable to meet the heavy interest payments, the bondholders foreclosed. A reorganisation of the Dominion Copper Company is now pending.

The only other mines contributing to the Boundary ore shipments during 1908 were the *Sally*, 108 tons, and the *Crescent* 53 tons, both high-grade properties. One car-load of ore from the *Sally* mine (21 tons), shipped last fall, netted $3,175 after paying all shipping and smelting costs.

An idea of the quantity of copper produced by each company is obtainable from the following figures, showing, approximately, the tonnage of ore mined and smelted last year:—

Granby Consolidated M., S. & P. Co	1,028,748	tons.
Dominion Copper Co	22,339	"
Consolidated Mining & Smelting Co. of Canada	49,036	"
British Columbia Copper Co	348,610	"
Total	1,448,733	"

OFFICE STATISTICS—GREENWOOD MINING DIVISION.

Free miner's certificates	416
Mineral claims recorded	109
Certificates of work recorded	376
Conveyances, etc., recorded	61

GRAND FORKS MINING DIVISION.

REPORT OF S. R. ALMOND, GOLD COMMISSIONER.

I have the honour to submit the following report of the conditions of mining in the Grand Forks Mining Division for the year 1908 :—

Mining in this Division has been confined, almost entirely, during the past year, to the larger companies, such as the Granby Consolidated Mining, Smelting and Power Company, the B. C. Copper Company and the Consolidated Mining and Smelting Company of Canada, Prospecting was practically at a standstill, and there was no demand for mining properties other than the acquisition of a few practically undeveloped mines alongside the above-mentioned companies' properties by them. The annual assessment work was done only on such prospects as the owners thought promising enough to stand by, and of these, I must say, there was a goodly stock, showing faith in the future of the district.

The different mining camps, such as Central, Wellington, Hardy Mountain, Brown's, Knight's, Franklin, Gloucester, Christina Lake and others, are at a standstill, excepting in the case where the aforementioned companies are working, and as far as bonding or sale of any property goes to any appreciable extent.

Some amount of work has been done on the *Little Bertha*, and more upon the *Golden Eagle*, in Brown's Camp. This latter property is a very promising one, the ore is fairly high grade, and the present work is showing the mine to better advantage every day.

Granby Con. M., S. & P. Co.

The Granby Company, though not working any mines in the Grand Forks Mining Division, smelts all its ores at Grand Forks, where, during the last year, 1908, it made the greatest showing since the smelter started, notwithstanding that, time and again, some one or more of the furnaces have been out of use on account of each furnace having to be connected with the new flue-dust chamber, and, towards the end of the year, the enlargement of one of the furnaces entailed the loss of the product of that furnace for several weeks. The grand total of ore received and smelted was 1,037,089 tons, which produced 23,535,009 pounds of copper.

The company made much improvement at the smelter, putting in new coke and ore bunkers, each of which was 1,000 feet long, the ore bunker holding 7,000 tons, and the coke bunker 4,000 tons; one furnace was enlarged from 18 to 21 feet long, and the other seven will be so enlarged during the present year. There were also added two rotary blowers, each of 30,000 cubic feet capacity per minute, each operated by a 150-h.p. motor; a steel dust chamber was built to replace the brick one formerly in use, and the flue from the steel chamber to the smoke-stack was also enlarged. The blower engine room, which was built of wood, was taken down and replaced by a fire-proof building of steel and brick, with cement floors, large enough to take in the two new blowers and engines. The converter department was enlarged in view of installing more converters, so as to give an output of 30,000,000 lbs. of copper per annum. The present smelting power of the company is about 3,000 tons per diem, but with enlarged furnaces the capacity is expected to be 1,000 tons more.

B. C. Copper Co.

The B. C. Copper Company ranks next to the Granby, as one of the copper producers of the Boundary. The smelter of this company is at Greenwood, but some of the mines worked by the company are in the Grand Forks Mining Division, in Wellington and Summit camps. In the latter camp, on the *Oro Denoro* mine, the company installed a new crushing and conveying plant, and, in the seven months that the mine was in operation, it shipped to the smelter 58,000 tons of ore. This company recently bonded several claims in Wellington camp, from which it has taken considerable ore as samples, and holds it ready to ship to the smelter, as soon as a spur from the workings to the Great Northern Railway is built.

The *Emma* mine, in Summit camp, is partly owned by this company, and a fair amount of ore is shipped from it when working.

Consolidated M. & S. Co.

The Consolidated Mining & Smelting Company of Canada, with smelter at Trail, worked the *Snowshoe* mine, in Wellington camp, in this Mining Division. Much money was spent by the company in improvements and development work during the past year. Among the improvements made, a new machine shop, fully equipped, the machinery driven by electricity, was built; the water storage capacity was increased to 170,000 gallons, and other work done.

The *Snowshoe* only resumed work in August, but since then it has shipped to the smelter 48,000 tons of ore. At the present time the daily shipments approximate about 600 tons.

Dominion Copper Co.

The Dominion Copper Company commenced to work its mines in July, but, some short time afterwards, had to close down on account of fuel shortage. Some time after closing down, owing to financial difficulties, this company went into liquidation. The company worked several mines in this Mining Division, chief of which was the *Rawhide*, in Wellington camp. During the short time this latter property was worked, it shipped 10,740 tons of ore to the smelter at Boundary Falls, and from the *Athelstan*, in the same camp, 120 tons were shipped, and from the *Mountain Rose*, in Summit camp, 530 tons.

Production of ore to date by the different companies acting in the Boundary is approximately:—

Granby Co.'s mines	4,642,000
B. C. Copper Co.'s mines	1,655,000
Dominion Copper Co.'s mines	595,000
Consolidated Co.'s *Snowshoe* mine	278,000
Outside of above	70,000
Total	7,240,000 tons.

Ore treated during 1908 at the Granby Co.'s smelter, 1,037,089 tons, producing 23,535,000 pounds of copper.

The B. C. Copper Co. treated from the Boundary mines, at their smelter at Greenwood, to the end of November, 300,000 tons of ore, as well as about 18,000 tons from a mine south of the Line and from other sources. This represents only a six months' run.

The Dominion Copper Co. was only running for a short period, and treated only 22,666 tons of ore in 1908. By late reports, this company's affairs are almost straightened out, and it is expected that work will before long be again in full swing in their mines and at their smelter at Boundary Falls.

The Consolidated M. & S. Co. of Canada's smelter is at Trail, and to that place most of the 49,000 tons of *Snowshoe* ore was shipped, although some portion went to the Greenwood smelter.

OFFICE STATISTICS—GRAND FORKS MINING DIVISION.

Locations	95
Certificates of work	390
Certificates of improvements	17
Conveyances	54
Agreements	1
Notices of work	43
Free miner's certificates	221
Special free miner's certificates	2

OSOYOOS MINING DIVISION.

REPORT OF JAS. R. BROWN, 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 1908.

CAMP FAIRVIEW.

In Camp Fairview but little work has been done. The Stemwinder Gold and Coal Company, after purchasing the Stratheyre Company's properties, closed down all work in the early part of the year and has not started again. On the *Silver Crown* mineral claim considerable work has been done by the owners, Steve Mangott *et al.*, and very good values have been obtained.

KRUGER MOUNTAIN.

On Kruger Mountain the Dominion Fairview Copper Co., Ltd., has had a force of about 9 or 10 men at work from May to October. Considerable development work was done in that time on the *Waneta* mineral claim, on which a tunnel was run 200 feet in, with the object of finding the lead, so far, however, without success. On the *Waterdown Fraction* mineral claim the existing shaft, 50 feet deep, was sunk 60 feet deeper, and at the 110-foot level a crosscut of 30 feet was made, looking for the lead, the shaft being sunk in country rock. No very promising results have, however, as yet been obtained, and work has been for the present suspended. The Dividend-Lakeview Consolidated Gold Mining Co., Ltd., has done considerable work on its group near the International Boundary Line on Kruger mountain.

KEREMEOS.

Outside of the *Bullion* and *Dolphin* groups of claims but little development work has been done in Keremeos valley. On the *Bullion* group, owned by Robert Gaede, of Paterson, New Jersey, U.S.A., there has been a good amount of work done; over 1500 feet of tunnel driven, and over 100 feet of shaft sunk. The work now being done is to fully develop the ore found on the mountain. This work consists of sinking a winze on the ore for 30 feet, and cross-cutting on the ore. The ore found during this work consists of iron ond copper pyrites, carrying gold values, and assays, in places, 3 to 4 per cent. copper, and from $5 to $10 in gold. No. 4 tunnel, now being worked, is in low grade ore its whole length of 50 feet. The ore is of the same character as the ore on the winze; the ledge has been opened on the surface for a width of 40 feet, and shows constant values its whole width. No. 2 tunnel is being driven to tap the ore at a point 200 feet lower than at the winze. This tunnel, up to date, has been driven 400 feet, and the face is now in the rock forming the foot-wall of the ledge above, but it is expected that the ledge will be tapped within 50 feet. The country rock in these workings consists of a highly silicified limestone. The mineral is found in a garnetite rock, and consists of iron pyrites intimately mixed with copper pyrites and always carrying some gold, with an occasional trace of silver.

The *Dolphin* group consists of the *Dolphin*, *Spar Fraction*, and *Bluebird* mineral claims, situated near Olalla; there is 1,400 feet of work done on the group, including tunnels, upraises and open cuts. An aerial tram-line, with ore-bins, has been erected, and one car of ore was shipped from Keremeos in January, 1908, which ran about 6 per cent. copper; work, however, was closed down at the end of February. The claims are now being Crown-granted, and work is expected to begin in January, 1909.

In upper Keremeos valley assessment was done on some of the best properties, including *Riordan* group, *Cornell* group, the *King Arthur*, *Cinnabar*, *Dominion*, *Horseshoe* and other groups. It is the general belief, however, that next season will see a return of activity, as the coming of the railway into the Similkameen ought certainly to be a great inducement.

In the lower Keremeos valley the *Mount Zion* is showing up well under the recent assessment work, and the *Eldorado* and *Silver Plate* are both looking exceedingly well. Up Cedar creek the *Black Hawk* group, owned by Messrs. Griffin, Price and Murphy, has had the greatest amount of work done this year of any group in the district, outside of the *Bullion*. The three owners put in nearly all the summer running a cross-cut tunnel, which is now in about 125 feet; they cross-cut the ledge at a distance of about 60 feet from the portal, where it is found by actual measurement to be 7 feet 6 inches wide, and about 15 feet farther in they cross-cut two feet more of solid ore, at a depth of about 50 feet below the open cut on the surface. The ore is magnetite iron, with iron pyrites and considerable yellow copper in garnetite. On the same ledge, about 300 feet south-west of the tunnel, they have a large hole sunk, 17 feet deep and about 12 feet across, showing the ledge from surface down. It has a vertical dip for that distance and carries the same kind of ore as that found in the tunnel.

CAMP HEDLEY.

(Kindly contributed by Mr. A. Megraw, Hedley.)

The year 1908 has, on the whole, been one of substantial progress in Camp Hedley, and has, moreover, been notable in some respects, for the production has increased considerably over that of any previous year. While this evidence of progress is to be placed altogether to the credit of the *Nickel Plate* group of mines and the management thereof, the year has also witnessed earnest effort in the development of other important properties, and as a result of the work done upon them these are brought nearer the producing point.

Nickel Plate Group.

On the *Nickel Plate* group, owned by the Yale Mining Co., the principal work of the camp was done, under the management of F. A. Ross, who is also manager of the Daly Reduction Co.; these two corporations having for the most part a common ownership, vested in the Daly Estate, although there are also minor interests in both concerns apart from this estate. The *Nickel Plate* group consists in all some 22 mineral claims, although of these only three, the *Nickel Plate*, *Sunnysides* and *Woodland* fractions, are being worked. As in the case of many large one-level mines with enormous bodies of more or less variable grade of ore, the mining operations are confined to extraction, and the exploratory work is done by diamond drill, no development work, *per se*, by means of drift or winze being necessary. The year's operations have broken all its previous records, while the plant, instead of being allowed to deteriorate, is in far better condition than formerly. There has been mined and milled for the year, 16,551 tons from the *Nickel Plate*, 17,135 tons from *Sunnysides No.* 2, 6,236 tons from *Sunnysides No. 3*, and 4,146 tons from *Sunnysides No. 4*, making a total of 44,068 tons for the year. The concentrates turned out in the mill amounted to 1,257 tons. The highest tonnage ever before mined and milled in a year was 35,000 tons. The recovery of values for the year has also shown a greatly increased percentage, distributed as follows: extraction on plates 21 per cent., on vanners 41.5 per cent., and in cyanide 29 per cent.; making a total extraction of 91.5 per cent.

In mining, new ground was opened up in *Sunnysides Nos. 2, 3* and *4*, the last-mentioned being a totally new discovery. In exploratory work with the diamond drill, 1,500 feet of diamond drilling was done during the year. Formerly this was done by contract, but during 1908 the company did it with its own drills. No new equipment was added during the year to either mine or reduction plant, further than for renewals and repairs, except a couple of new hoists for *Sunnysides 3* and *4*.

Pollock Mines.

Outside the *Nickel Plate* group, considerable interest was displayed in the development work on the *Pollock* group, owned by the Pollock Mines, Limited, about two miles above the mouth of Twenty-mile creek, but on the opposite side of the river. This group consists of the *Martin*, *Maple Leaf* and *Pine Knot*

mineral claims, and as these lie on a steep hillside the development work was confined to tunnelling on the *Martin* claim, which is nearest the river. Former work had been done both on the *Martin* and *Maple Leaf*. The work this year done on the *Martin* consisted of No. 1 crosscut tunnel driven 70 feet in all, cutting the vein on the foot-wall at 55 feet and the hanging-wall at 68 feet, with a drift 18 feet along the vein. No. 2 tunnel was driven 40 feet in length, passing through the foot-wall at 15 feet and striking the hanging-wall at 38 feet, the vein being 16 feet wide at this point. No. 3 tunnel was driven 35 feet in length, cutting the vein, which is 7 feet wide at this point, at 18 feet, and a winze 6 feet deep was sunk on the vein from floor of tunnel. No. 4 tunnel was driven 35 feet in length, cutting the foot-wall at 12 feet and passing through the hanging-wall at 32 feet, showing a width of fully 18 feet. No. 5 tunnel is 147 feet in length, striking the vein at 111 feet. There is a drift to the south on the vein 60 feet in length, with a cross-cut at the end of 22 feet, and a drift to the north of 40 feet with 10 feet of a cross-cut. The vein thus shown up for 100 feet from this tunnel ranges from 18 inches to 5 feet in width. No. 6 tunnel was driven 20 feet towards the vein, through very heavy wash, but was not driven far enough to cut the vein, although an open cut on the hillside above showed the vein to be 22 feet wide at this point. Various other surface cuts were also made during the period that work was in progress, and altogether the results from all development was most satisfactory, showing the *Martin* vein to be persistent both horizontally and vertically, and the values obtained showing in all cases payable ore. The total amount of work done was 520 feet, of which 500 was on the *Martin* claim and *Pine Knot*, and 20 on the *Maple Leaf*. The average cost per foot was $4.35. The amount expended was $2,265.

Kingston Group. At the beginning of the year this property, owned by the Kingston Gold Copper Mining Co., ceased development work, which had been carried on continuously for about 15 months prior to that time. Work was resumed early in the fall of 1908, under supervision of H. C. Pollock. The claims belonging to the company consist of the *Kingston*, *Warhorse*, *Metropolitan* and *Grand View*. Most of the previous work had been done on the *Kingston*, although the *Warhorse* had also received considerable attention and large surface deposits had been shown to exist. Since resuming, work has been continued on the *Kingston*, but on a bolder scale, which appears to have been encouraged by the work of the Geological Survey under Mr. Camsell, and excellent results are being obtained, large ore-bodies being located. On the *Metropolitan*, much surface work has also been done, with excellent results. Power is needed to operate satisfactorily, the rock being too hard for economical hand work.

Golden Zone. This group, owned by Messrs. Marks, Brodhagen and Murphy, has witnessed active operations during the year. A five-stamp mill was installed and equipped with Wilfley concentrator, and a prospecting plant, consisting of boiler, hoist and No. 5 Cameron pump. In excavating the mill foundation a large body of new ore was found. The mill was not ready for operation until late in the summer, and by that time the water supply had begun to give out. A company, known as the Golden Zone Mining Co., Limited, has been incorporated to work the property, and with the large bodies of payable ore in sight their prospects are exceedingly bright.

Across the river, H. B. Brown and Captain Kent have done a great deal of development work on the *Bull Dog* claim, immediately above the tracks of the V., V. & E., and have taken out some very good silver ore, in addition to locating a good body of low-grade sulphide ore. The advantageous location of this property will help the owners very materially in further exploitation.

On the *Florence* group a fair amount of development work has been done and some other claims added. Arrangements are also being made for working it on a larger scale.

Geological Survey Work.

During the year, also, the Geological Survey, under Mr. Camsell, continued to work, and the topographical sheet undertaken in 1907 has been completed, and the geology carefully worked out. In addition to completion of the work undertaken in 1907, preliminary examinations of other localities outside this sheet area were made and formations co-related. Already the practical benefit of Mr. Camsell's work is seen in the confidence it has inspired in claim-owners, and that confidence is becoming still greater as the correctness of his conclusions are being proven by actual work.

OFFICIAL STATISTICS—OSOYOOS MINING DIVISION.

Certificates of work issued	205
Location records	121
Free miner's certificates issued	228
Certificates of improvements issued	32
Conveyances, etc., etc	34

VERNON DISTRICT.

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VERNON MINING DIVISION.

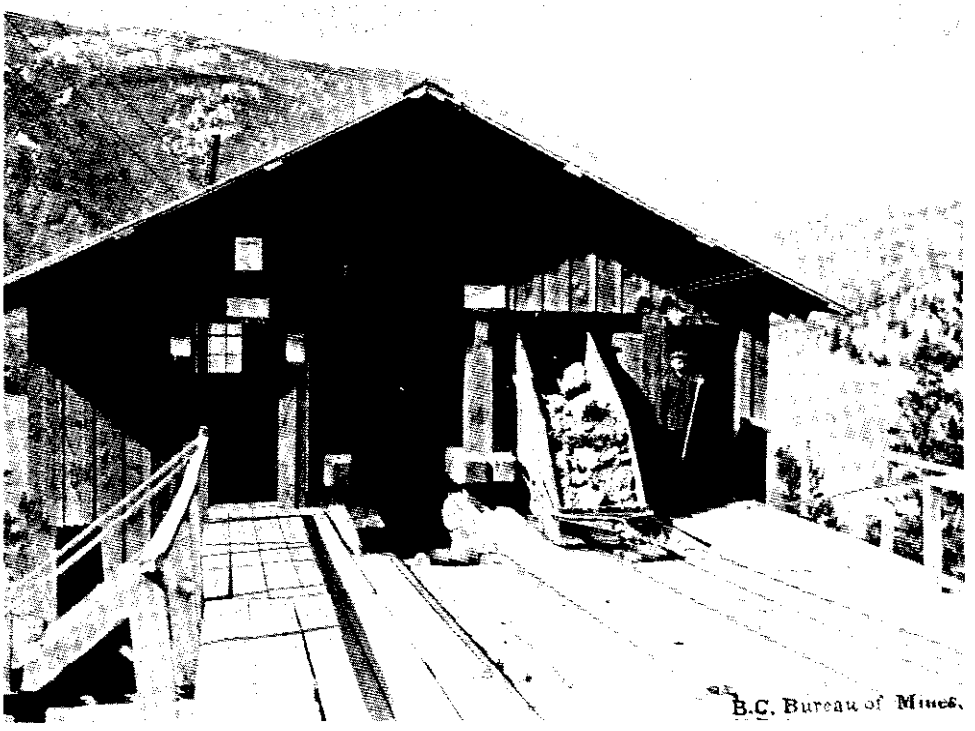
REPORT OF L. NORRIS, GOLD COMMISSIONER.

I beg to submit the following report on the mining industry in this Division during the year 1908 :—

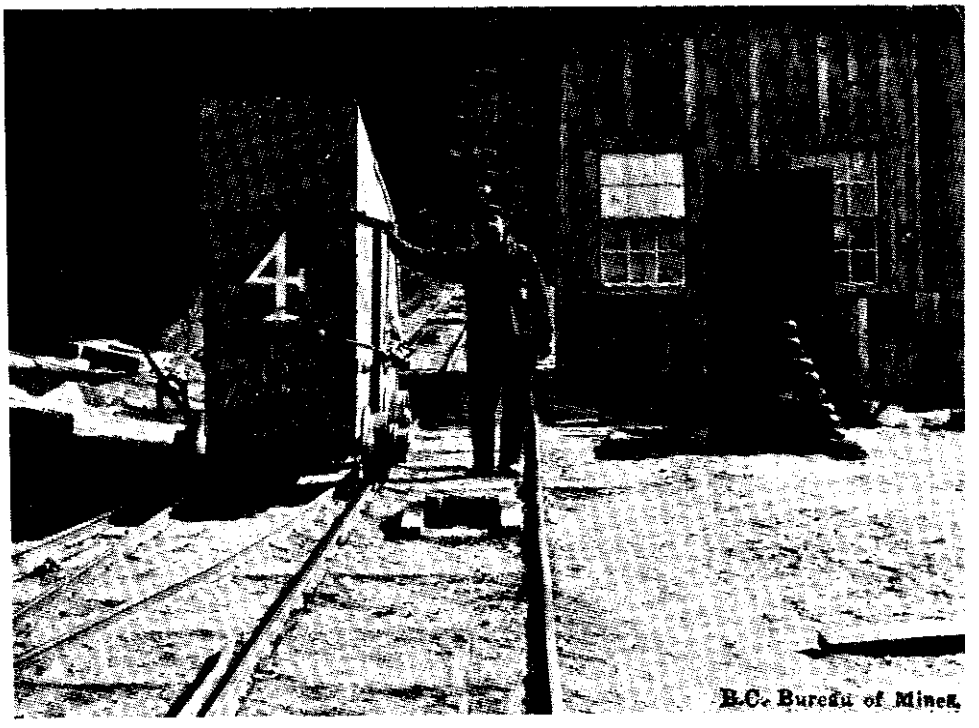
During the year 1908 but little progress was made in mining in this Division, and nothing transpired of sufficient importance to warrant reporting.

The statistics appended were furnished by Mr. H. F. Wilmot, Mining Recorder :—

Free miner's certificates issued	113
Company's certificates	1
Mineral claims recorded	19
Certificates of work	20
Conveyances recorded	4



LOWER TERMINAL, YALE MINING CO.'S TRAMWAY, HEDLEY.



SIX-TON SKIP, YALE MINING CO.'S TRAMWAY, HEDLEY.

YALE DISTRICT.

KAMLOOPS MINING DIVISION.

From Report of G. C. Tunstall, Gold Commissioner.

The Kamloops Mining Division shows signs of recovery from the period of depression resulting from the low price of copper.

Mr. W. Young, a mining engineer, made an examination of some of the principal properties south of Kamloops, and obtained several options, being of the opinion that the mineral deposits, though of low grade, offered inducements for the investment of capital, when within reasonable distance of transportation, but these facilities must be provided, as the present freighting charges to nearest point of treatment are prohibitive.

Mr. Beckman, of Cleveland, Ohio, has bonded some properties at Cherry creek and in the Jocko lake section of Coal Hill, that are undergoing development and on which some large bodies of ore have been exposed, but these also must await transportation facilities.

The Coal Hill district embraces some 40 square miles, in which there are a number of extensive iron dykes, associated with which are extensive mineral deposits, carrying chalcopyrite and assaying from 2 to 3 % copper, with $2 to $3 in gold. The district is easy of access, enjoys a mild climate with light snow-fall, while, on the higher elevations, timber is plentiful.

New mineral areas are being opened up, and among the more recent discoveries may be noted the gold-bearing quartz ledges near Lac la Bois, owned by Arnold & Son, and the copper deposits in vicinity of Mara lake, on which the surface prospects are very promising.

The following is a summary of mining operations in the Division :—

On the *Iron Mask*, some 18 men were employed, extending the drifts and making improvements to enable the property to ship next season.

On the *Python*, a tunnel completed a few months ago brings the face of this drift to a depth of 600 feet below the surface, and discloses the ore-body encountered in the shaft. The property is bonded to W. O. Young.

The *Kamloops Queen* and *Wheal Tamar*, adjoining claims in the Jocko Lake section, have had assessment work done on them with satisfactory results. On the former a new vein has been discovered, some 20 feet wide, carrying hematite with copper sulphides, which has been traced on to the *Wheal Tamar* ground. A tunnel 300 feet long has been made which is expected shortly to intersect the ore-body exposed above. The properties are owned by Philips and Batchelor.

Assessment work has been done on the *Ajax* group of claims and has exposed a ledge of good ore on the *Mars* and *Neptune*. The vein on the *Ajax* has been cross-cut and proved to be of considerable width, carrying an ore of good average value in copper and gold.

A tunnel has been driven on the *Arcadia*, one of the *Arcadia* group, intersecting the vein at a depth of 50 feet, where it was found to be 15 feet wide, but the ore was low-grade. A second and similar vein shows on surface.

A shaft sunk on the *Monte Carlo* this year encountered some good ore a few feet from the surface, which extended to the bottom of the shaft. Samples of the ore assayed 6 % copper and $2 in gold and silver.

The *Evening Star*, owned by John Morrison, lies about five miles south-west of Kamloops and adjoining the *Iron Mask*. Assessment work has been performed on the property this year with gratifying results, exposing some fine specimens of carbonate of copper. A 4 x 9-foot double-compartment shaft has been sunk 90 feet.

The *Coast* and *Commoner* claims, owned by Fred. Humphrey and Dr. Wade, are in the Jocko lake district, near Humphrey's ranche. Several prospect shafts and open cuts indicate an extensive iron capping impregnated with copper pyrites, which, although no assays have been made, looks promising, and next season a shaft will be sunk.

The *Irene* group, consisting of the *Irene*, *Sunset*, *Queen* and *Shamrock* mineral claims, situated eight miles south of Kamloops in Jocko Lake district, is owned by J. Beckwith. The ore is distributed in a felsite and hornblende rock, and is mostly low grade, although assays have been obtained from the surface of the *Irene* and *Sunset*, yielding over 4 % copper, with $2 in gold. Development consists of three shafts 20 feet deep, and proving the ore-body to be of large size.

The *Beaver* group adjoins the *Irene* on the south, and is owned by Fred. Bradley. A shaft 30 feet deep has been sunk in what is apparently a very large vein, in a felsite and hornblende country rock, which carries iron pyrites with carbonate of copper, the vein being richer next the contact. Other excavations confirm the belief as to the extent of the deposit.

The *Kimberley* group was acquired last year by Mr. Beckman. There are on the property two apparently large, parallel ore zones, in which a number of excavations have been made,—one 86 by 50 feet by 20 feet deep, exposing a very large amount of medium grade copper ore. A definite idea of the value of this deposit cannot be obtained until the development work now under way is finished next spring. A force of 9 men is now employed stripping the surface.

The *Laura* group has also been acquired by Mr. Beckman. Since spring of last year a shaft has been sunk 60 feet deep, with a drift of 20 feet, along what appears to be the footwall of a very large vein containing iron sulphides, mixed with hematite and copper pyrites. Further exploration is to be continued.

The *Copper King*, also acquired by Mr. Beckman, lies on a mountain opposite Cherry creek. The former owners had confined their attention to a chute of bornite, from which several shipments were made to Coast smelters, but the chute was eventually lost. Other rich chutes have since been found and development would seem to indicate that there exists a large body of low grade ore, in which these richer chutes occur.

The *Iron Mountain* group, consisting of the *Iron Mountain*, *Iron Duke*, *Lucky Boy* and *Lucky Strike* mineral claims, was located last October by J. W. Smith on the west shore of Mara lake about 8 miles south of Sicamous. The vein, in a granite formation, carries gray copper with small gold values. A sample of 500 lbs. has been sent away for assay purposes.

The *King Edward* group, consisting of the *King Edward*, *Hidden Treasure*, *British Queen* and *Jap Girl* claims, was located last year by W. C. Arnold, at the north-east extremity of Lac le Bois, a few miles north-west of Kamloops. Numerous excavations made have shown up a large body of gold-bearing quartz, from which good assays have been obtained, and a shaft has been started on a quartz vein 20 feet wide.

About half a mile to the west of the lake a similar, though perhaps larger, quartz vein, has been discovered, running north-east and south-west. The work so far accomplished has, however, been insufficient to prove the value of these locations.

The *Fortuna* group, situated on Louis creek, consists of the *Fortuna*, *Fortuna No. 1*, *No. 2* and *No. 3* Crown-granted mineral claims, and is controlled by the Fraser River Copper Mining Co. A large amount of development work has been done on the property, consisting of three tunnels, one 420 feet long and the others 30 and 20 feet, respectively. The main tunnel intersects several stringers carrying values in gold, silver, lead and copper, while in the face there shows up a strong body of sulphide ore carrying values in copper, silver and gold.

Nickel has also been reported as having been found.

No drifting has been done along the vein that would prove its length. The necessary camp buildings have been erected, including bunk-house, cook-house, store-house and blacksmith shop.

Cotton Belt Mines.

The *Cotton Belt* group is situated about 15 miles east of Seymour Landing, that point being reached from Sicamous by water, a distance of 31 miles. On the *Cotton Belt* a tunnel has been run for 98 feet, which shows the quartz vein to be wider and richer than on the surface.

Considerable development work has also been done on the *Tartar;* a shaft, 45 feet deep, exposes vein matter 8 feet wide, carrying cube galena in considerable quantity.

On the *Boyne*, *Black Princess*, *Mountain Chief* and *Lee Metford*, is exposed a 6-foot lead of quartz, with some 18 inches of galena on the foot-wall.

On the *McLeod* claim, surface stripping and prospect holes indicate a strong lead carrying galena and copper pyrites.

This camp is very much in need of a suitable trail from Seymour Landing, over which supplies might be brought in.

Cinnabar Mines.

The cinnabar mines on Hardie mountain, numbering some 15 claims, owned by the Hardie Mountain Cinnabar Mines, Ltd., are about 10 miles north of Kamloops lake. This property has not been worked for some years, but the company by its former development work exposed a body of ore for a length of 1,000 feet. The ore, as formerly mined, carried about three-quarters of one per cent. of mercury.

Office Statistics—Kamloops Mining Division.

Mineral claims recorded	110
Certificate of work recorded	161
Bills of sale recorded	39
Free miner's certificates issued	184
Placer mining leases	12

SIMILKAMEEN MINING DIVISION.

Report of Hugh Hunter, Mining Recorder.

I have the honour to forward the annual mining report on the Similkameen Mining Division for the year 1908:—

Development work has not been carried on to any great extent, except on the *Reco* group, situated on the south end of Copper mountain. A tunnel is being run to tap the ore-body; at last report it was in over 250 feet.

Most of the claims on Copper mountain are Crown-granted, assessment work being done on the remainder. The near approach of transportation should stimulate mining to a large extent.

I append a synopsis of the principal mineral claims in the district, kindly furnished me by W. C. McDougall, of Princeton, and T. H. Murphy, of Granite creek.

OFFICE STATISTICS—SIMILKAMEEN MINING DIVISION.

Free miner's certificates (individual)	163
" " (company)	2
Location records	143
Certificates of work	304
Conveyances	36
Certificates of improvement	12
Placer leases	2

Princeton and Vicinity.

COAL MEASURES.

Surrounding Princeton occur extensive deposits of coal, so situated as to be easily mined, a ready market being assured on the completion of the V., V. & E. railway, now being extended up the Similkameen valley to Princeton. The coal measures of the Princeton basin, although lignitic in character, have proven to be well adapted for domestic, steam-generating and gas-producing purposes; in fact, the use of these coals for power purposes, through the medium of gas engines, is likely to largely increase the local demand at a comparatively early date.

The Vermillion Forks Mining and Development Co., Ltd., owns 1,200 acres of coal land adjoining Princeton. Boring records made by this company, using a Calyx core drill, show a total of 35 feet of coal, in three seams of 5 feet, 5 feet, and 25 feet thick respectively. Development of the property by this company has been by means of an adit level run in 622 feet from the river bank, and there connected with a timbered air shaft 64 feet deep, connection being also made with a new working incline 8 feet by 10 feet in the clear, and 154 feet in length. This incline attains a vertical depth of 64 feet, the last 20 feet being in coal, top, bottom and sides. An average sample, taken from an 8-foot face on this property, gave the following results upon analysis:—

Moisture	11.97 %
Volatile combustable matter	30.49 "
Fixed carbon	49.21 "
Ash	8.33 "
	100 "

Other analyses made from different portions of the property correspond approximately with the above.

This company also owns the townsite of Princeton, adjoining the mine, and affording easy access and a local market for a limited output.

At and near Ashnola, nine miles south of Princeton, up the Similkameen river, the coal measures have been explored to a considerable extent. At one point, on Nine-Mile creek, near Ashnola, Messrs. Wilmot and O'Leary, of Gem, Idaho, are driving a tunnel into a 15-foot seam of good coal.

Two and a half miles north-east of Princeton, on One-Mile creek, the United Empire Company has opened coal of about the same grade and character as that developed by the Vermillion Forks M. & D. Co. This company is now developing the coal measures within its

property, with the object of commencing shipments as soon as the V., V. & E. railway is in a position to accept freight. The full extent of the coal deposit opened by the United Empire Co. has not as yet been ascertained, but enough is already disclosed to enable them to depend upon a supply sufficient to maintain shipments on an extended scale for years.

The Princeton coal basin proper is estimated to comprise about 30,000 acres. Whether it is in any way related to or connected with the bituminous deposits at Granite creek, some 15 miles to the west, is a question that can only be determined by further exploration and development of these measures.

Back of these coal deposits, and surrounding Princeton, at a distance of from two to thirty miles, are situated extensive and valuable deposits of copper, gold and silver-bearing ore. Up to date the lack of transportation facilities has rendered the active prosecution of extended mining operations impracticable, if not impossible. The completion of the V., V. & E. railway into Princeton will, however, almost immediately furnish the much required transportation and enable the whole Princeton region to become productive.

Copper Mountain.

Copper Mountain, situated about twelve miles south of Princeton, is accessable by means of a waggon road, which is being improved each year. The general character of the ore opened on this mountain is bornite and copper pyrites, often intermixed with a magnetic iron capping on the surface. The formation may be characterised as diorite cut by porphyry dykes, the ore occurring in lenses close to and paralleling the dikes.

The *Sunset* mineral claim, the first location on the mountain, is developed by an incline shaft 180 feet in depth, with a 50-foot cross-cut, at the 100-foot level, to the south-west, in the direction of the ore-body on the *Helen H. Gardiner*. There are also cross-cuts of 70 feet to the north-west and 150 feet to the south-east, at the 150-foot level in this shaft. The 50-foot and 70-foot cross-cuts at the 100-foot and 150-foot levels are entirely in ore. The 150-foot cross-cut ran through a dike or "horse" of porphyry, but disclosed at least 50 feet of good ore. The average value of the ore opened by the above work has proven to be from 1½ to 4 per cent. copper and $1 in gold, silver values being practically *nil*. The *Sunset* is proven by the above work to be an extensive property. Title is Crown grant.

The *Helen H. Gardiner* (title Crown grant) adjoins the *Sunset* on the south. Development consists of a shaft 50 feet in depth, with a 16-foot cross-cut at the bottom, shaft and cross-cut being entirely in ore. A second shaft, about 18 feet in depth, is in ore from top to bottom. Considerable open cut work has also been done on this claim, disclosing bodies of copper ore of high-grade and wide extent. Values run up to 5% copper and $1 in gold. Owners are Charles Saunders and partners.

The *Oriole* adjoins the *Helen H. Gardiner* on the south-east. Development consists of a shaft 25 feet in depth and a large amount of open cutting, disclosing a vein about 150 feet in width, extending entirely across the property. The owners are Snowden, French, Day and Almond.

The *Jennie Silkman* (title Crown grant), owned by Messrs. French and Day, is situated about 2,000 feet easterly from the *Helen H. Gardiner*. Development consists of a shaft 50 feet deep and extensive open cutting, disclosing a large body of copper ore.

The *King Solomon* (owners Snowden and Burr), adjoining the *Jennie Silkman* on the west, has a lead 40 feet in width, carrying copper, gold and silver. Development consists of open cuts and shallow shafts showing up the ore-body. Title is Crown grant.

The *Holdfast*, owned by French and Day, is a Crown-granted claim located on the Similkameen river between Copper and Kennedy mountains. A lead 60 feet in width, carrying ore from wall to wall, crosses the property. The surface ore on the claim consists of carbonates of copper, malachite and azurite, overlaying the pyrites which replace the oxidized material at depth.

The *Vancouver* (title Crown grant) adjoins the *Sunset* on the north. This claim has been developed by a series of open cuts and a 40-foot shaft, the ore showing up extensively, values being about on a par with those of the *Sunset* and *Helen H. Gardiner*.

The *Sunrise*, another Crown-granted claim, adjoins the *Sunset* on the south-west. A considerable amount of work has been done on this property, disclosing ore of good grade.

The *Copper Farm* adjoins the *Vancouver* and *Sunset* claims on the west. Development consists of a shaft 50 feet in depth, which is in ore from the surface. At the bottom of the shaft the ore has proven to be of an exceedingly attractive character and higher values than elsewhere. This claim is held under Crown grant.

The *Princess May* lies north-west of and adjoining the *Copper Farm*. Development consists of an open cut 10 feet wide, 10 feet deep and 60 feet in length, all in ore; also a shaft 15 feet deep in ore from top to bottom. Values run to 5 % copper and $1 in gold.

In addition to the above work a 600-foot diamond drill bore was put in, showing copper values from the entire bore. A second hole was drilled to a depth of 300 feet, cross-cutting the ore-body, but values obtained from this work are not available. A third hole was drilled from the same point to a depth of 300 feet, which was in ore from top to bottom.

Excellent tunnelling facilities exist on this property, from which not only the claim itself but the *Sunset* and *Helen H. Gardiner*, lying above it on the mountain, can be opened by what will be practically a drift. Title, Crown grant.

The *Red Eagle*, (Crown grant) is developed by three shafts, 17 feet, 12 feet and 10 feet, respectively; also considerable open cutting.

The *Triangle* is a Crown-granted claim, developed by a 70-foot cut and tunnel. A fissure occurs on this property, the ore being of higher grade than general throughout the mountain. This claim adjoins the *Princess May* on the north and *Red Eagle* on the west.

The *Copper Reef* (Crown-granted) adjoins the *Triangle* on the west, and is opened by a 30-foot shaft and a 20-foot open cut. Values are in copper, gold and silver.

The *Copper King* (Crown-granted) is opened by two shafts, 10 feet and 12 feet, respectively, and a 25-foot open cut. It adjoins the *Triangle* on the north. Values, as disclosed by the above work, are in copper and gold. Timber and water are abundant.

The *Copper Bench* (Crown-granted) adjoins the *Copper King* on the west and is opened by a tunnel 50 feet in length. Timber and water are available in quantity. Values obtained have not been ascertained.

The *Diamond Dot* (Crown-granted) is opened by a 15-foot shaft and 25-foot tunnel.

The *Ada B.* (Crown-granted) is situated about 3,000 feet south of the *Sunset* mineral claim, and is owned by Chas. Willarson, Johnson, Cramer and Morrison. The property consists of about 36 acres. There are two distinct leads on the claim, running in a northerly and southerly direction, parallelling strong porphyry dykes which cut the formation in the same direction. The lead showing on the western side of the property has the most prominent showing, consisting of a heavily oxidised iron capping carrying considerable copper and small gold values. Development consists of a shaft 20 feet in depth, all in ore, with a deep trench on each side cross-cutting the lead. This lead is tapped at different points across the property by a series of open cuts.

The eastern lead is also of considerable width, and although lacking the prominent surface showing possessed by the lead on the west, gives promise of value when more fully developed. The work done on this lead consists of open cuts, shallow shafts, etc.

The *Princess Maud* (Crown-granted) adjoins the *Ada B.* on the south. The same leads developed on the *Ada B.* undoubtedly run through this claim. Development consists of open cuts and shallow shafts, disclosing heavily mineralised capping similar to that on the *Ada B.* ground. Values are chiefly copper.

The *Centre Star Fraction* (title Crown grant) adjoins the *Princess Maud* on the south-east, contains about seven acres, and is owned by Willarson and Johnson. A heavily mineralised lead crosses this property in a north-south direction. Strong porphyry dykes parallel this lead. Development consists of surface openings, results so far being very promising and assay fairly well in copper and gold.

The *Dividend* (title Crown grant), owned by Willarson and Johnson, adjoins the *Sunset* on the east and has a most promising showing of ore, similar to that opened on the *Sunset.* Development work consists of open cuts and shafts.

The *Transvaal*, owned by A. E. Howse & Co., is situated between the *Sunset* and *Centre Star Fraction*, and has the same heavily mineralised lead running through it as the *Centre Star Fraction*, from which good average assays have been obtained. Considerable surface work has been done on this property.

The *New Fraction* (Crown-granted), owned by Willarson and Johnson, lies between the *Helen H. Gardiner* and *Oriole.* The same lead opened on the *Helen H. Gardiner* extends through this claim. The work so far done has been confined to the surface.

The *Annie L.* (Crown grant), owned by W. A. Smith, lies between the *Ada B.* and *Centre Star Fraction.* Considerable work has been done on this property in opening up the ore-body, which appears to be running in a more easterly direction than on adjoining claims. Assay values have proven satisfactory.

Voigt's Camp.

Voigt's camp is situated on the north-east slope of Copper mountain, and is reached by the same road that gives access to the main camp farther west.

The *Fallum* (Crown grant) has an ore dyke of heavy magnetite. Development consists of three prospect shafts, 30, 25 and 22 feet deep, respectively, all in ore. A fine trail, that at little expense can be converted into a waggon road, leads from the main road into this property.

The *No. 14* claim (Crown grant) has an ore dike about 200 feet wide, heavy magnetic iron. Four shafts, 18, 22, 30, and 60 feet deep, respectively, have been sunk along this lead. Considerable surface stripping has also been done. This claim is situated close to the main waggon road.

The *R. S. and Frisco* (Crown grant) has three distinct ore dykes, with diorite and lime gangue. Development consists of several thousand feet of surface stripping, all of which shows strong mineralization, with some high grade ore. Three prospect shafts have been sunk, 18, 35 and 80 feet deep, respectively, all in ore. A tunnel 165 feet long cross-cuts part of the largest dyke. This tunnel is all in ore of varying grades and character, but does not have enough depth to reach the solid formation. Another tunnel, intended to cross-cut the three different dykes, is now under construction, and is in about 110 feet. This tunnel will tap the main ore-body at about 650 feet depth.

This claim is situated on the main waggon road and has good roads of its own leading to the different workings.

The *Tigma* has two distinct ore dykes, 130 and 90 feet wide, respectively, gangue consisting of feldspar and lime. About 800 feet of stripping and hillside cuts has been done, all showing up ore of various grades and character. A tunnel 155 feet long, which cuts the main ore dyke, is all in ore, varying much in value; the tunnel has not reached the solid formation, decomposed and oxidised ores occurring in the deepest portion of the tunnel. A second tunnel, to reach greater depth, is in about 50 feet, but idle for the present.

Nos. 18 and *5* claims (Crown grant) have two large ore dykes, 150 and 300 feet wide, respectively. These dykes are characterised by a strong iron capping carrying copper, gold and silver with varying values, on the surface. Development consists of about 1,200 feet of open surface and side-hill cuts, two tunnels, 50 and 65 feet long, respectively, and two shafts, 18 and 24 feet deep, the latter now being sunk upon.

The *Colorado* group consists of six claims; Crown grants applied for. This group has a number of well mineralized ore dykes. Development consists of 1200 feet of surface and side-hill cuts. Three shafts, 45, 36 and 42 feet, respectively, have been sunk, and a tunnel 180 feet long driven. A second tunnel, now under construction, is 60 feet in length. All workings show more or less ore, with some very good values.

Duke of York and *Bluebird* (titles, Crown grant). Development consists of about 400 feet of side-hill cuts, some 30 feet deep, and extensive surface stripping, all in ore. A tunnel to cross-cut these ore-bodies at great depth is now under construction, and is already in 110 feet.

Iron Mask (title, Crown grant), located near the north end of Copper mountain, near upper Wolf Creek lakes: Development consists of open cut work and shallow shafts, disclosing a heavy iron body or capping, carrying small gold values. Other values have not been determined.

The *Jubilee No. 2*, *Home Rule* and *Vancouver* form a group to the south of the *Iron Mask*. Titles are Crown grant. Development work consists of open cuts and shafts, showing up very good ore, consisting of copper pyrites and bornite. Vermillion Forks M. & D. Co., owners.

KENNEDY MOUNTAIN.

Kennedy mountain camp lies directly west of Copper mountain, being separated from the latter by the Similkameen river, which flows between the two. Access to this camp is by trail to Ashnola, thence by waggon road to Princeton.

Red Buck, *Red Buck Fraction* and *Bornite* claims (Crown-granted) are owned by George Allison and Chas. Reveley. Two strong leads occur on this group. Development consists of a tunnel 30 feet long, on the No. 1 lead, all in ore.

Other work consists of open cuts and stripping, showing the No. 2 lead to be at least 10 feet in width, and continues almost across the *Red Buck* claim.

The No. 1 lead extends from the *Red Buck* into the *Bornite* claim, surface mineralisation being extensive throughout the three claims. A good trail, three miles in length, gives access to the waggon road at Ashnola, and any railway building up the Similkameen above Princeton must cross this property.

The *Mogul* (Crown-granted), owned by Willarson and Johnson, lying north of and adjoining the *Red Buck*, has the same strong lead running through it that occurs on the *Red Buck*. Similar outcrops of solid ore also occur. The lead on this property has been opened by numerous open cuts exposing the ore. Further development will undoubtedly be by means of tunnelling, the hill side being steep and offering exceptional facilities for this method of development.

FORT GRAHAME, H. B. CO. POST ON FINLAY RIVER.

The *La Reine*, *Tempest Fraction* and *Princeton*, located to the south of the *Mogul*, on Kennedy mountain, are Crown-granted claims belonging to the Vermillion Forks M. & D. Co. Development work consists of open cuts, shafts and tunnels. A fine body of ore was opened on the *Princeton* by the above work, and extends through the *La Reine*.

Farther south, along Kennedy mountain, properties owned by W. S. Wilson, McRae Bros., Kennedy and Hugh Campbell, are all reported as showing up most satisfactorily, but accurate data regarding them is not available.

At Friday creek, which enters the Similkameen at the south end of Kennedy mountain, the *Gladstone*, owned by Messrs. Wheeler and Spath, has been developed by drift tunnels, and quantities of exceptionally high grade bornite and copper pyrital ore opened up.

At Roche river, still farther south, and up the Similkameen river, Bonnivil and Powells have opened by a drift tunnel an excellent showing of copper-gold ore. Wm. Fearless has also opened up his claims at Roche river with satisfactory results.

Holmes Mountain Camp.

The *Shamrock* group is situated on Holmes mountain, five miles below Princeton, on the left bank of the Similkameen river, and consists of nine claims owned and operated by Uhler, Cox and Gillespie. Access to this property is by a good trail connecting with the Princeton-Hedley waggon road. The V., V. & E. railway line, now under construction, passes within two miles of this group, access being especially easy from the claims to the railway track. The group consists of the *Blue Ridge*, *Gladstone*, *Belemnite*, *Productus*, *Shamrock*, *Roseberry*, *Monte Carlo*, *Bornite* and *Right of Way* claims. The combined property is developed by a series of tunnels, the conformation lending itself to this method of operation to a remarkable degree.

On the *Blue Ridge* claim a tunnel, 71 feet in length, has disclosed a fine body of copper pyrital ore in a lime gangue.

On the *Gladstone* claim a tunnel, 24 feet long, has opened another splendid body of ore similar to that on the *Blue Ridge* claim.

On the *Belemnite* a tunnel, 14 feet in length, has opened a body of pyrital ore, the extent of which has not as yet been fully determined, but enough is already shown up to establish the high value of the ore.

On the *Productus* a tunnel, 28 feet in length, has disclosed an extensive and valuable body of ore. On the *Shamrock* a shaft, 10 feet deep, is in ore consisting of carbonates and copper pyrites, the lead occurring between lime and porphyry, the gangue being garnetite.

The *Bornite* is developed by two open cuts, 12 and 14 feet in length, respectively. The ore at this point consists of sulphides intermixed with carbonates.

Development on the *Roseberry* claim consists of two open cuts, one 10 feet and the other 12 feet in length. The ore occurs on this claim in a dyke, impregnated with arsenical pyrites, the ore values being in copper, gold and silver.

On the *Monte Carlo* claim a large body of copper ore in a lime gangue has been opened by surface cuts. This ore-body has been recently opened and values have not, therefore, been determined, but they evidently correspond with those found elsewhere throughout the combined property.

On the *Right of Way* claim development has shown up a valuable body of ore four feet in width, in a quartz gangue, the country rock at this point being granite. This vein shows up strongly and is exceptionally well defined.

Ore values throughout this group, ascertained by carefully sampling the various openings, have run from 3½ % to 16 % copper, $1.40 to $4 gold, and 1 oz. to 30 ozs. silver. The combined property is favourably situated as regards facilities for development, operation and transportation, and its operation will eventually add extensively to the tonnage output of the Princeton district, when the V., V. & E. railway is completed.

The *Stevenson* group, consisting of four claims, is located on the mountain slope of D'Arcy mountain, close to the V., V. & E. railway line and directly opposite the *Shamrock* group on Holmes mountain. A lead about 10 feet in width, with well-defined walls of porphyry and diorite, cuts through this property in a north-south direction. Development is by means of a drift tunnel, run in on the lead from a point sufficiently above the V., V. & E. railway track to admit of ore bins being constructed between the railway track and the tunnel floor. Robert Stevenson, the well-known pioneer, owns the property.

The *Rob Roy* and *Riverside* claims are owned by Mrs. Allison and J. Norman, and are situated on the northern slope of D'Arcy mountain close to the V., V. & E. railway line, and adjoining *Stevenson's* group on the east. Development on both these properties is by means of drift tunnels.

The *Great Northern*, located on the northern slope of D'Arcy mountain on the line of the V., V. & E. railway, is owned by Messrs. Wright and French. Development consists of open cuts and discloses a well defined lead in a porphyry dyke. Shipping facilities, owing to the railway crossing the property, cannot be excelled. The property will be developed by means of a drift tunnel.

The *Freddie B* and *Rustler* claims (Crown-granted), owned by L. Gibson, are situated on Five-Mile creek, to the east of Holmes mountain and the *Shamrock* group and about 3½ miles directly up Five-Mile creek from its junction with the Similkameen river, near the V., V. & E. railway line. Development work consists of 233 feet of tunnelling and a series of open cuts. The ore disclosed consists of carbonates, changing to pyrites at depth ; values are in gold and copper, with a little silver. The property is easily accessible from the V., V. & E. railway line *via* the valley of Five-Mile creek.

One-Mile Creek Properties.

The *United Empire* group is owned by The United Empire Co., Limited, Non-Personal Liability, and is situated on One-Mile creek, two and a half miles north-east of Princeton. The property consists of nine mineral claims, a wide extent of coal lands and 692 acres of adjoining land, which comprises the company's power and smelter sites. Development consists of three tunnels, two shafts and a series of open cuts, extending for almost a mile along the cropping of the large copper-gold bearing lead, which strikes across the property in a west-east direction. About 500 feet of underground work has been completed, disclosing extensive bodies of ore and coal.

The ore-body on this group occurs along a contact between a lime-diorite on the south, and an altered, igneous rock on the north. The lead, so far as determined, is from 100 to 150 feet in width, and shows up for about one mile within the limits of the property.

The ore comes through to the grass roots and consists chiefly of carbonates, changing to copper pyrites as depth is attained. The gangue is highly silicious. Values are principally copper, but gold and silver, running from one to two dollars per ton, generally accompany the copper. Lime dykes occur throughout the property, rendering lime for fluxing purposes abundant. Towards the western boundary of the mineral claims the coal formation peculiar to the Princeton basin comes in, cutting out at this point the lime-diorite and igneous rocks,

and along with them the ore-body. There is evidence of an ore deposit along the contact of the coal measures and above formations, but up to the present this contact has not been explored.

The surface conformation at this property admits of both the coal and ore being opened by a single working tunnel, which is now being driven. This tunnel first enters the coal formation, which it cross-cuts in an easterly direction. When driven 500 to 700 feet it will have passed through the coal measures, and will then be continued as a drift tunnel along the ore-body, to the eastern limits of the property, where it will have attained a vertical depth of 900 feet.

The company intends developing its coal measures first and commencing shipments as soon as the V., V. & E. Railway completes its line into Princeton. It is expected that later on a reverberatory furnace will be erected at the property, for the purpose of smelting the ore, the company using its own coal for fuel. Should this method of reduction prove as successful as anticipated, the cost of smelting at this property will be cut to a low figure.

Three miles farther up One-Mile creek valley, extensive croppings have been discovered by J. Pollock. These new properties will be further opened up in the spring by the owner. The ore is copper pyrites and bornite in a lime-quartz gangue, the formation being diorite.

Eight miles above the *Pollock* discovery, Burns & Merkle are developing a group of properties that yield copper pyrital ore. Near the latter locations L. McMullen, of Princeton, has recently discovered and is now developing a group of claims, surface samples running high in copper, gold and silver.

The *O'Neil-Aldous* group is situated on the mountain above the creek and north-east of the McMullen and Burns-Merkle properties. Considerable development work has been done on this group, showing up extensive ore-bodies. The gangue is silicious, values being in copper, gold and silver. The deepest shaft on the group is down 50 feet, and the ore-body is stated to be 9 feet in width at the bottom of the shaft, where it has been cross-cut.

The One-Mile creek valley has been heretofore overlooked by prospectors, but there is reason to expect that it will receive at least its proportion of attention from this time forward.

Wolf Creek.

The only property of importance opened along the lower reaches of Wolf creek is that owned by W. A. Davis. Open cuts, side-hill stripping and tunnels have disclosed an exceptionally strong lead, assaying in gold, copper and silver. The property is located on the north slope of Vermillion mountain, and can be operated to great depth by means of drift tunnels. The V., V. & E. railway, branch line, is located along the base of the mountain about 1,200 feet from the point where the ore is opened out on these claims.

Tulameen River and Tributaries.

The Tumaleen river placers, between Princeton and Granite creek, have only been worked where the bedrock was shallow. Chinamen who followed the early day white miners made a rich harvest out of the river. In the early workings of the river, Granite creek was overlooked, and was not discovered until July, 1886. Granite creek was worked for gold, platinum being of little or no value in the early days of the creek, the fine platinum being thrown back into the creek along with the black sand.

R. A. Lambert & Co., of Vancouver, B. C., are working some four miles up Granite creek, on ground that was considered too heavy and expensive for the early placer miners to open up. It is expected that this company will secure rich returns when they reach the bedrock. Many gold-bearing quartz veins cross the creek, some of them showing free gold.

About four miles above the town of Granite Creek, on the first north fork, extensive coal beds occur. These coal measures have been prospected by means of tunnels, one of which penetrates the largest coal bed for 600 feet. Extensive surface cuts show coal of fine quality, good for steam or coking purposes. When transportation facilities reach this rich mineral country this coal will be of great commercial value.

The next creek entering the river above Granite is Collins gulch, which produced some gold in the early placer days, but is now noted as showing the extension of the North Fork coal measures, which outcrop extensively in this gulch.

Tulameen City (Otter Flats) is six miles above Granite creek and situated on Otter creek, near its confluence with the Tulameen river.

About three miles west of Tulameen City is Rabbitt mountain, where many mineral claims are located. This is a gold-copper camp. Considerable development work has been done, and has shown up bodies of copper-gold ore.

Bear creek is situated west of this camp, most of the claims being located on the mountain range west of the creek. The ores are mostly pyrrhotite, the gangue being principally calcite. The main lode runs north and south and is thought to be the northern continuation of the big iron dyke heretofore referred to. A Vancouver company is doing considerable development work on their claims, the *St. George* and the *St. Lawrence*. The *Liverpool*, on the south and near the apex of the mountain, shows a very strong ledge which assays well in copper and gold. To the north of the *St. George* group, is the *Frisco*, *London*, *Over* and *Proffit*, all on the same lead.

On the mountain at the head of Bear creek the *Independence* group is situated, in which the Granby Company, of Phœnix, B. C., is interested. This group was prospected by the above company for two years, while under bond from the original owners, and has been proven to possess extensive ore-bodies of good grade. To the north of the *Independence* lies the *Socialist* group, comprising eighteen claims and supposed to be located upon the same lead as the *Independence*.

Eagle creek enters the Tulameen about four miles west of Bear creek. Immediately west of the junction of this creek with the Tulameen river, the *Britton* group of claims is located. Considerable development work has been done upon this property, showing up extensive deposits of copper-gold ore.

The *Lee* claims, near the *Britton* group, are also turning out satisfactorily.

Near the mouth of Eagle creek the great iron dyke crosses the river, being here split into three branches, each branch, however, being extensive. The west branch contains copper, gold, platinum, augite, hornblende, etc. Over the mountains to the south, many valuable claims are located on the divide between Champion and Slate creeks, notably the *Platinum* and *Reilly-Barnes* groups, many openings on these properties giving substantial returns in gold, silver and copper.

It is worthy of note that neither placer gold nor platinum has been found along the Tulameen river above Champion creek, but below the junction of that creek with the river both metals have been obtained. The Chinese still work portions of the river bed each year. Vancouver parties have located considerable placer ground along the Tulameen river, below Champion creek, which may be either hydrauliced or dredged.

Kelly creek is eight miles west of Eagle creek and contains copper-gold ores, also galena, the properties owned by James Kelly, Robert Stevenson and D. Ross producing high-grade ore.

The next point of importance west of Kelly creek is Summit City. This is a galena camp where many silver-lead properties are located. Owing, however, to the lack of transportation facilities, the camp has been kept in the background for years. Last summer a new lead was

struck, which was traced through several claims. A waggon road, or even a good trail, carried through from Tulameen City to Hope, will render the camp immediately productive, the ore being high-grade and consequently capable of standing heavy transportation charges.

Boulder creek, to the north of Tulameen City, is an affluent of Otter creek, and in early days produced considerable placer gold. The mountains to the west of the creek are highly mineralised. The Rabbitt mountain lead passes through this camp. The formation is schist and porphyry, the values being principally gold and copper. The principal groups of claims in this camp are the *Cousin Jack*, *Socialist* and *Klockman*. The *Cousin Jack* is owned by Indiana parties, who have done considerable development.

Elliott creek lies to the north of Boulder creek, the camp containing many promising properties, the principal of which is the *Boston* group and the *Osceola*. The formation, like that of Boulder creek, is a continuation in schist and porphyry. The values are in gold, silver and copper.

NICOLA MINING DIVISION.

REPORT OF GEORGE MURRAY, MINING RECORDER.

I have the honour to submit the annual report on mining operations in the Nicola Mining Division for the year 1908:—

The past year has marked but little progress in the metalliferous mining industry. In the main it has been an endeavour to hold on, by assessment work, to prospects on which there has been expenditure for several years.

Miners have not lost confidence in their claims, but they have not the means to push development. Work already done strengthens the conviction that Nicola will yet have successful mining camps.

Coal Mining.

Coal mining operations have a most hopeful aspect. The Middlesboro' Colliery will, at an early date, become an extensive shipper. Through the kindness of Mr. Faulds, the mine manager, the following information was obtained:—Five seams of coal have been exploited, from which shipments can now be made. The smallest seam is 6 feet thick and the largest 18½ feet thick. Three smaller seams, which promise to have commercial value when developed, are also in evidence. The coal measures are very favourably situated and conveniently accessible for development and shipment. To state that the company will at an early date attain a producing capacity of 500 tons daily, speaks well for the energy displayed, careful and efficient management and the facility with which coal can be extracted. The company is fortunate in having a good coking coal, as well as seams that give satisfaction for steam and household purposes.

The Diamond Vale Coal & Iron Company is shipping on a small scale. This company's coal is at a depth. The seam which is now wrought has been worked from the surface. The coal is of good quality, but depth must be gained in order to reach their larger seams. Unforeseen initial expenses have retarded the progress of this company; its exploitations with the diamond drill will no doubt enable them to carry on the development work to the best advantage. Exploratory work already accomplished assures a large coal area.

During the last two years the B. C. Amalgamated Coal Co. has conducted extensive drilling operations, resulting in the disclosure of a 15-foot seam of coal near the town of Nicola.

The South Nicola Coal Company has over 3,000 acres, about two miles south of the town of Nicola, on which, by means of a shaft, a 9-foot seam of coal has been exposed.

South of the Middlesboro' Colliery, Mr. Joseph Graham has been most successful in disclosing a large seam of coal.

OFFICE STATISTICS—NICOLA MINING DIVISION.

Claims recorded	63
Certificates of work issued	87
Free miner's certificates issued	119
Bills of sale recorded	29

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 31st December, 1908.

The operations of the Virginia Dredging Co., holding leases on the Fraser river extending from Union bar to the entrance of the canyon, came to a lamentable end through the complete wreck of the dredge on the night of the 7th November, 1908. It is believed that the head wire cable had in course of time become weakened through chafing on a submerged rock. At any rate the dredge disappeared on that night and was found above American bar, miles distant, next day. It was upside down and most of the machinery was gone. This dredge had been imported from New Zealand for these leases, and was said by competent judges to be efficient and adapted to the object in view. The amount of gold saved prior to the wreck, during the short season of the company, was returned at $4,000.

The owners of channel leases, extending from Union bar to Ruby creek, are investigating conditions, and may decide to put in an electrical dredge on the above bar.

There has been practically no other river mining, although a hydraulic lease has been issued to Messrs. Stout & Co. at the mouth of Siwash creek, and another new one to Messrs. Gwyn and McClarty at Boothroyd's flat, opposite Salmon river, and on the south side of the Fraser. Placer hand-mining, even on the part of the Chinese, may be said to be extinct.

The ten-stamp and five-stamp mills on Siwash creek have been idle during the past season. The Mount Baker Co. has Crown-granted nine of its quartz claims there.

On Salmon river, Messrs. Allen & Co. continue to develop their mineral claims, and some work was done on the Skagit river, where there are now ten locations on silver-lead showings, as also on the similar ores of Summit City.

Messrs. Teague & Williams have claims on Ladner creek, and further development is contemplated on the gold-bearing mispickel near Hope.

At Jones creek, some claims bearing asbestic are being investigated, and may possibly be utilised for the production of plaster, etc.

On the whole, considering the large areas of virgin ground which, owing to the Alpine topography, remain unprospected, it is somewhat remarkable that there are so very few prospectors in the district north and south of the Fraser and C. P. R.

Such prospecting as has been carried on in the past has confirmed the occurrence of various valuable ores throughout the Yale Mining Division.

OFFICE STATISTICS—YALE MINING DIVISION.

Free miner's certificates issued	41
" " (company's)	4
Mineral and placer claims recorded	31
Placer leases issued	1
Certificates of work	24
Conveyances	11
Agreements	2
Powers of attorney	14
Cash paid in lieu of assessment work	1
Affidavits, permits and notices filed	30
Crown grants issued	8

Revenue.

Free miner's certificates	$ 333 75
Mining receipts	1,361 75
Miscellaneous receipts	789 00
Total	$2,484 50

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 1908.

The mining situation at Ashcroft remains practically unchanged since my last report. Very little actual mining has been done, and the office receipts are almost the same as the previous year. The owners of the various properties still continue to think well of the outlook, and do the necessary assessment work to hold their claims.

OFFICE STATISTICS—ASHCROFT MINING DIVISION.

Free miner's certificates issued	84
Certificates of work recorded	48
Locations recorded	53
Conveyances	21

OSOYOOS AND SIMILKAMEEN MINING DIVISIONS.

The following is an extract from the report of Mr. Chas. Camsell, of Geological Survey of Canada, as contained in the Summary Report of that Department for the year 1908:—

"MINING DEVELOPMENTS.

"In the Hedley camp and adjoining district, except by two or three companies, little additional development work has been undertaken or carried out during the past year. Nearly all the mineral claims in the camp have been Crown-granted and the British Columbia mining law does not compel owners of these to do more than pay the annual taxes; consequently, much promising prospecting ground is tied up, with nothing being done to demonstrate for prospective investors its potential wealth.

"*Daly Reduction Company.*

"The Daly Reduction Company had a most successful year, the weather being so favourable during the winter that the whole plant was in operation almost continuously throughout the year. The lack of water for power, and the freezing up of the flume during some of the winter months, had in former years necessitated the closing down of the mill and the suspension of most of the mining operations, but the weather was so mild during the last winter that no difficulty was experienced in keeping the flume free from ice. Moreover, under the present management the efficiency of the stamp mill and cyanide plant has been greatly increased, and the daily average tonnage of ore treated brought up to about 130 to 135 tons.

"At the mine itself, where a year ago ore was being stoped only from the *Nickel Plate* and *Sunnyside No. 2*, large ore-bodies lying between these two places have since been exposed and are being worked at *Sunnyside No. 3* and *Sunnyside No. 4*. The former of these two is worked by an incline shaft, which is down about 175 feet. The latter is at present being worked as a large glory hole, but the intention is to drive a tunnel along the strike of the ore-body and stope out from either side. Some exploration has been done by means of the diamond drill and by open-cuts on other properties of this company.

"*Adjoining Districts.*

"In the adjoining Hedley districts the most important sections in which development has been going on are, the Henry Creek claims, situated on the south side of the Similkameen river two miles above Hedley and the *Golden Zone* group, lying to the north, about 11 miles by waggon road.

"*Henry Creek District.*

"In the Henry Creek district some local excitement was caused during the last winter and spring, owing to the finding of free gold in a vein on one of the claims belonging to the Pollock Mines Company. This company owns five Crown-granted mineral claims, on which a great deal of prospecting has been done by tunnels, shafts and open-cuts.

"GEOLOGY OF THE HENRY CREEK DISTRICT.

"The country rocks of these claims are interbedded limestones, argillites, and black, volcanic tuffs, belonging probably to a higher horizon than the limestones and quartzites of Hedley. A stock of monzonite resembling the darker variety of the Hedley monzonite cuts these sediments and occasionally sends off tongues into the sediments. These sediments stand in an almost vertical attitude and strike north and south. Fissures have been developed in these in a north and south direction, and in many cases dykes of andesitic and lamprophyric character occupy these fissures. The lower workings are on a strong and well-defined fissure, which has been explored for nearly 400 feet. This fissure varies in width from a few inches up to 10 or 12 feet, and is filled with crushed and broken rock, traversed by small quartz veins which cement the broken fragments. Mispickel occurs abundantly in the main fissure, besides appearing in considerable amount in the numerous small parting planes which traverse the sedimentary rocks in the neighbourhood of the monzonite.

"The upper workings of these claims are on a well-defined quartz lead, which cuts both the sediments and the monzonite. The quartz is well mineralised with mispickel, pyrite and galena, and is said to carry good values in gold in the sedimentary rocks. In the monzonite the values are not sufficiently high to induce prospecting.

"Many claims have recently been taken up in this neighbourhood, and on some of those lying to the east of the *Pollock* mines there are indications that values in silver may be obtained.

"*Golden Zone Group.*

"Another important group of claims on which a small 5-stamp mill has recently been erected and considerable development work done, is the *Golden Zone* group lying on the head-waters of one of the branches of Twenty-Mile creek, about 11 miles from Hedley. This group consists of four claims lying at an elevation of about 5,900 feet above sea level. They were first located in 1900 by the present owners, who had been doing development work on them annually until a year ago, when a 5-stamp mill was brought in and erected on the ground. Actual milling of ore began about the beginning of August, but owing to a lack of water there were numerous interruptions, and about three weeks later the plant had to close down.

"The geological conditions on this group are as follows:—

"A belt of sedimentary rocks consisting of limestones, quartzites and some tuffs covers the northern portion of the claims running from east to west across all of them. On the two western claims these sediments are cut by a very fine-grained micaceous granite, and to the south this fine-grained variety is cut by a large batholithic mass of coarse reddish granite.

"Later in age than all the above-mentioned rocks, an intrusion of granite porphyry of dike-like proportions has been injected between the sediments and the coarse-grained granite, exhibiting well-marked contacts with each of these rocks.

"The four mineral claims have been staked on a well-defined and persistent quartz vein which can be traced by its outcrop for about 1,000 feet in an east and west direction. This vein cuts both the fine-grained granite and the sediments. In the granite it occupies a strong fissure varying in width from two to four feet, but on passing into the sediments, it appears to split up into four or five smaller veins which become lost under the drift and may possibly pinch out altogether.

"It is a true fissure vein, and, in the granite—when not much oxidised and well exposed—shows a well-marked banded structure due probably to the filling of an open space. In the sediments, and in the contact zone where oxidation goes deeper, the true nature of the vein is not so apparent. The gangue is a hard, white quartz and the ore-minerals found in it are pyrite, arsenopyrite, zinc blende and chalcopyrite. Besides the secondary minerals due to oxidation and surface alteration, a later fracturing of the vein has taken place and these fractures filled with secondary sulphides. The walls of the vein are clean and often show slickensided faces.

"The values are in gold and are said to be lower in the granite than in either the contact zone or the sediments. On panning some of the oxidised ore of the surface, a number of very fine colours of gold are obtained among the arsenopyrite concentrates in the bottom of the pan.

"The value of the property will depend to a large extent on the size and persistence of the veins where they lie in the sediments, but sufficient work has not yet been done to demonstrate either of these factors.

"*Princeton District.*

"In the Princeton district, little in the way of mining development has been going on. The coal mines have not been operated since the summer of 1907, and there is little evidence that anything will be done until the Great Northern railway reaches that point.

"On Copper mountain, like Camp Hedley, most of the mineral claims have been Crown-granted, so that no assessment work is necessary for the owners to hold them. The *Reco* mineral claim, however, has been steadily worked for a year and a half by a crew of four men; and on the other side of the river at Friday creek, the *Gladstone* claim was further prospected by the owners during the summer.

"Some claims on Five-mile creek and at Roche river were considered by the owners sufficiently promising to warrant the expenditure of a considerable amount of money in development.

"*Tulameen District.*

"In the Tulameen district, where the new sheet is being mapped, much more development work has been going on than in other sections. The Granby Company, of Phœnix, have had a gang of from eight to twelve men working continuously for the last two years in prospecting the *Independence* group of claims at the head of Bear creek. Over 1,000 feet of tunnelling and 180 feet of shaft and winze have been done, besides a large amount of surface prospecting. A large chute of good copper ore has been defined by these workings. This chute has been followed in a north and south direction for about 350 feet, and downward for a depth of 180 feet. At a level of 126 feet below the surface, cross-cuts show the ore-body at its northern end to be about 90 feet in width, and the tunnels from this end running in a southerly direction along the east and west wall, show these walls to be gradually diverging from each other, increasing the probable width of the ore-body. The eastern wall, along which the tunnel has been driven for 300 feet, is a well-defined plane of fracture which shows a selvage of clay and talc. There has been some movement along this plane, as shown by the slickensided faces. The western wall is not so well defined, the ore apparently falling away into low-grade rock.

"The ore-body, which is in a granite porphyry, appears to be cut by a darker syenitic variety that is also highly mineralised with copper ores. The whole is much fractured and cut by small calcite veinlets, which carry the ore minerals. Where the fracturing is greatest, the rock is richest in sulphides. The whole ore-body is very porous with geodes of calcite and many cavities. All the workings are very wet. Much alteration is going on even at the present time; the feldspar is being altered to kaolin; calcite is being deposited and the chalcopyrite is being changed to higher grade ores, such as bornite, chalcocite and cuprite. The water itself contains a large percentage of copper and where it flows down the shaft or over the walls of the tunnel the red oxide of copper is deposited.

"On this group operations have been suspended until a waggon road from Otter Flat can be built and mining machinery imported.

"A new discovery of Tertiary coal, of a fairly high grade, was made a couple of years ago on the north fork of Granite creek. An English company obtained a bond on a group of these claims and spent several thousand dollars in the work of driving tunnels and making cross-cuts to expose the different beds. Owing to inability to secure an extension of time on its bond from the owners, with a view to making thorough coking tests, operations were suspended last spring and nothing further has been done. The work of this company, however, was sufficient to show the great economic importance of this coal field, which though somewhat smaller in extent than the Princeton coal field, contains a coal which will be in great demand for steam purposes, as soon as a railway reaches the Tulameen. The work done also demonstrated the identity of the Collins Gulch coal, which has been known for years, with that of Granite creek. But while the outcropping edges of the basin on the Collins Gulch side have undergone a good deal of disturbance, the seams on the Granite creek edge have only been slightly tilted and lie in such a position that they can easily be mined. The area of the whole basin does not cover more than about eight square miles; but three different coal-bearing horizons have been defined, and each of these is likely to contain from one to three workable seams. This coal formation is probably of the same age as that of the Princeton basin, which has been defined as Oligocene. The two are separated from each other

by a broad belt of volcanic rock. The coal measures are seen to be resting on a flow of earlier volcanic rocks, while a younger series of volcanic rocks overlies and covers a part of them on the western part of the basin.

"The geological relations of these rocks will be worked out next summer.

"Other portions of the Tulameen district in which operations have been carried on are at Laws camp, on Bear creek, at Boulder creek, and on Champion and Eagle creeks. At Laws camp where work has been continuously in progress for the last three years on some very promising gold properties, briefly described in the Summary Report for 1906, operations were discontinued last spring on account of the difficulty of getting in supplies through the destruction of a part of the waggon road leading up to the camp.

"Placer mining of the gold and platinum-bearing gravels of the Tulameen river and Granite creek has been carried on in an intermittent manner by some white men and a few Chinese, and a small quantity of these two metals has been recovered. The most important work of this nature is that being done by Mr. Lambert, on the main branch of Granite creek, just above the North fork. The preliminary work of building a dam and a 600-foot flume has been completed, so that the actual work of sluicing the gravels should be commenced next summer, and good results ought to be obtained. Leases have also been taken up by Messrs. Law and Godfrey on the benches of the Tulameen river above Otter flat, with a view to working some of those higher benches on a more extensive scale than has hitherto been attempted.

"With the advent of a railway these and many other mining enterprises in this district promise to develop into importance."

LILLOOET DISTRICT.

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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 1908:—

MINERAL CLAIMS.

The Anderson Lake mines were bonded early in the season to the Northern Exploration Company, of Seattle, who worked twelve men for about three months, milling 1,200 tons of ore. There is a large body of free-milling ore in these mines, but the average value is low.

On the *Wayside* mineral claim, Bridge river, work has been carried on during the season with five men, and a contract is let to extend the tunnel 100 feet during the winter.

No other mineral claims were worked to any extent, but the annual assessment work has been performed on 63 claims.

PLACER MINING.

Messrs. Babb, Swanson *et al.* employed twenty-four men during the first part of the season, and nine men afterwards, on their creek leases on Alexander creek. They constructed 1½ miles of flume and ditch to bring more water into Alexander creek; built a reservoir 180 feet long, 12 feet wide, and 16 feet high, for the purpose of storing water for hydraulicing in early spring; extended sluicing flume 1,100 feet. The gold is chiefly on bedrock, which they are down to now in places. They will have about two months' more development work in the spring before commencing piping with two giants.

DREDGING.

Mr. Percy Williams, M. E., manager of the Boston Premier Gold Company, Limited, owning gold dredge and leases upon the Fraser river at Lillooet, reports that, after a year's investigation and experimentation with these Fraser river gravels, the gold contents of same have been demonstrated to be commercial and the gold easily saved with proper appliances. Operations by dredging these gravel bars in the past have proven failures, due to the fact that the small dredges used were of an obsolete type incapable of doing efficient work. It is the expectation of this company to build in the spring a new 2,500-yard dredge of the most improved design, capable of solving all the metallurgical and mechanical problems incidental to the profitable working of these gravels. Because of repeated failures in the past, occasioned by inefficiency and ignorance, it has been difficult to again interest capital in these dredging propositions, but there is no reason to doubt that the near future will witness successful dredges at work on the great gravel bars of the Fraser, extracting the gold which the more primitive methods of rocking and ground-sluicing have failed to obtain. The fact that the Fraser river and its tributaries have, during the past fifty years, produced so many millions in coarse gold, using the rocker and ground-sluice, is significant and explains in a measure why attempts are still being made by the Boston Premier Gold Co., Ltd., by means of improved mechanical excavators, to profitably win the gold still left in the gravels, especially at

a depth. The company expects to work its properties next spring. Under normal weather conditions, dredging can be carried on during the entire year, but this winter operations were suspended temporarily, as the weather was abnormally cold.

No other mining leases have been worked.

OFFICE STATISTICS—LILLOOET MINING DIVISION.

Mineral claims recorded	23
Placer claims recorded	6
Placer claims re-recorded	2
Certificates of work recorded	63
Money in lieu of work	2
Conveyances recorded	49
Mining leases in force	20
Dredging leases in force	6
Free miner's certificates issued	76

CLINTON MINING DIVISION.

REPORT OF F. SOUES, GOLD COMMISSIONER.

My report on the mining industry in the Clinton Division of Lillooet District for the year 1908 may be disposed of in a few words. It has come almost to a full stop. A few Indians and still fewer Chinese follow extreme low water in the Fraser river in the spring for a brief period. The amount of gold obtained by them I have no means of ascertaining, either the total or how disposed of.

The revenue received from the mining industry in all its branches, alluvial, quartz and dredging, shows at a glance the almost entire falling off in this Division.

OFFICE STATISTICS—CLINTON MINING DIVISION.

Mineral claims recorded	5
Certificates of work	7
Mining leases in force	8
Dredging	12
Conveyances recorded	1
Free miners' certificates	$192 50
Mining receipts, general	388 10

VANCOUVER ISLAND AND COAST.

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ALBERNI DISTRICT.

ALBERNI MINING DIVISION.

H. C. RAYSON, ACTING GOLD COMMISSIONER.

SIR,—I have the honour to submit my annual report of mining in the Alberni Mining Division during the year ending December 31st, 1908.

Although I cannot report any actual shipments of ore from this Division, the mining outlook is hopeful and greater activity is being shown by claim-holders as to assessment and development work.

On the *Jingo Bird* group, situated on the north side of Taylor river, Sproat lake, the usual amount of development work has been done and the showings are very satisfactory.

On the *Laddie* and *Seattle* claims, Mr. Berger has followed his leads for a distance of about 150 feet and has exposed some very good copper ore.

On the *Defiance* group, Mr. Comerford has, with a tunnel 75 feet in length, shown up a lead of 20 feet carrying copper ore associated with iron.

On the *W. J.* group, Mr. Wilson has done a great deal of work and has exposed a very good ledge, carrying copper ore of good grade.

On the *Raven* group, Messrs. Ward and Rochester have done their annual assessment work, following a 6-inch lead of good copper ore.

On the *Saucy Lass* and *Thunderbolt* groups, situated near Snug basin, in Uchucklesat harbour, T. H. Knights-Bayne has done a great deal of work and has exposures of ironstone cappings with frequent showings of copper.

On the *Merry Maid* group, situated at Henderson lake, Messrs. Whitwell and Wilkinson have done the usual assessment work with satisfactory results. These claims are now under bond to a Coast syndicate.

At Sechart, though little actual work was done, there was considerable activity in locating claims, and no doubt 1909 will see further developments.

On the *Silver Star*, situated on the Taylor river, about three miles from the head of Sproat lake, Mr. Lindsay reports that he now has a tunnel in about 140 feet which taps the lead about 96 feet below the surface, where he has a well-defined vein about 6 feet in width, carrying iron and zinc blende with a small proportion of galena, which will concentrate at about 6 into 1.

The *Ivanhoe* group, situated about a quarter of a mile from deep water in Snug basin, at an elevation of about 300 feet, has a main tunnel in about 230 feet to a limestone contact. At about 80 feet from the mouth a cross-cut was made, opening up about 3 feet of low-grade ore and various small stringers of copper and iron sulphides. This tunnel gives a clear 100 feet of backs.

Another tunnel, farther up the mountain, is in 100 feet, giving 30 feet of backs, being in limestone all the way, and cutting a bunch of copper and iron sulphides, but is not far enough in to cross-cut the ore-body. There shows on the surface about 3 feet of iron and copper

sulphides with 4 inches of talc on the wall. About 300 feet from here is an outcrop, showing chalcopyrite, bornite and grey copper. A shaft of 20 feet carries a stringer of bornite all the way down with 3 feet of epidote, carrying dabs of copper; again some 300 feet farther there is a showing of chalcopyrite, traceable for about 25 feet.

The *Defiance* group, owned by J. Moine, is situated on the west side of Alberni canal, about 7½ miles back from the water, at an elevation of about 850 feet. The main outcrop is magnetic iron, and it has been stripped for about 300 feet, varying in width from 5 to 15 feet. In one place the iron shows from the surface down to an old creek bed to a depth of about 15 feet where a tunnel has been driven in for about 30 feet, exposing ore all the way.

About 100 feet from the above-mentioned, another tunnel was driven from 50 to 60 feet through limestone, but work was stopped just when they were getting into the ore, copper and iron showing right across the face of the drift at the floor, but not at the roof. About 20 feet in they went through a bunch of magnetite with copper sulphide impregnated through it. This property has about 200 tons of iron ore in sight and is a promising prospect.

Other properties in this Division which have done just assessment work are as follows:—

Forfarshire Mining Co., Henderson lake. *Sunshine* group, south slope of Uchucklesat harbour. *Monitor*, Alberni canal. *Belvidere*, Snug basin. *Happy John* (Crown-granted), Alberni canal. There are also about thirty other claims, some of which have very fine showings of copper and iron.

The iron mines at Sarita, I regret to say, were not further developed during this season.

At Wreck bay, there was some activity and 10 placer leases were granted during the year. I understand that the holders of these leases intend to put in an hydraulic plant.

Near Bamfield creek there were several applications to prospect for coal.

OFFICE STATISTICS—ALBERNI MINING DIVISION.

Free miner's certificates issued	43
Mineral claims recorded	27
Certificates of work recorded	28
Transfers recorded	1
Certificates of improvements issued	6
Placer leases issued	10
Powers of attorney issued	1
" " rescinded	1
Option on mineral claims	1
Crown-granted mineral claims on roll	151

Revenue.

Free miner's certificates	$ 190 50
Mining receipts general	1,016 00
Acreage tax on Crown-granted mineral claims	1,398 50
Total	$2,605 00

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, 1908.

During the year there has been very little activity in mining in this Division; with the exception of the *Indian Chief* group of mineral claims at Sidney Inlet, no more work has been done on claims than was absolutely necessary to hold them, and very few new locations were

made. The *Indian Chief* group, now operated by the Tyee Copper Co., Ltd., has been working all the year, employing from 25 to 30 men, and has made several shipments of ore to the Ladysmith smelter, amounting to about 3,300 tons, and averaging from 3 to 4% copper, with about 3 oz. of silver and a little gold.

In October there were six placer mining claims located and recorded on Zeballos river, Nootka sound, but up to date nothing has been heard as to how they panned out.

At Nootka sound, the Nootka Marble Quarries, Ltd., has done a great deal of development work, spending in the neighbourhood of $120,000, and has proved a large body of very valuable marble which is now being prepared for the market, orders for a considerable amount having already been booked. This company intends to put in still more modern machinery so as to enable it to supply an increasing demand.

NOOTKA MARBLE QUARRIES.

NOTE BY PROVINCIAL MINERALOGIST.—The establishment at Nootka sound of a marble quarry is a matter of considerable interest to the district, since the establishment of one permanent industry, "breaks the trail," so to speak, rendering it easier for others to follow, and which is usually found to occur. While marble has been found in various localities on the Coast, it has been, in its surface exposures, too much shattered by flaw cracks to be of any commercial value. This might be said also of the surface showings at Nootka, and it required some capital and enterprise to quarry to a sufficient depth to prove that solid and commercial marble underlay the weather-affected surface showings. This the Nootka Marble Co. provided, having been for the past two years opening up a quarry on the beach on Nootka sound, and with results which seem to justify the company's faith in its property and the expenditures made. The quarry, although still in the initial stages of development in which the economics of production can not as yet be put into practice, has demonstrated that there is a deposit of solid marble of good and commercial quality which can be quarried in blocks of a size limited only by the appliances provided for the handling of them. These appliances include suitable derricks, power drills, channelling machines, etc., which will be added to as required.

Nootka Marble Company.

The quarry as opened now is producing a blue-gray marble with white and whitish markings, free from flaws and very suitable for monumental work or for being sawed up for purposes of interior decorations or utilities. The marble so far produced has been of the colour mentioned, but the management states that at one end of the present opening the deposit shades off into a marble of a much lighter colour, the quality remaining equally good, and that, as soon as convenient, the quarrying operations will be extended in that direction, thus providing from the same general opening marbles of a variety of shading.

The company, besides opening out its quarry, has built a suitable and efficient dock at which the coasting steamers can land, and has erected a marble dressing plant consisting of 2 marble cutting gang saws, a marble lathe, polisher, etc., all suitably housed and provided with the required steam power, while the necessary accommodations for the men employed have also been erected. The plant only came into operation about the first of December, 1908, so that by the end of the year the actual product was but of nominal value and consisted more particularly of samples showing what the product would be. These samples, however, have served their purpose and the company is in receipt of sufficient orders for the product at good prices to necessitate the immediate doubling of the dressing plant, and this is now being done.

An accompanying photograph shows the location of the plant, the dock and marble dressing shed, and indicates the quarry opening, which latter, however, is not as yet sufficiently opened to lend itself well to photography.

SKETCH MAP
TO ACCOMPANY
REPORT OF PROVINCIAL MINERALOGIST
ON
INGENIKA RIVER & McCONNELL CREEK
SCALE
Miles
20 15 10 5 0 20 40 60
LEGEND
MINING RECORDING OFFICES
DEPUTY " "
CAMPS OF PROV. MINERALOGIST
BOUNDARIES OF MINING DIV'NS
TRAILS
Tuya Lake
Dease River
Thibert C.
Dease Lake
Shesley River
Tuya River
Tanzilla River
To Liard R.
Turnagain River
Kachika River
Sifton Pass
Stikine River
Telegraph Creek
Clearwater
First South Fork
Yukon Telegraph Trail
Klappan River
Fox River
Ruby Cr.
Porcupine Cr.
Quadacha
Fishing Lakes
Delta Cr.
Bower Cr.
Deserters Canyon
Falls
Thutade Lake
McConnell Creek
North Fork
Pelly Creek
Finlay River
Ingenika River
Fort Grahame
Laurier Pass
Police Trail
Otter Tail Cr.
Halfway River
Iskut River
International Boundary
Skeena River
Sustut Lake
Police Trail
Osilinca River
Oshika River
Finlay Rapids
Hudson Hope
Peace River
Stewart
Fort Connelly
Bear Lake
Omineca River
Driftwood River
Germansen Lake
Manson River
Parsnip River
Pine River
Pine Pass
Portland Canal
Observatory Inlet
Nass River
Babine River
Hazelton
Suskwa R.
Bulkley River
North Tacla Lake
Nation River
Nation Lakes
Middle R.
Pack R.
McLeod Lake
Parsnip River
Port Simpson
Dundas Is.
Kitsilas
Aldermere
Babine Lake
Trembleur L.
Tachie
Telkwa R.
Portage
Stuart Lake
Fort St. James
Zymoetz R.
Prince Rupert
G.T.P. Railway
Skeena River
Morice River
Stuart R.
Salmon River
Giscome Portage
Fraser R.
Essington
Kitimat
Kitimat Arm
Porcher Island
Fraser Lake
Nechako River
Francais Lake
Pitt Island
Banks Is.
Kemano R.
Gardner Canal
Ootsa Lake
Cheslatta Lake
Chilako River
Ft. George
Fraser R.

In addition to the work actually accomplished by the Nootka Marble Company, and perhaps inspired by its success, another company has been prospecting certain other marble deposits in the vicinity by means of a power drilling plant, and reports that the cores obtained indicate a large, solid deposit of a somewhat lighter colour, and the probability is that this quarry will also be opened up in the near future.

OFFICE STATISTICS—CLAYOQUOT MINING DIVISION.

Free miner's certificates issued	28
Mineral claims recorded	7
" " (placer)	6
Certificates of work recorded	47
Bills of sale, etc., "	12
Certificates of improvements recorded	7

Revenue.

Free miner's certificates	$ 121 25
Mining receipts	1,340 75
Total	$1,462 00

QUATSINO MINING DIVISION.

REPORT OF O. A. SHERBERG, MINING RECORDER.

I have the honour to submit my annual report of the mining operations in the Quatsino Mining Division for the year ending December 31st, 1908:—

Very little development work has been done during the year on mining properties in this Division, owners of mineral claims having contented themselves with the annual assessment.

A group of claims, the *Golden West*, *Eldorado* and *Stafford*, situated between Klaskino inlet and Lawn point, owned by the Klaskino Gold Mines, Ltd., has been worked on a small scale during the summer, with fair prospects.

A few claims have been staked in the vicinity of Lawn point and Reef point this year, the assays made from some of them giving high values in gold, but no work has been done on any of them.

The Quatsino Coal Syndicate, under the management of Thos. P. Pearson, has been working on its property on the West Arm during the summer and until the latter part of October, when work was closed down for the winter. Mr. Pearson expressed himself as satisfied with the results of the work so far done, and he expects to be back again to start work in the early spring.

OFFICE STATISTICS—QUATSINO MINING DIVISION.

Free miner's certificates	30
Mineral claims recorded	66
Certificates of work recorded	48
Bills of sale, etc., recorded	9

Revenue.

Free miner's certificates	122 00
Mining receipts	563 05
Total	$685 05

NANAIMO DISTRICT.

:o:

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 December, 1908.

Not as much development work has been done during the past year as in former years, and the mining properties that were heretofore shipping ore have shipped very little last year, on account of the low price of copper, and any properties having low-grade ores shut down entirely; and as a great deal of the development work has been done by Americans and American capital, the financial stringency in the United States has shut out the money for exploiting the Coast mines during the past year.

There were 628 mineral claims in good standing on the 31st of December, 1908.

The Tyee Smelter, at Ladysmith, was only in blast 72⅓ days, and only smelted 16,535 tons of ore during the past year, valued, approximately, at $184,500, which is only about one-fourth of the amount treated in the year 1907, but the prospects are that the smelter will run to its full capacity during the year 1909.

TEXADA ISLAND.

The Marble Bay group of claims belonging to the Tacoma Steel Co., under the management of A. Grant, mined and shipped 6,396 tons of ore for the year 1908. The development work done on the property for 1908 consists in sinking the shaft 75 feet deeper and 450 feet of drifting. The total depth of the shaft is now 935 feet below the surface and 882 feet below sea level. The lowest workings are in high grade bornite ore. No new plant was installed during the year 1908. The average number of men employed during the year was about 50.

On the *Cornell* mine but very little work was done during the past year.

The *Commodore* group of mines has only done development work during the past year, which consisted of 75 feet of sinking and about the same amount of drifting, with considerable surface prospecting, which disclosed ore in several known veins and two new veins of as yet unknown value. Some 10 or 12 men were engaged, but work ceased on June 6th, owing to the financial situation on the American side.

The Puget Sound Iron Co. has been doing some development work, having driven 320 feet of tunnel and sunk a winze 18 feet, and the bunkers are full of ore, though none has yet been shipped.

The *Loyal* group of mines has done but very little development work during 1908.

The Northern Texada mines, under the management of G. L. Tanzier, have shipped about 1,000 tons of ore, part of which was smelted at Tacoma and part at Ladysmith, but in future the shipments will be made to Ladysmith. A large body of ore has been opened up at the 360-foot level, and still another at the 160-foot level. The ore is a high-grade bornite and runs on an average $10.50 in gold per ton. The ore-body at the 360-foot level is 35 to 50 feet in width, and from all indications the size of the ore-body on the 160-foot level will be the same. They have built a new engine house 30x60 feet, built additional ore shutes, blacksmith shops, etc., and have installed a new Franklin duplex compound air compressor, 340 feet of

air per minute, and a new locomotive type boiler 45 H.P. The ore buckets have been discarded and a new steel cage put in the shaft, with a new $\frac{7}{8}$ inch steel wire cable 700 feet long, and modern improvements have been put in at the various stations. They are working 40 men and run two shifts, and have been making weekly shipments of 200 tons of ore, which they propose to increase to 400 tons weekly within the next three months, and at the same time keep the development work far ahead of operations. They calculate that there is about two years' ore in sight.

The *Malaspina* mines, under the management of Alfred Raper, sank a shaft 75 feet deep and ran about 50 feet of drift in 1908, on the *Cornet* mineral claim, and will shortly instal a steam hoisting plant, and a system of conveyance to tidewater will be installed with the necessary wharf and facilities for shipping the ore. From all appearance, this company will be shipping ore of good values in 1909.

Not much development work has been done on the numerous other claims on Texada Island during the past year, only enough work having been done to keep them in good standing.

Valdes Island.

Owing to the low price of copper and the financial stringency on the American side, very little has been done on this island during the past year, other than to keep the claims in good standing, as a great deal of the work in the past has been done by American capital.

Dunsmuir and Oyster Districts.

Very little work has been done in developing mines in these two districts, other than to keep the claims in good standing; but if there was a road built out to the *Jubilee* mines, so that the owners could get their supplies out, there is no doubt that the *Jubilee* would come to the front as a shipper of good paying ore.

There is another portion of the Nanaimo Mining Division that would come into notice if there was a trail built to get into the country, viz., the Tatlayoco Lake section, which has shown up very favourably in gold, silver, copper, iron and antimony, during the past year. A trail from the head of Bute inlet for about 60 miles would let prospectors into this section, and would no doubt open up a fine mineral section, besides a fine farming country.

Office Statistics for 1908—Nanaimo Mining Division.

Free miner's certificates issued (individual)	280
" " " (companies)	8
Mineral claims recorded	215
Placer "	1
Certificates of work recorded	181
Paid in lieu of work and recorded	8
Certificates of improvements recorded	3
Crown grants applied for and issued	3
Bills of sale recorded	46
Placer leases issued	1
Placer leases in force	2

The revenue collected from the above free miner's certificates and mining receipts generally, for the year ending 31st of December, 1908, was $3,862.25, being about $500 less than the previous year.

VALDES ISLAND.

NOTES BY THE PROVINCIAL ASSAYER.

The name Valdes has for many years been applied to what was supposed to be one island, lying between Vancouver island and the mainland, opposite the mouth of Bute inlet, and separated from Vancouver island by Seymour narrows. This island was first chartered by Capt. George Vancouver in 1792, but subsequent, in fact recent, explorations and surveys have shown that instead of being only one island, it was really a group of three or four islands, separated in a most remarkable manner by narrow salt water passages, thro' which the spring tides rush with great violence. The name "Valdes Island," however, still is applied to the group, which is distant some 140 miles from Vancouver city, with which point, and also with Vancouver island ports, frequent steamboat communication is maintained. This group of islands has for many years yielded an immense quantity of beautiful fir and cedar timber, and is traversed in many directions by old logging roads.

From Open bay, on the east coast of the most southerly island of the Valdes group, a belt of limestone extends in a north-westerly direction towards Granite bar, on the north-west coast; associated with which, and at certain points penetrating it, is a dark igneous rock having in places a porphyritic structure, while on either side of the limestone the country rock is granite. Along the belt referred to a series of ore outcroppings have been found and claims located, the principal of these being the *Lucky Jim* group.

Lucky Jim Group.

This group of claims, which has been but recently staked, is most easily reached from Granite bay, a steamboat port of call. From this point a logging railroad runs south-westerly for a distance of 3½ miles to a large logging camp operated by the Hastings Saw-mill Company. About 3 miles up this railroad, and some 300 feet from the track, the *Lucky Jim* has been located, at an elevation of 300 feet above salt water. The group consists of four claims, the *Lucky Jim*, *Rising Sun*, *Saxon* and *Standard*, owned by George D. Mumford, of New York. The principal work has been done on the *Lucky Jim*, where several open cuts have been made, and a shaft sunk to a depth of 23 feet. This work has disclosed an ore-body on a limestone and diabase contact, in close proximity to the granite country rock, the gangue matter being diabase, although there are small quartz segregations or stringers that carry high values in free gold and tellurides. The mineralisation consists of chalcopyrite with a little pyrrhotite, and specks of sylvanite and free gold, while the apparently barren rock carries considerable gold values. The shaft, when visited, was down 23 feet, and for the first 12 or 14 feet was in ore, where a "horse" of limestone came in, with a little ore on either side, but in the bottom of the shaft the ore was again coming in. The general stroke of the ore-body is N. 55° W., magnetic, with the dip still undertermined. More recent reports say that this shaft has since been sunk to a depth of 100 feet, with encouraging results.

Great Granite Group.

The Granite group, consisting of five claims, the *Great Granite, Great Copper*, *Great Gold*, *Great Boulder* and *Great Silver*, is also owned by George D. Mumford. The *Great Gold* claim, on which the principal work has been done, is located 4,000 feet magnetic north of the *Lucky Jim*, and on this claim an open cut about 30 feet long and 4 or 5 feet deep has been made, disclosing an ore-body about 20 feet wide, with mineralisation and a gangue similar, in nearly all respects, to that found on the *Lucky Jim*. The ore-body has been traced both north and south of the main opening by several small open cuts, showing it to be, apparently, a parallel lead to that found on the *Lucky Jim*.

This mineralised belt on Valdes island seems to offer promise of ore in the future, and is worthy of further attention from prospectors. It is noted that more or less ore has been found where a rock allied to diabase or trap penetrates a limestone strata in proximity to the granite of the Coast Range, and these conditions are found on Valdes island.

NANAIMO RIVER.

NOTES BY THE PROVINCIAL ASSAYER.

Some ten or twelve years ago a number of mineral claims were located on the mountains at the head of the north and south forks of the Nanaimo river. The district is reached by a waggon road from Nanaimo to the east end of the largest of the Nanaimo lakes, a distance of ten miles, from which point a trail follows the left bank of the south fork of the Nanaimo river to the claims referred to, a total distance of about twenty-five miles from Nanaimo. The exposures noted on the trail were nearly all granitoid rocks and the ground was very generally covered with glacial drift, the mountains rising with a slope of 20° to 30° to heights of 3,000 or 4,000 feet above the river. For the first fifteen miles the timber is largely second growth fir, but towards the head of the river it changes to hemlock and cedar. The mineral claims are located on the range forming the height of land that is the source of rivers flowing to the east and to the west.

Delphi Group.

The *Delphi* group consists of three claims, the *Iron Crown*, *Tyro* and *Brass*, owned by Henry Shepherd *et al.*, of Nanaimo. This group is situated at the headwaters of the south fork of the Nanaimo river, at an altitude of 2,250 feet. On the *Iron Crown* claim a shaft has been sunk 30 feet in a brecciated diabase rock, slightly mineralised with pyrite, maracite, and with a little chalcopyrite showing in places; the mineral has been deposited in the crevices and partings of the brecciated mass, accompanied by small stringers of quartz.

On the *Brass* claim, adjoining the *Iron Crown*, a shaft has been sunk 80 feet on a quartz vein, about 18 inches wide; the shaft was full of water, but information was received that an ore chute of solid chalcopyrite had "come in and pinched out again." The quartz vein shows up strongly in a small creek which flows past the shaft, and here an inch or two of solid chalcopyrite was noted.

The *Tyro* claim adjoins the *Brass* and *Iron Crown* farther up the hill, and on it a tunnel has been run in for a distance of 40 feet on a brecciated quartz with a little copper showing in places.

Mountain Group.

The *Mountain* group consists of eight claims, owned by Shepherd, Manifold *et al.*, of Nanaimo, and is situated on the northern slope of Green mountain, at the head of the north fork of the Nanaimo river, 2,700 feet above sea level. The claims were reached by crossing over a divide between Mount Spencer and Green mountain, 500 feet above the *Brass* claim and about one and a half miles distant. Owing to the precipitous slope of the north side of Green mountain at this point, it is easier to go down to the creek and up again than to circle around the face of the mountain, though the main tunnel is only 425 feet above the *Brass* cabin, or practically even with the top of the divide. The principal work has been done on the *Pitson* claim, one of the group, where a tunnel has been run in 500 feet in a fissured greenstone rock. At 490 feet a mineralised zone was struck which shows the rock to be heavily impregnated with iron, solid magnetite showing in places, while in other places the iron has combined with quartz, forming jasperite; the remaining mineralisation is principally iron pyrite and mareasite. At 260 feet farther up the

mountain a tunnel has been run in 150 feet, but it had caved in near the mouth, closing it completely. Samples were taken of the best mineralised parts of the zone, but the values obtained upon assaying were very small.

Mount Buttle Group.

The group, consisting of five claims, *Jasper No. 1* and *No. 2*, *Bear No. 1* and *No. 2*, and *Skyline*, is owned by Cowey, Neeve *et al.*, of Nanaimo. This group is situated on the northern slope of Mount Buttle, opposite the *Delphi* group and distant some two or three miles. To avoid going to the river and up again, the ridge between Mount Spencer and Mount Buttle is followed around. On the *Jasper* claim a tunnel has been run in 22 feet on a well-defined quartz vein; strike, S. 45° E.; dip, 60° to the east. The quartz vein matter is sparsely mineralised with pyrite, chalcopyrite and molybdenite; the vein has a clear parting from the walls, which are a hornblende porphorite.

The *Bear No. 2* claim is situated farther up the hill, 325 feet above the *Jasper* tunnel. Here the creek has exposed a small quartz vein, with an approximate strike of 45° E. and a dip of 60° N.E., on which a shaft has been sunk 30 feet; but when visited this was full of water. As seen in the creek, the vein was white quartz, sparsely mineralised and much broken up into stringers.

NORTH-WESTERN PORTION OF TEXADA ISLAND.

By R. G. McConnell.

(From Summary Report, 1908, of Geological Survey of Canada.)

The work of the past season consisted of an examination of the geology, working mines and prospects on the north-western portion of Texada island, B. C.

This important island has been visited at various times by members of the Geological Survey, notably by Richardson, Dawson and LeRoy, but no general detailed examination has heretofore been undertaken. A reconnaissance topographical and geological map prepared by Mr. LeRoy was published by the "Survey" in 1907.

Texada Island is situated in the Strait of Georgia near the mainland, about 50 miles north of Vancouver. It has a length of 30 miles, a maximum width of 6 miles, and a total area of about 125 square miles. The south-eastern portion consists of a high, irregular ridge surmounted by occasional peaks rising to a height of nearly 3,000 feet. Going northward the general elevation decreases and the topographic outlines become more regular. The surface is rough and rocky over the greater portion of the island. Rolling boulder plains, usually of limited area, occur at a few points, mostly towards the northern portion of the island.

The streams are small and most of them have carved out canyon-shaped valleys of moderate depth. Small lakes dating from the glacial period occur at a number of points.

The island was originally well forested throughout except on the summits of the higher ridges and peaks, and notwithstanding the usual ravages by forest fires and the large quantity cut for commercial purposes, the timber resources are still considerable. The forest is open and consists mostly of Douglas fir. The trees of this species on the island usually range from 2 to 4 feet in diameter, although occasional specimens attain a diameter of 6 feet and rise to a height of over 150 feet. Besides the Douglas fir, the conifers are represented by the hemlock, spruce and two species of pine and cedar. The principal broad-leafed trees are the alder, maple and arbutus.

GEOLOGY.

The rocks represented on the island consist in order of age (1) limestones, (2) a series of basic, predominantly porphyritic rocks often passing into breccias or agglomerates, (3) small stocks and dikes of dark basic rocks the character of which has not been determined, (4) granites and grano-diorites, (5) clays, sandstones and shales of Cretaceous age. No Tertiary rocks, either sedimentary or volcanic, were identified, and the Cretaceous deposits are followed by the sands, clays and boulder clays of the glacial period.

The limestones, the most important formation economically, occur mostly in the northern portion of the island. A band usually a mile or more in width follows the south-east coast from Point Marshall southward to Sturt bay and a short distance beyond, then bends almost at right angles and extends in a south-westerly direction nearly acress the island. A second area measuring about 2 square miles in extent occurs in the vicinity of Davies bay on the west coast, and other small areas are frequently found in the vicinity of the larger masses as inclusions in the surrounding porphyrites and associated rocks.

The limestones occur characteristically in heavy beds often 6 or 8 feet in thickness. The beds undulate in easy folds, and except where broken by small faults or thrust up by dikes, *are seldom steeply tilted. They are cut everywhere by steep, often vertical, jointage planes.* These are so strong and persistent that in many places they simulate bedding.

Normally the limestone is bluish in colour and fine grained, almost compact in texture. Exposures of this character are, however, infrequent, as most of it has been altered into moderately coarse, grayish and white crystalline limestones and marbles. In the vicinity of some of the ore-bodies small areas of limestone are completely replaced by coarse white calcite.

The limestone when unaltered is remarkably pure and furnishes an excellent lime. This has led to the erection of six kilns at the northern end of the island with a capacity of somewhat over 550 barrels per day.

The porphyrites and associated rocks outcrop over the greater part of the island. All the peaks and ridges examined in the southern mountainous portion are built almost exclusively of these rocks, and they alternate with the limestones in the lower northern portion.

The porphyrites, while apparently all belonging to the same period of volcanic activity, vary greatly in character in different parts of the field. They have not been examined in thin sections and can only be briefly described here. The prevailing type is a brownish weathering, moderately coarse green rock usually considerably altered and epidotised. The feldspar phenocrysts are seldom fresh and are often replaced by calcite or calcite and epidote. The ferro-magnesian minerals are rarely conspicuous as phenocrysts. While the prevailing type is *distinctly porphyritic, greenish compact and finely granular varieties also occur.*

Along the west coast and at points in the interior the porphyrites alternate with and apparently pass into breccias or agglomerates made up of angular and sub-angular fragments of porphyrite enclosed in a porphyrite matrix. These rocks contain no foreign material and probably originated largely from the breaking up of a porphyrite crust by subsequent intrusions of the same or a similar magma.

The porphyrites are cut by small gold-bearing quartz veins, and also contain numerous magnetite lenses always carrying a small percentage of copper.

The porphyrites and limestones are cut by numerous dykes and stocks, usually of small areal extent, of dark intrusive rocks. Microscopically these appear to range from dark augite porphyrites to gabbros. They are closely associated with the copper deposits and are often bordered by ore-bodies.

Granites probably connected with the Coast Range batholith occur at a number of disconnected points on the east coast, and also at one point on the west coast some distance north of Gillies bay. They present the usual variations in composition, varying in this respect from typical biotite granites to grano-diorites and probably also to diorites.

The granites, with the exception of a few small dykes, are the latest intrusives on the island. They are succeeded by sedimentaries of Cretaceous age. These consist mainly of soft sandstones passing in places into conglomerates, and clay and shales containing a few calcareous nodules. A bright red clay occurs at the base of the formation at a couple of points. The beds are nowhere steeply tilted and in most of the exposures seen the dip does not exceed 5°.

Cretaceous rocks are exposed at several points on the west coast, the largest area occurring in the vicinity of Gillies and Lower Gillies bays. No coal seams were seen in the surface outcrops, and a bore-hole put down some years ago on Lower Gillies Bay creek proved unsuccessful in finding them at a depth.

The Cretaceous rocks are succeeded by boulder clays of glacial age, no deposition of sedimentaries or intrusion or extrusion of volcanics have taken place so far as known in the long intervening period. The glacial deposits, consisting of boulder clays occasionally underlaid by sands and clays, are distributed irregularly over most of the island up to an elevation of 1,200 feet. Above that they thin out and on the summits of the higher peaks and ridges are represented only by occasional erratics. The presence of these on the highest points shows that the whole island was totally submerged by ice. Well marked grooves and striæ indicating a general south-westerly movement of the ice occur on Surprise mountain and at other points.

MINERAL DEPOSITS.

The northern portion of Texada island, the only portion examined during the season, is widely mineralised and has been pretty completely staked as mineral claims in the various excitements which have overrun the island. Of the hundreds of claims staked many have been abandoned, a considerable number are still held in a more or less undeveloped condition, and a few have attained the status of producing mines.

Only a brief description of the mineral deposits is attempted as neither the rock nor mineral specimens collected have yet been examined.

The deposits worked include quartz veins containing free gold, lenses of copper-gold ores, mostly replacements in limestones, and lenses of magnetite usually carrying some iron and copper sulphides.

Work on the gold-quartz veins, most of which cut the rocks of the porphyrite group, proved disappointing and has now almost entirely ceased. The known veins with few exceptions are small and non-persistent, and the general tenor in gold is low, although small rich shoots carrying high values are occasionally found. The total output of the gold quartz veins to date is probably less than $20,000.

The exploration of the copper-gold lodes has been attended with better results. These occur in limestones and are usually situated either at the contact with or in the vicinity of masses of granite, or of the older basic intrusives referred to in the geological sketch. They all belong to the class known as contact metamorphic deposits, and represent replacements of limestone and occasionally of a portion of the bordering intrusive by copper minerals, chiefly chalcopyrite and bornite, accompanied by garnet, augite, epidote, serpentine and various other silicates.

Among the more important mines working in deposits of this character are the *Marble Bay, Cornell, Copper Queen* and *Little Billy* in the vicinity of Stuart bay, and the *Loyal Lease* at the north end of the island. Occurrences of chalcopyrite ore have also been worked to some extent at various points along the Iron range on the west coast.

SKETCH MAP

SHEWING MINERAL CLAIMS

IN VICINITY OF

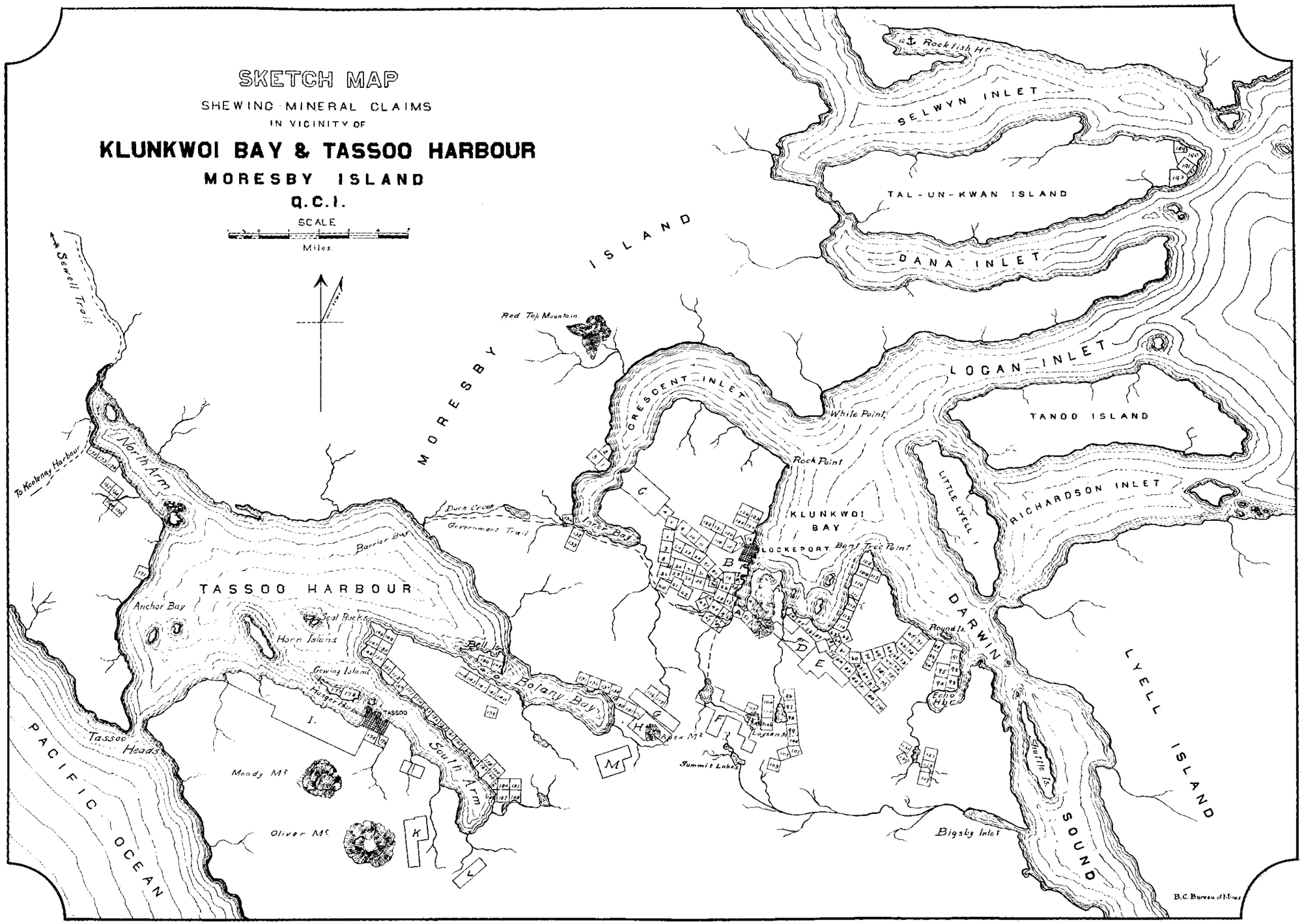
KLUNKWOI BAY & TASSOO HARBOUR

MORESBY ISLAND

Q.C.I.

SCALE

Miles



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E	Surprise	7 "
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G	Copper Belle	6 "
H	Apex	9 "
I	Werwick	84 "
K	Hercules	6 "
L	Snowdrop	6 "

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50	Azurite	150	Shamrock
51	Cuprite	151	Woodpecker
52	Cork	152	Alice
53	Parmaugh	153	
54	Cupid Frac	154	Moody
55	Kate	155	Martha
56	Ottawa Frac	156	
57	Lampriere	157	
58	Jersey Frac	158	Sullivan
59	Pontiac Frac	159	
60	Fugi	160	Nelson
61	Kalori	161	
62	Kasimo	162	
63	Nogi	163	
64		164	Emma Jones
65		165	Pyrite
66		166	Corbett
67		167	Blue Jay
68		168	Darling
69		169	Blue Bell
70		170	Coquaiesza
71	No 1	171	Jackson
72	No 2	172	Wren
73	No 3	173	Rupert
74	Beauty Frac	174	Rex
75	Bismarck	175	London
76	Bird	176	Birmingham
77	Bob	177	Seagull
78	Brigham	178	Seal
79	Victor 3	179	Sultana
80	Victor 2	180	Sultan
81	Victor 1	181	Selma
82	Victor	182	Selma
83		183	Britt
84		184	Jackson
85	Top Notch 1	185	Fitzsimmons
86	Top Notch 2	186	Dempsey
87	Victor 4	187	Kilrain
88	Lucky Strike	188	Mitchell
89	Nil Desperandum	189	Lilly
90	Puzzler	190	Annie Fract
91		191	Blue Bell
92		192	Hawk's Nest Frct.
93	Echo Harbour	193	Maud
94	Mountainside	194	
95	Hillside	195	
96	Caribou	196	
97	Lake View	197	
98	Homestake	198	
99	Telluride	199	
100	Smuggler	200	

The *Marble Bay* mine, the principal copper-gold mine working at present, is described in considerable detail by Mr. LeRoy in a report published by the "Survey" in 1907. At the time of his visit the workings had reached a depth of 760 feet; since then they have been continued down to a depth of 920 feet.

The ore-bodies in this mine have the irregular outlines characteristic of replacement deposits, but are unusually large and persistent considering their richness. The ore-bodies first worked extended from near the surface down to the 260-foot level and for some distance beyond. At the 260-foot level a new ore-body was discovered in a drift to the westward and has been followed continuously downwards for a distance of 530 feet. It terminated against limestone at a depth of 790 feet. Below it the workings are barren for a distance of 70 feet. At the 860-foot level rich ore was again encountered and has been followed to the present 920-foot level. At this level, the lowest reached, the ore-body has a width in places of over 20 feet and is rich in bornite.

The ores consist mainly of the two copper sulphides bornite and chalcopyrite, enclosed in grains and small masses in a garnet-augite gangue. The shipping ores carry about 8 per cent of copper, and while varying to some extent on the different levels, the general average has remained practically unchanged from the surface down the present level. The gold values are high, the whole yearly output averaging about $10 per ton.

The ore-bodies of the *Marble Bay* mine occur in limestone cut by numerous basic dykes and are situated at some distance from large intrusive stocks. The dykes where they cross the ore-bodies are always altered, and occasionally are partially replaced by the same minerals which occur in the limestone, showing that they are older than the mineralisation. The limestone is brecciated in places and is traversed by numerous fissures running in different directions and often crossing each other. It is probable that these controlled the mineralisation, to some extent at least, as most of the ore-bodies have been found by drifting along or sinking on them.

The *Cornell* mine is situated about a mile south of Van Anda. The limestone is intruded here by a long, narrow basic stock and the ore-bodies occur along the contact of the two rocks. The workings of this mine consist of a shaft sunk to a depth of 460 feet, with long drifts at intervals of 100 feet. Several important ore-bodies somewhat similar in character to those of the *Marble Bay* mine have been discovered and mined. During the past season the *Cornell*, after having been idle for some time, was re-opened under lease, by Dr. Tanzier. The drift at the 360-foot level was extended along a fissure for a few feet and reached what is considered to be a new ore-body, although it may be an extension downwards of one of those mined on the upper levels. The unsuspected presence of this bornite-chalcopyrite mass near the end of an old exploratory drift illustrates the erratic and uncertain distribution of the ore-bodies, and also furnishes an incentive for further exploratory work.

The *Cornell* ores, like those of the *Marble Bay* mine, carry good and often high values in both copper and gold.

The *Copper Queen* mine was not examined. It has been idle for some time and the workings are partially filled with water. This mine has been worked to a depth of 750 feet, and rivalled the *Marble Bay* in the extent and richness of its ore-bodies. It has, however, latterly been worked under lease with the usual result. Exploratory work, even the extension downward of the shaft, has been neglected, and a considerable expenditure would be required to put it in a condition to continue the search for new ore-bodies.

The *Copper Queen* mine is situated in a limestone area traversed by numerous basic dykes, and is distant about 1,600 feet from the nearest intrusive mass.

The *Little Billy* mine differs from the other mines in the neighbourhood in occurring at a limestone-granite contact. It has not been explored in depth, and so far only one moderate sized lens has been mined. A shaft was sunk during the season on a second ore-body outcropping in the limestone a short distance away from the contact, and a few tons of ore were shipped.

The geological conditions at the *Loyal Lease*, situated in the north end of the island, are similar to those at the *Marble Bay* and the *Copper Queen*. The croppings occur in limestone cut by numerous basic dykes and intruded at various points by small basic stocks. A number of small lenses outcrop at the surface, and shafts have been sunk on these to varying depths. Some ore has been shipped, but notwithstanding the favourable prospects no large ore-body has so far been found.

On the west coast of the island, lenses of rich copper ore have been mined at a number of points along the Iron range. The lenses occur in limestone along both the granite and porphyrite contacts, and are often found fringing the magnetite ore-bodies. They are small and so far, with the exception of some development work at the *Lake* mine, no attempt has been made to explore them in depth. The ores, while apparently similar in origin to those mined in the vicinity of Van Anda, differ in consisting altogether of chalcopyrite. The gold values are also smaller.

IRON ORES.

Lenses of magnetite are widely distributed on Texada island. On the south-west coast numerous outcrops occur north-west of Raven bay, and extend in diminishing number south to Pocahontus mountain and northwards to Stuart bay. The lenses are all of moderate size and vary in shape from rounded irregular masses to long vein-like forms bounded by walls and evidently deposited along zones of fissuring. They occur in the main limestone area, associated with small limestone inclusions in the porphyrite, and in the porphyrite itself. The magnetite is seldom pure and is usually intergrown with appreciable quantities of pyrite, chalcopyrite and more rarely pyrrhotite.

The principal iron deposits on the island occur on the west coast nearly south from Van Anda, at what is known as the *Iron* mine. The limestone here is intruded on the north by grano-diorite and on the south by augite-porphyrite, and a zone of magnetite lenses follows the winding contact between the limestone and both igneous rocks for a distance of about two miles. The lenses are not confined strictly to the contact and occur in all three formalities at some distance from it. They are often of large size, in some cases exceeding 200 feet in length. The impurities consist mainly of iron and copper sulphides in varying proportions. The ore in some of the smaller lenses, and a part of that in the large *Lake* mine deposit, is comparatively pure; but most of it will probably require to be roasted before treatment.

Considerable time was spent during the season on the Iron range, and a number of maps showing the principal deposits have been prepared and will be published with the detailed report. The abundance of the ores, their high grade in iron and easy accessibility must make them extremely valuable in the event of an iron industry being established on the coast.

PRELIMINARY SURVEY OF COAST FROM KINGCOME INLET TO DEAN CHANNEL, INCLUDING ADJACENT ISLANDS.

By R. P. D. Graham.

(From Summary Report, 1908, of Geological Survey of Canada.)

During the summer of 1908, the writer, with the assistance of Mr. E. G. Montgomery, was engaged in a continuation of the reconnaissance survey of the British Columbia coast, which was commenced in 1906 by Mr. O. E. LeRoy, and carried a stage further by Mr. J. A. Bancroft in 1907. The launch *Dawson*, belonging to the Geological Survey, was again used as a means of transportation. Altogether, rather less than three months were spent in the field.

Commencing at the entrance to Kingcome inlet, the examination of the coast, together with the adjacent islands, was carried as far north as Bella Coola, at the head of the north Bentick arm of Burke channel; a distance along the main coast of about 100 miles.

Physical Features.

The coast maintains its general north-westerly trend until Cape Caution is reached, then it takes a rather decided turn, and for the next 70 miles or so, runs almost due north. Beyond this, it again approaches the former direction. This north and south stretch lies between the northern extremity of Vancouver island and the most southerly point of Queen Charlotte islands and faces the open Pacific.

In its general aspect, the coast in the area examined is very similar to that to the south previously described. It is intersected by numerous inlets which, however, have as a rule a more nearly east and west direction, often branching abruptly to the north, especially near their heads. The mouth of Kingcome inlet is completely hidden behind a network of islands, of which Broughton is the largest, but between it and Smith sound the shore line is singularly continuous, with few off-lying islands. Beyond the latter point they form a continuous chain, parallel with the coast, thus affording a well sheltered channel for steamers.

Geology.

An excellent résumé of the geology of the coast from Powell river to Kingcome inlet was given by Mr. Bancroft in his preliminary report for 1907, and as the area under consideration presents the same general features, little need be added in the present instance.

The Coast Range batholith was intruded during Upper Jurassic times, and subsequent erosion has removed almost the entire rock roof which covered it at that time. It now stands exposed, and forms the principal feature of the geology of the British Columbia coast.

Where the process of erosion has been arrested in time, we find remnants of the old roof in the form of more or less highly metamorphosed rocks; chiefly schists, cherty argillites and limestones. Their strike is variable, but as a general rule approximates N. 30 W., which is parallel to the axis of the range, and the dip is usually high to the northward.

Examples of these roof pendants were found in Drury inlet, Actæon sound, Seymour inlet and Nugent sound, possibly in this case representing a continuous belt stretching across the intervening country, since they lie roughly along the same line. These occurrences are of great economic importance, as the altered roof remnants are always mineralised to a certain extent, and may be expected in some cases to yield valuable results when carefully prospected. There are many exposures of similar argillitic rocks and limestones along the shore between the West arm of Moses inlet and the entrance to Fitz Hugh sound. They were also observed in several other localities.

From the greater part of the area, however, the roof has been completely removed, leaving the batholith exposed, and it is possible to observe the changes which have taken place within the magma during its intrusion. As seen towards the heads of the larger inlets, where these have penetrated into the hearts of the range, the batholith appears to have been originally, in its upper portions at least, a light, medium to coarse grained granite, containing rather more hornblende than biotite; but elsewhere it presents many differentiations, which in some cases have been due to segregation in the magma itself, and in others are possibly due to its having dissolved and assimilated portions of the roof material during its intrusion.

In some cases the magma has been unable to assimilate the engulfed blocks, hence these remain imbedded as highly altered inclusions, but still preserving their stratified character. An example of this was noted on an island of the Southgate group, the included blocks being quite large, 20 feet or more in length. But in nearly all the observed cases the evidence might be taken as indicating assimilation of the engulfed roof material. This may show itself in the occurrence of areas of a more basic facies of the granite, of gabbro, or even of an almost pure, coarsely crystallized hornblende. Broughton island is composed largely of such basic rocks, which also occur extensively along the main coast and in many of the inlets. It is not supposed that these basic differentiations are all to be explained in the above manner; they no doubt very often represent segregations from the original magma.

In other cases where assimalation seems to have taken place, diffusion has not proceeded sufficiently far to produce a homogeneous solution, and the rock after solidification presents a blotched or striped appearance, which at times is very striking. All possible gradations between the light acid granite, containing only a few dark inclusions, and the homogeneous basic gabbroid differentiations, are met with continually.

Following the granitic intrusion there have been at least three distinct periods of dyke formation, the earliest of these having produced aplites, which were then succeeded by two sets of dark basic dykes.

The occurrence of a small area of conglomerate, probably of Tertiary age, was observed in Millbrook cove, Smith sound. No microscopic examination of the specimens collected has yet been made, but some included granite is apparently identical with that found in place in the neighbourhood.

Although search was made for fossils wherever sedimentary rocks occurred, none were found. It is therefore impossible to state definitely to what period these belong. From their similarity to the corresponding rocks in the area covered by Mr. Bancroft's report, in which fossils of Triassic age were found in five localities, it is very probable that some stratified rocks in this season's area also belong to that period, others may represent remnants of Devono-Carboniferous formations, which Mr. O. E. LeRoy has noted as occurring on Texada island and elsewhere.

It might be expected that, in some instances at least, unconformities might be found within such patches, representing as they do isolated portions of the stratified rocks, which, in early Jurassic times, blanketed the whole of this district; but although careful attention was directed to the possibility of such an occurrence, no evidence was forthcoming to suggest that the rocks within any one patch were not laid down in a single geological period.

The general elevation of the Coast Range in this area, as judged by the mountains forming the shores towards the heads of the longer inlets is from 4,000 to 6,000 feet, but at the mouths of the inlets and along the main coast, the country is considerably lower, and wherever the more easily weathered limestones and argillitic rocks occur in any quantity, the effect of erosion on the topography of the country is very pronounced.

Drury inlet may be mentioned as a remarkable instance of an inlet running due west. It is a comparatively shallow channel, and the country for many miles around is low, being more nearly related in its topographic features to some of the island scenery than to that of the fiords. This inlet has indeed narrowly escaped forming an island, its head being only about two miles distant from the main coast.

Economic Geology.

There are no mines in the district, and very little prospecting appears to have been carried on at any time. The timber and salmon fishing industries have proved more attractive in the past, while at the present time, prospectors are turning their attention to the Queen Charlotte islands, which lie off the coast a little farther north. The only place at which mining operations were being carried on at the time of our visit was at Bella Coola at the head of North Bentinck arm. The north shore of the latter is formed by a mountain rising 5,700 feet above the sea, and several claims have been staked along a band of highly altered green schists which occur near the summit. These have a general north-easterly strike, and are bounded on each side by the granite which forms the mass of the mountain. The schists are mineralised with sulphides of iron and copper. Some assays of the ore are said to run as high as 9.6 per cent. copper as well as something in gold. Mr. Scribner had two men working on one of the *Bella Coola* group of claims during the summer, while the North Coast Copper Company had driven in two tunnels on a similar proposition, but had suspended operations prior to our arrival.

In Kilbella bay, Rivers inlet, a patch of limestones in the gneissoid granite includes a seam of massive magnetite which was staked some years ago, but abandoned after a shaft had been sunk 100 feet. The width of the magnetite near the shore varies up to about a foot, and it is said to have been traced back into the mountain for 1,800 feet. It is probable that a further examination of this property will be made shortly.

There is a somewhat similar occurrence of magnetite near the head of Seymour inlet, on its eastern shore opposite Wigwam bay.

The granite along the south shore of Bramham island maintains an even grey colour over a large area. There are few inclusions, and dykes are rare. It is dissected by joint planes into rectangular blocks and would make an excellent building stone which could be conveniently shipped from Miles inlet.

Our season was curtailed a week or two owing to an unfortunate accident which necessitated our beaching the launch for repairs, after which it was thought advisable to return to Vancouver.

It might be well here to call attention to the inadequacy of the existing charts for the purposes of a geological survey, in a portion of the territory covered this year, and also along the coast immediately north, as far as the International Boundary. Although the main coast from Seymour inlet to Fitz Hugh sound is well charted, on a scale of about one inch to the mile, the inland waters have been mapped from a sketch survey only, and the greater part of Smith and Boswell inlets and the whole of Naysash, Mereworth and Belize inlets have never been surveyed at all. Beyond Fitz Hugh sound, the only charts at present available are on a scale of about 4 miles to the inch, and in the case of a large portion of Burke and Dean channels, representing some 200 miles of shore line, the scale is 15 miles to the inch. This renders even an approximate location of contacts and other data almost impossible.

VICTORIA DISTRICT.

VICTORIA MINING DIVISION.

NOTES BY THE PROVINCIAL MINERALOGIST.

The following statistics have been obtained from the Mining Recorder of the Division, who, however, furnishes no report as to work or prospecting :—

OFFICE STATISTICS—VICTORIA MINING DIVISION.

	1907.	1908.
Free miner's certificates	708	635
" " (special)	7	7
Mining claims recorded	136	37
Certificates of work recorded	122	82
Certificates of improvements recorded	15	13
Conveyances recorded	28	21
Permits "	2	1
Lay-overs "	2	...
Abandonments "	1	1
Placer claims "	0	1

Revenue.

	1907.	1908.
Free miner's certificates	$6,032 17	$5,328 57
Mining receipts, general	1,932 70	704 90
	$7,964 87	$6,033 47

The following is from the report of Mr. Chas. H. Clapp, as contained in the Summary Report, 1908, of the Geological Survey of Canada, his work being done within the Victoria Mining Division :—

SOUTHERN PORTION OF VANCOUVER ISLAND.

(By Chas. H. Clapp, for Geological Survey of Canada.)

TOPOGRAPHY.

The topography of the south-eastern part of Vancouver island is in general that of a heavily wooded, low mountain region. It is in rather marked contrast to the more rugged and higher mountainous districts to the north and west. The eastern coast is marked by low rocky hills and mountains, with occasional broad, flat areas underlain by the softer rocks of the Coal Measures. The southern and western coast is more bold and rocky, although in the neighbourhood of Victoria and Esquimalt, and south-west to William head, the rock headlands are low and are separated by low, flat, drift-filled valleys. From William head west to Point No point, with the exception of the north shore of Sooke harbour, and several small patches underlain by the softer Tertiary sediments, the shores, although not very high, seldom more than 500 or 600 feet, and usually less, are steep and rugged. The coast line is deeply indented, a fiord coast. Although along the west coast several of the inlets penetrate into the very heart of the mountains in the region we are considering, the Saanich inlet is the only one bordered by

very high hills, which in this case range from 1,000 to nearly 2,000 feet above sea level. In the interior, the mountains are higher and more rugged and form broad, flat-topped ridges which are often separated by wide valleys, now occupied by lakes. The highest elevations attained during the present season were nearly 4,000 feet, found on the mountains and ridges farthest to the north and west.

The mountains have characteristically flat or rounded summits, partly due to glacial erosion. Glacial erosion cannot, however, explain the gently rolling, wide, tableland-like summits, which, in the majority of cases, are so broad and flat as to be marshy, small swampy ponds or lakes, often occuring near the very tops of the mountains. The summits have a gradual and fairly even and uniform slope from a few hundred feet above sea level in the south-east to nearly 4,000 feet in the north-west. The mountains seldom occur in distinct ranges consistent with the structure of their component rocks. These facts indicate that this section of the south-eastern part of Vancouver island has been once nearly levelled; that is, peneplained by erosion, and that the region has been subsequently elevated and partially dissected.

The rivers and lakes in general follow north-south and north-west, south-east valleys. The former are the larger in this region, being those occupied by the Saanich inlet, Sooke river and Sooke lake, Shawnigan lake and the lower part of the Koksilah river. The latter system corresponds more or less closely to the underlying structure of the rock formations, which strike in the main from N. 50° W. to N. 70° W. Some of these valleys have been filled with drift; the Langford and Colwood plains are good examples. Others are occupied by streams and lakes generally small, but including the upper part of the Goldstream river, the Leach river, the upper Koksilah, the Cowichan and Chemainus rivers and Cowichan lake.

The glacial and more recent periods have greatly affected the present topography. Most of the rounding of the higher peaks is directly traceable to ice erosion, as striæ of large size, and glacial polishing and grooving are often observed. No evidence is seen in this part of the island of the formation of cirques and hanging valleys. In most mountain regions where local glaciers have been developed the tendency of glacial action has been to heighten rather than lessen the ruggedness of the country; here, on the other hand, the peaks are rounded; talus slopes—exceptionally well illustrated a few miles north of Victoria, at Mount Tolmie and Cedar Hill—were formed on the southern slopes of the hills; and much of the country is covered by thick layers of drift, some of it morainal in character, but most of it stratified. In recent time, the country has been submerged, thus giving rise to the fiord, or drowned coast of the present day, although there is evidence of a comparatively slight uplift of a late date.

General Geology.

The formations exposed in the southern part of Vancouver island range from the Devonian period or older, to the Pleistocene and recent. A provisional field classification has been made into the following:—

Unconsolidated superficial deposits	Pleistocene and recent.
South coast deposits	Tertiary.
Coal Measures	Cretaceous.
Younger metamorphics, Mt. Sicker series	Mesozoic.
Older metamorphics, Victoria series	Devonian.

The Tertiary sediments of the south coast are the youngest consolidated rocks. Rocks which when unaltered resemble the Coal Measures, have, along certain belts, been metamorphosed. Metamorphic rocks underlie the greater part of the region.

The older metamorphic rocks cannot be definitely assigned to any one period. A careful search for fossils was made in the calcareous rocks, now completely crystallised; but without

success until the writer's attention was called to the occurrence of fossil corals on the south shore of Cowichan lake, about 9 miles from the east end. The locality was visited and identifiable corals, brachiopods, pelecypods and gasteropods were collected. Although the material has not yet been worked up, the fauna undoubtedly belongs to the Devonian period. These fossils fix a series of limestones and calcareous slates in the neighbourhood of Cowichan lake as definitely Devonian. The series is very similar in character to the old metamorphics near the east coast. Definite correlation, however, will take further work, as the greater part of the territory between the formations is covered by drift, and it was impossible to get their exact relation in the hurried work of the past season. The formations are lithologically similar, although no volcanic members were noted at Cowichan lake. It is very probable that the rocks in the neighbourhood of Victoria and north are of the same general age as those at Cowichan lake, that is Devonian; with some that are possibly younger or older.

Provisionally, therefore, one can place the great series of old metamorphics in the south-eastern part of Vancouver island as late Middle Palæozoic. Dawson and other earlier writers classify the old crystallines which underlie the Coal Measures as the Vancouver series, and place them in the Triassic period, with possibly some carboniferous members. As the evidence for assigning part of this great series of rocks—especially those in the northern part of the island—to the Triassic, is indisputable; and as Dawson suggests[1] that, should this series eventually prove separable into other formations beside the Triassic, the name Vancouver series be retained for the Triassic members, it seems best to restrict the term Vancouver series to Triassic rocks of the northern part of the island, and to introduce a new term for the older rocks. Hence, I suggest the term Victoria series[1] as a general name embracing the older metamorphics of the southern part of the island, belonging to the Palæozoic era. Dawson has already used the name in a limited sense; but it seems best to enlarge its meaning.

The Victoria series consists of a great group of rocks comprising not only sedimentaries, but large masses of intrusive and effusive volcanics, mainly of a basic nature. The sedimentaries are principally of deep water origin, calcareous and fine grained. Some non-calcareous argillaceous members and even quartzites are, however, present. They have all been very much altered and recrystallized, resulting in massive marbles, and crystalline "cement rocks," calcareous slates, ordinary slates and phyllites, slaty quartzites and graywackes and quartzites; with some hornfels amphibole schists and gneisses which are of sedimentary origin. The volcanic members are both intrusive and extrusive, largely the latter. They are mainly massive flows, porphyritic and amygdaloidal, but tuffs, breccias and agglomerates are present. Some of the agglomerates may represent old vents. The original lavas were mainly basic augite andesites and basalts, but are now altered to the characteristic greenstones. Associated and at times seemingly interbanded with both the sedimentaries and volcanics are dioritic rocks such as those in the immediate vicinity of Victoria, whose origin is very obscure. Some of them are doubtless old intrusives; but in part they appear to be the product of extreme metamorphism of beds of impure argillaceous limestone.

These formations have a general strike of N. 70° to 50° W., with steep dips both to the south and north. The series is very thick, but at the present time an estimate of the total thickness is little better than a guess, as the problem requires further detailed work, both in the field and office. The rocks are tightly folded, and also faulted, and are, therefore, repeated many times. It is probable that the lowest beds are exposed in the most southerly portion of the island, and as one goes north across the strike higher and higher beds are exposed.

[1] Report on a Geological Examination of the Northern Part of Vancouver Island and Adjacent Coasts, Ann. Rep. Geo. Sur. of Can., 1886; p. 10 B.

OLD GOVERNMENT OFFICE, LEECH RIVER. (Occupied during gold excitement there in early '60's.)

Roughly, the distribution is as follows :—

The southernmost beds are massive greenstones, which form a belt 5 to 7 miles wide, extending from Cape Church north-east to Albert head, and from Otter point north-east nearly to Leech river. To the north of this belt of greenstone, there is in the western part of the area, and extending eastward beyond the lower northward flowing portion of the Goldstream river, a belt of slates, argillaceous schists and quartz schists from 2 to 3 miles in width. Still farther to the north, and apparently forming a continuous conformable series, is a great succession o calcareous beds, limestones, argillaceous limestones, now metamorphosed to amphibole schists and gneisses, and some argillites and quartzose rocks, with intercalcated volcanics. This series is 7 or 8 miles wide, and extends to the north of Shawnigan lake. In the eastern part of the region, near the coast, the greenstones are bounded on the north by a deep, wide, drift-filled valley, extending from Langford to the Royal Roads. All the evidence obtainable goes to show that this valley is underlain by limestone ; but there may also be present representatives of the argillaceous sediments. Directly to the north of this valley is the great series of calcareous and argillaceous rocks, met with in the west, north of the schist belt, and which extends from Esquimalt and Victoria northward some ten miles. The absence in the east of the greater part of the argillaceous series, so pronounced along the Leach river, seems to best explained by faulting.

Intrusive into this Victoria series are plutonic rocks, ranging from a hornblende gabbro, or gabbro diorite to a granodiorite, and even a granite. There are several of these intrusive bodies. The East Sooke peninsula is underlain almost entirely by hornblende bearing plutonics, principally of the composition of a gabbro-diorite, but with some amphibolites and intrusive apophyses and dykes of a feldspathic rock, syenitic in nature. These plutonics are intrusive into the greenstones to the north and east. Similar areas, but smaller, occur in the Esquimalt peninsula and Victoria West, and still smaller, cross-cutting bodies, seemingly related to these rocks, occur to the west of Cedar Hill and near Elk lake. In the northern part of the Saanich peninsula, south of the cretaceous sediments, is a considerable area of granodiorite and granite, which rocks cut the old metamorphic series. Similar granodiorites occur to the westward on the opposite shore of the Saanich inlet, south of the Coal Measures which occupy Cowichan bay. Another small area is also found at the northern end of Sooke lake.

In the Sooke peninsula the diorites are cut up by trap dykes, some of them being clearly diabase. The Saanich granodiorite is also cut up by a system of dykes, which appear to be andesitic in nature.

To the north-west of the Victoria series, and unconformable upon them, is another system of sediments with andesitic volcanic members. As far as known these rocks contain no distinctly calcareous members, and consist not only of shales, slates and sandstones, but of conglomerates as well. Their principal occurrence is north of the Cowichan river, where they form a belt some 8 to 10 miles wide, with a strike of about N. 60° W. The actual thickness is probably not more than 15,000 feet, but it is repeated by folding or faulting. There are also one or two down warped areas, or down faulted blocks of the same formation along the Koksilah river. To judge from the report of the prospectors and others, this formation appears to form a continuous belt extending to Alberni. The beds are well exposed along the Chemainus river north and west of Mount Sicker. Since at Mount Sicker the formation is best known, as it is the country rock of the copper ores found there, it will be called, provisionally, the Mount Sicker series.

[1] Geological Survey Report (76-77), p. 101.

In places this formation has comparatively low dips, is free from intrusive and extrusive igneous rocks, and is not metamorphosed. Thick beds of conglomerate with sandstone and carbonaceous shale occur, which closely resemble the coal-bearing Cretaceous rocks. These unmetamorphosed rocks, if traced across their strike, grade into conformable, tightly folded, highly inclined, metamorphic rocks, slates graywackes, quartzites, crystalline conglomerates, graphitic and quartz schists. Associated with these metamorphosed sedimentaries are intrusive and probably extrusive basic igneous rocks, mainly of an andesitic composition. Where the metamorphism has been excessive, these andesites have become recrystallised, gnessoid, and even schistose, forming amphibole gneisses and chlorite and talc schists. The transition from the unaltered sediments to the crystalline ones, which in some cases are stratigraphically the same beds, is particularly striking along the Chemainus river, where to the south-west of Mount Sicker the rocks are unaltered comglomerates, sandstones and carbonaceous shales, which grade gradually into the rocks directly at the base of Mount Sicker, where they are mainly gneisses and schists.

The definite determination of the age of the Mount Sicker series is at present impossible, as no fossils have been found in them, and their structural and lithological correlation will require further work. That they are separated from the Victoria series by a profound unconformity is unquestionable. Structurally, they appear to underlie the Cretaceous Coal Measures. However, the formation has been disarranged by great overthrust faults which have in places brought older beds over younger, and this disarrangement may have also affected the Coal Measures. The contact between the Mount Sicker series and the undoubted Coal Measures is not well exposed; that this contact is unconformable is suggested, but not be proved by the exposures examined during the past summer. This point can easily be satisfactorily worked out by future field work. On the other hand, the striking lithological similarity of the unmetamorphosed sediments with those of the Coal Measures indicate most strongly that the Mount Sicker series is related to the coal-bearing Cretaceous rocks, and may be of nearly the same horizon. From the occurrence of lower Mesozoic formations on the island, and the suggested unconformity between the Mount Sicker series and the Coal Measures, it may be argued, however, that the doubtful strata most probably belong to the Triassic or Jurassic periods.

Sediments belonging to the Coal Measures, principally sandstones and conglomerates, with carbonaceous sandy shales, were encountered where Richardson maps them, at the extreme northern end of the Saanich peninsula, and at Cowichan. The southern end of the Nanaimo area was seen in the neighbourhood of Ladysmith, and at the coal mines at Extension. The areas underlain by this formation are more extensive than Richardson maps them, and the thickness somewhat greater. If, as he declares, all the rocks of the Cowichan area belong to the Productive Measures,[1] they are in this region about 1,800 feet thick. Few fossils were found in this series, but from the evidence collected by Richardson and others, they clearly belong to the Cretaceous period.

Along the south-western coast, from Beecher bay westward, occur several small basins or down faulted areas of consolidated, but rather soft, sandstones and conglomerates, associated with relatively thin beds of shale and marl. These have been mapped by Richardson as Tertiary, and there is abundant fossil evidence to warrant the determination.[2] These sediments are shown, not only by their enclosed fauna, but by their character, to be undoubtedly marine. They are separated from the underlying greenstones and plutonic diorites by a marked unconformity and a thick basal conglomerate. This conglomerate rests on an old eroded surface of

1. Report of Progress, 1876-77, Geol. Survey, Can., p. 187.
2. J. C. Merriman, Bull. U. of Cal., Vol. 2, No. 3, pp. 101-108, 1896.

the crystalline rocks which formed the coast of the Tertiary sea. The irregular surface, the immense, wave-polished boulders, and the characteristic wave-worn dyke, and joint-chasms filled with sand and coarse gravel of the sea coast of to-day, are strikingly parallel in the unconformity and basal conglomerate. The beds have only been gently folded, but have been faulted very considerably. The exact estimate of their thickness cannot be made until the throw of the faults has been calculated, but the total thickness exposed is probably not more than 300 or 400 feet.

The heavy covering of drift has already been spoken of. Some of this material is certainly morainal, although much of it can be considered as part of the outwash apron of the immense continental glacier which overrode the island. Some of the stratified drift, as shown by its fauna, is marine. Notable examples of the marine deposits are found in the unconsolidated sands, clays and gravels overlying the low, flat Tertiary basins of the south-west coast. Fluviatile, lacustrine and bog deposits likewise occur. One of the most interesting of these is the old valley which extends from Langford lake to the Royal Roads. This valley is now completely filled with river drift, so that there has developed a flat, broad plain, with well marked, longitudinal terraces.

Economic Geology.

The mineral wealth of the district is of considerable importance, but with the exception of copper, it is very doubtful if any of the other metals of commerce have been produced economically. Placer gold has been obtained, and placer mining is still carried on in a very small way. Coal is an important industry on the east coast. Lime and cement are manufactured, clay and sand are used for brick, and, with increasing demand and greater facilities of production and transportation, other non-metallic deposits will doubtless be mined and industries established.

The principal copper deposits occur at East Sooke, Mt. Malahat, Koksilah ridge and at Mt. Sicker. Other claims of less importance are scattered over the entire area, notably in the Highland and Goldstream districts, and in the neighbourhood of Leech river. There are three main types, which are illustrated by the occurrences at Sooke, Mt. Malahat and Mt. Sicker.

The principal deposits at Sooke are in the diorite or gabbro diorite of that area. Intrusive into this formation are dykes and apophyses of more acid plutonic rocks, dioritic and syenitic in nature, and also dykes of diabase. These intrusions seem to have had little or no effect on the formation of the ore. The diorite has been rendered gneissic, and is broken by prominent shear zones, along which, shown by the slickensides, considerable movement has taken place. The diorite is very generally, though sparsely, impregnated with pyrite and chalcopyrite. In the shear zones the sulphurets have been concentrated and sometimes form low-grade ore-bodies of quite large size.

These shear zones are very numerous. The majority are small and low in sulphides. Some of them are, however, large and quite extensive, and the development of the chalcopyrite more pronounced. The zone in which the *Margaret*, *Copper King* and *Eureka* claims (not registered) are located, is some 200 feet wide, and traceable for at least 4,500 feet, and probably for a greater distance. There are two main sets of shear zones in the Sooke District, one set striking about N. 40° E., and the other a little to the west of north. The sheared diorite has, however, been broken and slickensided in all directions. Tiny quartz stringers and a large amount of secondary hornblende have been developed in it. The secondary development of the hornblende has sometimes taken place to such an extent that very little of the original feldspar remains and the rock resembles an amphibolite. Veins of coarse bladed hornblende often seam the diorite in many directions. There is no field evidence that these veins are representatives

of a basic intrusive, but it all goes to prove that the component materials have been derived from the diorite. Along the shear zones waters have easily penetrated, removed the feldspar, recrystallized the hornblende and deposited the sulphides of iron and copper. As a rule the sulphides are disseminated through the shear zone in small patches, but occasionally they occur in small veins and lenses, due to a complete replacement of the country rock. In the shafts on the *Willow Grouse* and *Blue Bird* claims, chalcopyrite and pyrite occur with but little of the silicate gangue. This more complete replacement is probably to be accounted for by the fact that it occurs near the junction of two shear zones. Native copper frequently occurs in the outcrop of these deposits, but only near the surface, and is due to surface alterations of the chalcopyrite. It is improbable that any marked secondary enrichment of these deposits will be found, as the chalcopyrite and pyrite occur unchanged at the surface, except for the most superficial oxidation and alteration. The copper deposits, considering the entire sheared zone, are all essentially low-grade, but are of large size.

Towards the west end of East Sooke peninsula is a large deposit of almost pure sulphides, with a little magnetite. The sulphides are, however, very low in chalcopyrite, consisting mainly of pyrrhotite and pyrite. The material is too low in copper to be mined profitably, although one or two attempts have been made. It occurs in a more basic rock, a gabbro, which is related to the normal gabbro diorite. The whole deposit may be a basic segregation from the original magma, but it has been secondarily concentrated in a well marked shear zone in the gabbro. Less important deposits of iron and copper sulphides also occur in the shear zones of the greenstones to the east and north.

On Mt. Malahat, to the east of Shawnigan lake, sulphides of copper and iron, with considerable magnetite, are developed in limestones near the contact with dykes and apophyses of granite and granodiorite. In the contact zone of the limestone the usual contact minerals have been developed, garnet, diopside and wollastonite; the diopside altering to serpentine. Replacing the limestones are large irregular bodies of magnetite, pyrite and pyrrhotite, with small percentage of copper. Several attempts have been made to work these bodies, but they are too low in copper to pay the present cost of mining and transportation.

The copper ores on the ridge between the fork of the Koksilah and Cowichan rivers, the *King Solomon* and *Blue Bird* group of claims, are developed in the calcareous members of the Victoria series. They are not, however, directly contact bodies, although they may owe their origin to unexpected or neighbouring intrusive masses. The ore minerals occur in shear zones and veins in the metamorphosed calcareous rocks of the region.

On Mt. Sicker is found the only copper deposit that has been mined profitably, the ore-body on the *Lenora*, *Tyee* and *Richard III.* mines. At present, however, there is no production from the district. The ore is chalcopyrite, pyrite and sphalerite, with a quartz and barite gangue, and the country rock is the much metamorphosed Mt. Sicker series. The *Tyee* ore-body is a flat lens, and Mr. J. W. Bryant, of the Tyee Company, believes it to have been developed in a syncline of the black, lustrous, partly graphitic schists. Mr. W. H. Weed[1] infers from the occurrence of the barite in the ore, and its absence in the surrounding rocks, that the ore-bearing solutions must have come from a depth. Ores of a similar nature occur elsewhere on Mt. Sicker, to the west on Mt. Benton, and to the east on Mt. Richards. They do not, however, occur in distinct lenses of relatively massive ore, but as disseminations, and partial replacements in the more schistose rocks and shear zones. They are usually in close association with the basic volcanic rocks, which in the neighbourhood of the ore-bodies have been sheared and altered to chlorite and talc schists. The ores have doubtless been formed

1. Notes of the Tyee Copper Mine, Eng. and Min. Journal, Jan. 25th, 1908; pp. 199-201.

by hot waters, indicated by the alteration of the country rock, while the presence of so large a percentage of barium—as Mr. Weed has shown—strongly supports the view that the waters are of magmatic origin. But it is possible that the concentration of ores into distinct lenses has resulted from the work of relatively shallow, circulating, meteoric waters.

The other copper deposits of the region are of much less importance, but of the same general type of those described above. They are principally disseminations and replacements in the rocks of the Victora series, along shear zones or fissures easily penetrated by waters. All the ores of the district are low-grade, but some of the ore-bodies are large, hence by mining on a large scale, and by concentration at the mine, it seems probable that some of them may be profitably worked.

The discovery of placer gold has caused much excitement and prospecting in the district. From Leech river and vicinity considerable placer gold has been obtained, most of it in the late sixties. Of late there have been unsuccessful attempts to continue placer mining in the river and in the north fork. One or two Chinamen have been working up Leech river for some time, but it is believed have hardly made living wages. The writer is of Dawson's opinion that the gold in Leech river and north fork has been derived from small quartz stringers in the slaty rocks of the district.

The quartz stringers and veins are very abundant, and although usually small, sometimes attain a considerable size, four to six feet in width and traceable for several hundred feet. In spite of the fact that they seem to have been the source of the gold found in the streams, they are too low-grade to be worked profitably. Every attempt, and the attempts have been many, to obtain gold from the quartz veins of the vicinity has been a failure. The veins are doubtless similar in character to the quartz veins which are so numerous in any strongly metamorphosed region, and which commonly are practically barren. It has taken a long period of erosion and the disintegration of many hundreds of these veins through a very considerable thickness, to produce the small amount of gold which has been found in the rivers. At present it appears that even Leech river has been, from an economic standpoint, worked out, and that the other streams are unlikely sources of much placer gold.

The non-metallic mineral products of the district are of far greater value. The excellent coals of the east coast are well known, and form the basis of a large well established industry. The above-mentioned coal basins were merely visited. Some prospecting has been carried on in the Cowichan basin, and at the present time a diamond drill is in operation prospecting the measures at the northern end of the Saanich peninsula. The Coal Measures of this basin are much thicker, probably 1,800 feet; and also more extensive than Richardson reports. As far as the surface exposures may be relied upon, the amount of coal present is small. The few seams found are thin and generally sandy. They occur near the base of the formation. There is a large area in the Cowichan valley underlain by the Coal Measures, in which there are practically no exposures, so that one cannot judge as to the probable presence or absence of workable coal; nevertheless, one is tempted to inquire if it would not be advisable to prospect this basin more thoroughly than has been done.

Prospecting has also been carried on in the small basins of Tertiary sediments of the south-west coast, at Sooke and Coal creek. Although there are a few small, thin lenses of lignite and lignitic sandstones present, there is nothing else to encourage the prospecting of these beds. The beds are clearly of marine origin; shown not only by their lithological character, but by their fauna, so that the occurrence of extensive coal seams in them is most improbable. Elongated cylindrical masses of lignite are found in the sandstones and are doubtless old logs which have been washed into the Tertiary seas and have become lignitised.

The rest of the carbonaceous matter in the sediments is probably of the same drift origin. The little coal that has been found is all lignite, and there is little or no hope that any semi-bituminous or bituminous coal occurs in these basins. The individual basins are not only small in extent, but have been extensively broken and faulted, and these faults would very seriously interfere with any mining that might be attempted. One feels very confident therefore, in discouraging any attempts at mining or even prospecting for coal in these basins of Tertiary sediments.

Of very considerable importance is the lime and cement industry. On Tod creek, a small branch of the Saanich inlet, the Vancouver Portland Cement Company's plant is located. They are procuring their cement rock, which requires little or no admixture of clay, from a thick band of a crytalline argillaceous limestone, one of the members of the Victoria series. Formerly, a little drift clay was mixed with the limestone, in order to bring up the almina and silica content; but at present this is found unnecessary.

Lime is manufactured from the purer limestone or marbles of the Victoria series. The plants are located on the west side of Esquimalt harbour, on the west coast of Saanich inlet, and to the north-west of the head of Esquimalt harbour near Parsons Bridge. At the latter plant the lime is used by the Silica Brick and Lime Co. to make sand-lime brick. The sand is obtained from a pit near the plant, in stratified sands and gravels of fluviatile origin. Lime has also been burned inland, in the Highland district, along the Millstream road, but at present the high transportation charges make the industry unprofitable. Other localities of good limestone, suitable for the production of lime, are numerous, and although other occurrences of natural Portland cement rock are not necessarily to be expected, the materials for the manufacture of Portland cement are convenient to any of the purer limestones of the Victoria series.

At present, with the exception of ordinary brick manufacture, the clay industry is confined to a small pottery plant in Victoria. Part of the clay is procured from the shales of the Coal Measures at Extension. Many of these are reported to be of good quality, some of them fire-clays. Other high grade clays are absent. None of the argillaceous members of the Victoria series, on account of their metamorphic character, are to be considered. The shales of the Mt. Sicker series, the Cowichan Coal Measures and of the Tertiary basins are not abundant, and are generally impure. The clays of the surficial deposits are also impure, and unsatisfactory for higher grade wares than common brick.

NEW WESTMINSTER MINING DIVISION.

REPORT BY J. MAHONY, MINING RECORDER.

I have the honour to submit the following report of mining operations in the New Westminster Mining Division for the year 1908:—

The quartz claims recorded during the year were distributed as follows: Britannia, Howe Sound and vicinity, 30; Bowen island, 13; Gambier island, 3; Squamish, 4; Burrard inlet and vicinity, 17; Lynn and Seymour creeks, 52; Sechelt inlet and vicinity, 19; Nelson island, 4; Jervis inlet, 28; Pitt lake, 5; Stave lake and vicinity, 15; Harrison lake and vicinity, 16; Chilliwack, 3.

There has been an increase in the number of free miner's certificates issued, and there has been a slight falling off in the number of claims recorded for the year. There has been a great deal of prospecting at Lynn creek and also Seymour creek. There has been an increase

in the number of certificates of work issued during the year 1908. There have been 56 placer claims recorded in the vicinity of Canyon creek, Jervis inlet, during the last three months of 1908, but, owing to the amount of snowfall, the working of the claims has been laid over.

The office receipts show an increase over the year 1907.

OFFICE STATISTICS—NEW WESTMINSTER MINING DIVISION.

	1907.	1908.
Free miner's certificates issued	1,403	1,766
Quartz claims recorded	261	209
Certificates of work recorded	246	270
Certificates of improvement recorded	23	11
Conveyances recorded	47	71
Placer claims recorded	..	56

Revenue.

	1907.	1908.
Free miner's certificates	$7,295 30	$9,530 45
Mining receipts, general	2,131 50	2,522 85
Total	$9,426 80	$12,053 30

NOTE BY PROVINCIAL ASSAYER.

Swayne Copper Mines.

This property is situated on the east bank of Lynn creek, which flows into Burrard inlet at North Vancouver. The group consists of the *Copper Duke* and *Necessity Fraction* mineral claims and is reached by following the "Pipe Line" road from North Vancouver to the water-works intake, a distance of 5 miles by a good waggon road; from this point a trail follows the east bank of Lynn creek to the claims; a total distance of about 8 miles from salt water. Towards the headwaters, the valley of Lynn creek is contracted and the mountains rise abruptly on either side to heights of from 3,000 to 4,000 feet. The mine buildings are situated some 400 feet above the creek, and, slightly above the buildings, a short tunnel of 30 feet has been run into the steep hillside, cross-cutting a zone, well mineralised for some 8 feet, with lower grade ore on either side; the higher grade ore averaging 4% copper with small gold and silver values. This mineralised zone, in diabase, runs parallel to the general trend of the mountains and is known as No. 1 lead; it has been further prospected by a 53-foot tunnel to the north, showing ore for some 20 feet, and by an open cut to the south.

At a point 200 feet below the 30-foot tunnel on the No. 1 lead, a long drift is being run into the hillside in diabase rock, to cross-cut the lead shown above, and is now in 240 feet, but has still some distance to run before the lead will be reached.

Some 450 feet above No. 1 lead there is a second parallel lead, known as No. 2, into which a tunnel has been driven for 51 feet, showing low-grade ore for about 20 feet.

Still farther up the hill there is a third parallel lead which out-crops 450 feet above No. 2 lead; this has been prospected by a short drift of 38 feet, showing some ore in quartz stringers.

The transportation problem is an easy one, as there is a good grade for a tramway to salt water.

The head office of the Swayne Mines is in Seattle, with a branch office in Vancouver.

MISCELLANEOUS REPORTS.

THE BULKLEY VALLEY AND VICINITY.

By W. W. LEACH.

(From Summary Report, 1908, Geological Survey of Canada.)

During the past season the work undertaken in this district was chiefly in the upper parts of the valleys of the Morice and Zymoetz (Copper) rivers, though some time was spent in collecting sufficient geological and topographical information for the compilation of a new and enlarged edition of the map published last spring.

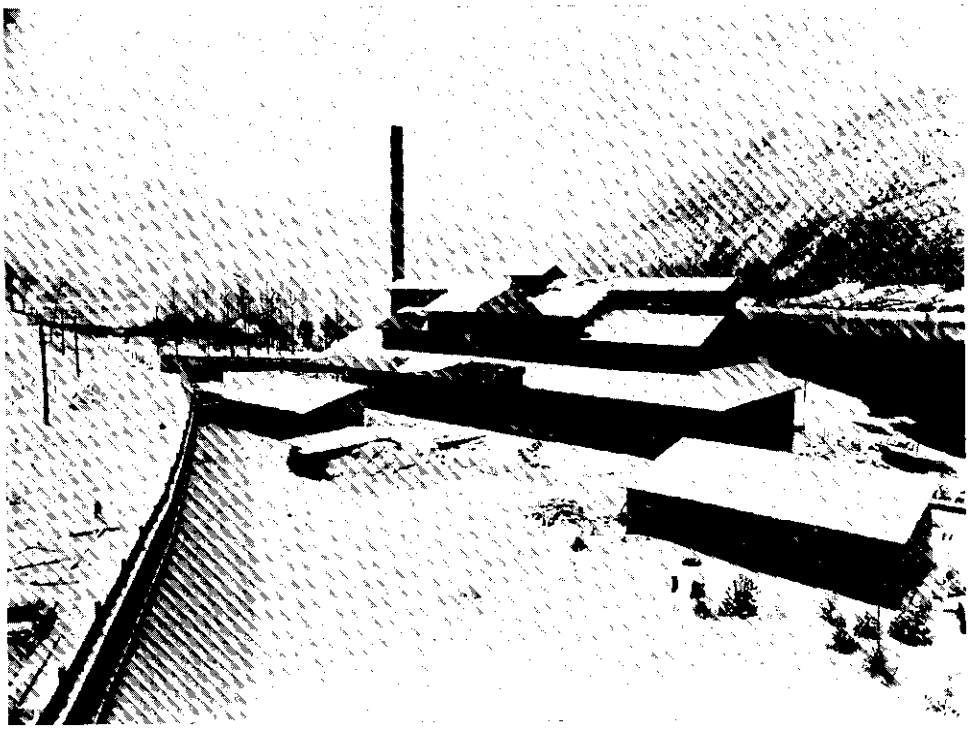
MORICE RIVER DISTRICT.

As the season was exceptionally late, it was found necessary to spend the earlier part of it in the lower levels; the valley of Clarks fork of the Morice being the first point to be visited. This stream rises with the south fork of the Telkwa, near Howson camp, in a wide, flat pass with an elevation of about 3,600 feet, thence its course is nearly due south for a distance of about 20 miles, when it unites with the main Morice river. Its chief tributaries are Starr creek, Goldstream, Gabriel creek, and a large unnamed creek coming in from the east a few miles below Gabriel creek. From the mouth of Gabriel creek down, the valley is wide, the hills on either side being comparatively low, with gentle slopes, while the grade of the stream itself is not great.

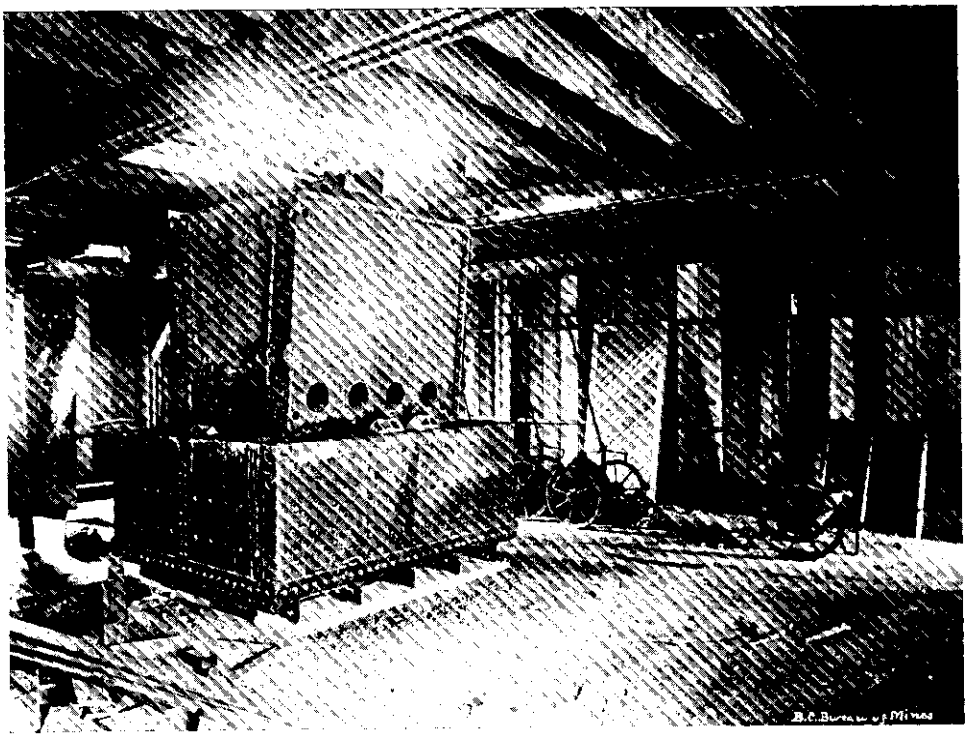
Geology.

From the pass southward to about one-half mile below the mouth of Gabriel creek, the rocks met with consist of the volcanics of the Porphyrite group (underlying the coal-bearing beds), except for a short distance midway between Starr creek and Goldstream, where the basil conglomerate of the coal series crops. It appears, however, that here the coal seams have been almost entirely eroded.

A short distance below Gabriel creek, the conglomerates again outcrop on the west side of the river, for a distance of at least eight miles, that being as far south as the valley was explored. Along this stretch the river follows pretty closely the strike of the rocks, near, but usually a little west of a synclinal axis. On the west side of the dip of the strata is very low, conforming more or less to the slope of the hills. Practically the whole of the coal measures above the conglomerates has been lost by erosion. On the east side of the valley, however, the hills have a steeper slope; the dips are quite low and the synclinal axis is roughly parallel to, and some distance to the east of, the river bottom. Taking these facts into consideration, it was thought probable that an important coal basin might be found on the east side of the valley. Some days were spent, therefore, in carefully examining a number of small creeks on the east side, with the result that the conglomerates were found outcropping at from one to one and a half miles back from the river, at elevations varying from 400 to 600 feet above it, and with westerly dips. The conglomerate here appears to reach a much greater thickness than where observed elsewhere in this country. Two distinct beds were noted, the lower one about 100 feet thick, and the upper probably 30 or 40; they are separated by about 50 feet of soft sandstone. On a small creek, about one mile below Gabriel creek, and about one mile



CANADA ZINC CO.'S PLANT, NELSON, B. C.



ELECTRO-THERMIC FURNACE, CANADA ZINC CO., NELSON.

from the river, the coal-bearing shales were seen overlying the conglomerates. Two coal seams were here found, the lower one showing three feet of coal, with no roof, while the upper one gave the following section:—

Clean coal, 12 inches; shale, 4 inches; coal, 3 feet 6 inches.

Later on in the season this point was again visited, when it was found that during the interim Messrs. C. B. Clark and T. Howson had done considerable prospecting in the vicinity, and staked a number of coal claims. They had opened up what is undoubtedly the upper of the above-mentioned seams, at several points, showing it to be about ten feet thick and dipping to the west at thirty degrees. At none of these openings had they reached below the level of the surface waters, the coal in all cases being wet and decomposed, so that any sample taken at that time would hardly give a fair idea of the character of the coal. The seam, however, appeared to be quite regular, except at one point, where a slight local disturbance was noted.

The following analysis is from a sample taken under the conditions already mentioned. It can be confidently expected that the percentage of moisture, and probably of ash, will be materially reduced in a sample taken under more favourable circumstances:—

Moisture	10.81
Volatile combustible matter	31.22
Fixed carbon	48.62
Ash	9.35

Coke, non-coherent.

This area appears to be one of the largest in a district where the coal beds occur, as a rule, in small basins. Although the seams were opened up at one point only, still there is little doubt that this basin extends down to the forks of the Morice, and probably widens out below the place where the seams were stripped, at which point it is approximately three-quarters of a mile in width.

The general attitude of the strata is quite regular; the valley is wide, with an easy grade, and no serious engineering difficulties need be looked for in the construction of a branch line of railway down the Morice river, to connect with the main line of the Grand Trunk Pacific. There is a plentiful supply of timber in the valley for all future mining purposes.

Goldstream Coal.

On Goldstream, to the north-west of this area and separated from it by a short distance only, another important coal basin is found, which was briefly described in last year's Summary. Since then, however, the locator, Mr. F. M. Dockrill, has opened up the seams at several new points, which proves this basin to be at least as large, and probably larger than it was estimated to be last year, viz., two by two and one-half miles.

The following results are from analyses made of samples taken this season:—

	Moisture.	Vol. Comb. Matter.	Fixed Carbon.	Ash.
(1) 8 ft. seam	4.67	30.55	55.23	9.55
(2) 6½ ft. seam	6.36	28.36	58.75	6.53
(3) 3½ ft. seam	6.86	27.24	59.47	6.43

Coke, non-coherent in all cases.

All these samples were from surface coal, so that the percentage of moisture is in all probability higher than what will be found at greater depth.

ZYMOETZ RIVER DISTRICT.

Two other coal areas were examined rather hastily, both on that branch of the Zymoetz river which rises with Pine creek near the Hudson Bay mountain.

Glacier Creek Area.

The first of these is situated near the head of the river, which here occupies a wide, marshy valley. The coal-bearing beds were seen cropping in the bed of Glacier creek, a small stream rising in the Hudson Bay mountains and entering the Zymoetz from the east. The contact of the conglomerate and the underlying volcanics is at an elevation of from 500 to 600 feet above the valley, and at this point the strata are very highly flexed and otherwise disturbed, but have general high westerly dips. Following down the creek from the contact, it was seen that everywhere the rocks have been severely folded and faulted till near the flat, where they become more regular, dipping under the valley to the west at about twenty degrees.

Some time was spent here in an endeavour to uncover a workable coal seam, but without success, although a number of small seams, from four to nine inches thick, were stripped. It would appear probable that the large seams of Goat creek are here split up into a number of small ones, though it is possible that larger ones do exist, whose outcrops are covered deeply with drift.

The coal here is very hard, with all the appearance of an anthracite, but the one sample taken showed by analysis such a high percentage of ash as to render it useless.

Coal Creek Area.

About eighteen miles from Glacier creek, down the Zymoetz river, on its north-west bank, another area of the coal-bearing beds is met with. The best exposures are seen in a small stream from the north-east, locally known as Coal creek, which cuts the strike of the rocks at a wide angle. The beds here appear in the general form of a shallow syncline, with a general strike nearly north-west and south-east; but there are many minor undulations and the strata were seen to be faulted in a number of places. The width of the basin is probably about two miles, but its extent along the longer axis was not seen, though it is fairly certain that it does not go any great distance south-east of Coal creek. To the north-west the country has a gentle slope, is heavily drift-covered, and for a considerable distance there are no transverse valleys, so that it was found impossible to trace the coal-bearing beds further in that direction in the time available.

A number of coal claims have been staked here by Mr. J. Ashman, but so far little or no work has been done. Two small seams only were seen outcropping in the bed of Coal creek, about one and a half miles above its mouth. The lower of these showed 3 feet of clean coal, while the upper one was 1′ 4″ in thickness. Mr. Ashman has since informed me that he overlooked another seam that had been uncovered a short way from the bank of the creek and farther up-stream, which was about 5 feet thick, with a small parting. The following analysis is from a sample from the lower or 3-foot seam:—

Moisture	5.45
Volatile combustible matter	34.03
Fixed carbon	48.17
Ash	12.35

Coke: partly fritted.

On the other coal properties, which have been described in previous reports, no new work has been undertaken during the past year, as all the owners of the lands in question are waiting for railroad construction before going to the expense of further development.

Mineral Claims.

During the past season comparatively few prospectors were in the district, and new discoveries of importance were rare, while on the older and better known properties little work was attempted, except the annual assessment work required by statute.

On the Hudson Bay mountains, more particularly on their western slopes, a number of claims are located and a large amount of prospecting has been done. The geological conditions here are very similar to those in the neighbourhood of the copper claims of Howson and Scallon creeks, described in previous reports, the ore occurring in dykes from or near the edge of an eruptive area.

The northern part of the Hudson Bay mountains is composed of rocks of the Porphyrite group, chiefly volcanics (andesites, tuffs, etc.), but including, towards the top of the series, some sedimentary beds. These rocks have been very severely folded and crumpled; some splendid examples of folding on a large scale showing very plainly on the bare rocky walls of the higher peaks. Towards the southern end of this group of mountains, extending nearly down to the Telkwa river, there is a large intrusive area of granite-porphyry, which has shattered, dyked and altered the volcanics near its edge to a very large extent, thus affording channels for the ascent of mineral-bearing solutions.

Most of the chief showings are on a group of claims which are quite close together, and reached by a number of short branch trails from the main Aldermere trail.

Coronado Group.

On the *Coronado* group a considerable amount of work has been done, consisting of open-cuts, by means of which the vein can be traced for the length of two claims. The ore occurs in what appears to be a dyke from the intrusive porphyry area, striking about north-east, with a nearly vertical dip, the strike conforming very closely to the slope of the mountain, here very steep. At the lowest opening a cut has been made 35 feet long and 12 feet deep at the face, exposing a lens of almost pure galena, varying from 14 inches in width at the face, to nothing, 12 feet back from it. Four and one-half tons of galena were shipped from the opening to a smelter, but the writer was unable to hear with what result. On the western or hanging wall there are about 3 feet of siliceous vein filling, carrying a little pyrites. A specimen of the clean galena gave by assay: gold $1.20, and silver 62.63 oz. to the ton.

In the other cuts, farther up the mountain, the ore shows much less galena, but the mineralisation is fairly heavy as a rule, one opening exposing about 4 feet of ore with no walls, the ore consisting of galena, blende, arsenical pyrites and lead carbonate in a quartzose gangue, but all much decomposed. A sample from this point assayed as follows: gold $10; silver 3 oz. to the ton.

Near the eastern boundary of the *Coronado*, on the west bank of Sloan creek, a similar and parallel ore-body has recently been discovered. Here a lens of galena, nearly pure, but carrying a little blende and chalcopyrite, has been uncovered, the greatest width of solid ore being 14 inches. This vein has been traced about 200 feet along the strike to the north-east; but as only the surface dirt has been removed in two or three small holes, the character of the ore could not be definitely seen. A specimen of the solid galena on assaying, gave: gold $4.40; silver 36.47 oz., to the ton.

Victor Group.

The *Victor* group, consisting of the *Standard*, *Victor* and *Triumph* claims, is situated west of the *Coronado*. The ore occurs in and along the east wall of a dyke about 60 feet wide, striking about north-east, and dipping at 80 to 90 degrees south-west. It has been traced by

means of open-cuts up the hill for a considerable distance. In the lowest cut about 3½ feet of ore are exposed, consisting of galena, blende and pyrites, irregularly and rather sparsely distributed in a gangue of altered dyke rock and a little quartz. The ore appears to follow a line of faulting and shearing parallel to the walls of the dyke. Fifty feet up the hill the ore has narrowed down to about 8 inches, with 3 inches of clean galena, a specimen from which assayed: gold, trace; silver, 43.33 oz. per ton.

Continuing up the hill, a number of superficial cuts show the dyke rusty and decomposed, and varying from 12 to 60 feet wide, with mineralisation strongest along the hanging wall. In one of these cuts about 2 feet of ore was seen, composed of blende, arsenical pyrites, with a little galena and chalcopyrite. At the highest opening up the mountain, about 2½ feet of ore is exposed, here highly decomposed and consisting of stringers of galena, associated with much lead carbonates. A sample from this point gave the following results by assaying: gold, 20 cents; silver, 39.20 oz. per ton.

Dominion and Newcastle Group.

The *Dominion* and *Newcastle* claims are located on the east bank of Sloan creek, near its head. On this property a dyke about 6 feet wide cuts the country rock, consisting of greenish and grayish andesites. The dyke, with nearly vertical dip, has the usual north-east strike, and where opened up by means of a shaft and several open-cuts, is very heavily mineralised, the chief constituents of the ore being blende, arsenopyrite, iron pyrites, a little chalcopyrite and a very little galena, in a gangue of altered dyke rock and much quartz.

Two samples were taken here, the first consisting of the general run of the ore, while the second was from a band of almost pure arsenical pyrites; the results by assay are as follows: (1) gold $5.80 silver 12.40 oz.; (2) gold $3.60, silver 0.55 oz.

Humming Bird Claim.

On the *Humming Bird* claim very little work has been done (by no means sufficient to prove the extent of mineralisation) consisting of several small cuts, the chief one of which is about 15 feet wide, with neither wall uncovered. The rock is much decomposed, with a considerable quantity of a black, earthy material on the surface, which in the laboratory was proved to consist largely of pyrolusite. Beneath this decomposed material the ore is composed of blende, arsenical pyrites, galena, and iron pyrites in a felsitic gangue of altered dyke rock, much shattered and brecciated; the mineralisation being irregular and somewhat sparse. An assay of a sample from this cut gave the following results: gold, 60 cents; silver, 10.37 oz. per ton.

Limestone.

As limestone suitable for smelting purposes has not before been noted from this district, the discovery of a bed of good quality may be of interest. This limestone occurs on the north side of the pass followed by the old trail from Moricetown to Hankin's camp, on the Zymoetz river, and not far from the summit. As the only outcrop seen was in heavy timber it was impossible to to ascertain the thickness of the bed, but it would appear to be of good size. The following analysis was made in this office:—

Insoluble matter	1.31 per cent.
Fe_2O_3 Al_2O_3	1.30 "
$Ca\,CO_3$	92.41 "
$Mg\,CO_3$	3.63 "

As the writer was on the point of leaving Hazelton for Ottawa, a number of samples of ore were brought in from a reported discovery near that town. The ore consisted chiefly of stibnite and gray copper. As the snow was then deep in the mountains it was not possible to investigate this new find at that time.

PLANT OF CANADIAN ZINC CO. AT NELSON.

Snyder Electro-thermic Smelting Process.

Report by Provincial Mineralogist.

Sir,—I beg to report that, in accordance with your instructions given me October 1st, I visited Nelson and made an inspection of the plant and process of the Canadian Zinc Company. I arrived in Nelson on October 13th, and on the 14th arranged for an examination of the zinc plant the following day, the 15th. The president of the company, Mr. Robert Irving, and the technical adviser, Mr. F. T. Snyder, offered me every facility and greatly expedited my examination by providing me with copies of the working plans and photos, which I submit with this report.

The plant is located about one mile from the town of Nelson, on a plat of about two acres of nearly level land, facing on the water of Kootenay arm, adjoining the shipyard of the C. P. Railway, and having a good waterfront on which a wharf could be easily constructed. A spur line has been run into the works from the C. P. Railway, over which cars are run direct to plant, thus giving direct railway connection with all branches of that railway in the Kootenays. The transportation facilities would, therefore, appear to be all that could be desired, and the works not tied up to any one line of transportation.

The smelting plant is contained in one main wooden building about 34 feet wide by 132 feet long, with a lean-to, 11 feet in width, extending along one side and end. The main building is 22 feet high to the wall plates at the ends, but 28 feet at the central portion, over the bins and roasting furnace. The roof is one-quarter pitch and shingled. The framework of the building is entirely made up of 2 by 10-inch plank, and, where necessary for strength, these are grouped together with spacing pieces and spiked, a style of construction not often seen in this Province, but extensively used elsewhere, giving a very rigid structure and one which can be very quickly erected with unskilled labour and at a comparatively low cost. All the posts supporting the building are set in substantial concrete blocks. The foundations of the furnaces and bins are separate from those of the building, and consist of concrete blocks of ample dimensions.

In addition to the main smelter buildings, and separate therefrom some distance, is a wooden transformer building, wherein the high voltage electric current is reduced. A temporary material shed and workshop and a temporary office and laboratory have also been erected in the grounds.

Handling of Material.

The railway track runs alongside the eastern side of the smelter building, the arrangement permitting of ore being unloaded economically from cars on to the floor of the lean-to, on the same level as the main floor of the building. As yet the arrangements only admit of the treatment of crushed ore or concentrates, as no crushing plant has been provided. The ore is received at the south end of the building, where ample floor space is provided for its reception and sampling. From this sampling floor the ore is elevated by a bucket elevator and dropped into any one of a series of ore-bins, from which it can be fed, through an automatic feeder, to a second elevator and carried to the hopper of the roasting furnace. The roasted ore from the furnace, after having passed through a "cooler," is again elevated and deposited in the furnace bins, which discharge into barrows on the feed floor of the smelter.

The plant contained in the main smelter building consists of, 1st, a standard type "McDougall Roasting Furnace," 14 feet in diameter. This furnace is essentially a cylinder of iron, 14 feet in diameter and about 25 feet high, having a brick lining about 12 inches thick, and

is divided into a number of flat, horizontal hearths, built of brick. In the centre of the furnace there is a central, vertical water-jacketted shaft, to which is attached at each hearth two horizontal arms with rake-like teeth. The central shaft revolves, driven by gearing, operated by an electric motor, causing the arms to rake the charge of ore which is on each hearth, and gradually to work the ore to a hole in the hearth through which it falls to the next hearth below, where it is again distributed over its surface, and so on until the roasted ore is discharged at the bottom into a water-chilled "cooler" and thence to an elevator by which it is elevated to the smelter bins.

This furnace is automatically fed from an overhead hopper and is throughout as nearly automatic as possible, requiring little attention. This class of furnace has been thoroughly tested and proven at many large works in the United States, and is no experiment.

This roasting furnace has a capacity of about 25 tons of ore a day, roasted to, say, 5 per cent. sulphur, as is required for further operations, and, with the class of ore expected to be handled, should require no fuel, as the sulphur contained in the ore should supply the requisite heat. The fumes from the roasting are led from the top of the furnace to a brick flue and brick dust chambers underneath the floors of the building, and thence to a reinforced concrete stack about 165 feet high and 48 inches inside diameter.

Electric Smelting Furnace.

The installation of the electric furnace was not completed on October 15th. It is, however, in its general construction very like an ordinary, rectangular, water-jacketted, lead blast furnace, with inside dimensions of 34 by 54 inches. At either end a carbon electrode is conducted through the end jackets, while a third electrode is connected and built into the furnace bottom. From a frame-work above, three cylindrical carbon electrodes each 9″ diameter, are lowered into the furnace, their height above the bottom being regulated by suitable gearing hung from the roof truss. In operation, the electric current entering by these three suspended electrodes will pass to either the end or bottom electrodes, the electric arc so formed generating the requisite heat for smelting the ore which is fed into the furnace, from the charging floor level, around the electrodes.

The products of the fusion are expected to be slag and matte, run off through a suitable iron spout; lead, collected in the bottom of the furnace and ladled out of a lead well; and metallic zinc, which, it is expected, will be condensed on the cool sides of the jackets and, running down, flow out of openings in the side of the furnace, through carbon blocks perforated by a small hole. Of the process I cannot give any results, as the furnaces had not been operated, but the electrical furnace, as partly erected, is a good piece of mechanical work and appears to be well suited for the work it is expected to do.

The electricity is to be obtained from the Bonnington Falls power plant, and is delivered by that company at the south-east side of the City of Nelson, across which city the Canadian Zinc Company has had to carry it, and to do so has built a pole line, some three miles in length, which is first-class in every particular—a high standard of construction being demanded by the city as a condition to its permission to pass through the city streets. The high voltage current enters the works directly to the transformer house, which is equipped with transformers capable of handling some 750 electrical horse-power.

Capacity of Present Plant.

The McDougall roaster has a capacity of about 25 tons a day; this is no experimental matter, but the result of extended working elsewhere on very similar ores. The capacity of the electric furnace is as yet a matter of expectation only, but it is expected to be able to treat about 15 tons of ore a day, and, as this furnace is calculated to consume 50 electrica

h.-p. per ton of ore, this would also be the limit of the present transformer plant. The roasting plant is, therefore, double the capacity of the rest of the plant—but it must be said that the roaster installed is the smallest stock size of the McDougall roaster built, which quite justifies the apparent "unbalance" of the plant—and provides roasting capacity for the duplication of the smelting furnace when that is shown to be necessary.

In a plant of this character, embodying, as it does, a "new departure" in metallurgy, it is essential that all the conditions possible should be placed beyond peradventure, which, I think, has been done in this case, and this of necessity has cost considerable money; but in my opinion, the money expended on the plant has been laid out judiciously and upon a well-thought-out plan. With this plant the electric smelter has every opportunity to succeed, and it is clearly "up to" that furnace to demonstrate the practical commercial possibilities of the process.

The only serious criticism I have to make on the plant is that I think there has not been sufficient precaution taken to prevent fire starting around the smelting furnace, where molten metal and slag may, through careless handling, set fire to the wooden floor and building; and a fire there, in such a very compact plant, would possibly result in its complete destruction. I should advise a filling in of this floor with solid earth, or a lowering of the wooden floor and a covering of it with 6 or 8 inches of concrete. As the building and plant form the chief security the company has to offer, I think this matter should be looked after and the plant kept fully insured against fire.

My instructions did not call for any investigation on my part of the financial conditon of the company, but the president, Mr. Irving, showed me his books, which showed that the company had no outstanding debts, save a few small current monthly bills.

REPORT ON "BUMPS" IN CROW'S NEST COAL FIELD.

By Provincial Mineralogist.

Under instructions received on October 1st, the Provincial Mineralogist proceeded to Fernie to investigate as to the cause, and to suggest a protection against the so-called "bumps" which have occurred at various times in the No. 2 mine, Coal creek, of the Crow's Nest Pass Coal Company, and which have caused the death of several miners. He now begs to report as follows:—

"Bumps," what they are.

The term "bump" is somewhat descriptive of the sensation produced by their occurrence a certain distance away—a sudden jarring of the mine, produced by the sudden giving away or cracking of the strata above or below the coal seam.

Cause, in No. 2 Mine.

These "bumps" are caused by a combination of conditions, which may be summarised as follows:—

The great pressure from overlying measures, upon the rigid and inflexible roof of the coal seam, the area of pillars of coal left to support which, being insufficient, causes undue pressure, which pressure being transmitted to the underlying "pavement," a comparatively soft, carbonaceous shale, causes this shale to burst upwards in the openings made by the roadways, with the sudden liberation of gas contained in the shale. The shock so caused frequently jars down portions of the roof and slivers off portions of pillars of coal, with a probable further liberation of gas.

LOCATION OF MINE.

No. 2 mine is the most extensively developed mine on Coal creek and one of the first opened up, and it was here that the great explosion occurred in 1902, whereby many lives were lost. The general range of mountains in which the coal occurs runs north and south, on the east side of the Elk river, the coal outcropping on the face of these hills, high up above the valley of the Elk river, the seams dipping to the eastward into the mountains. Coal creek, flowing from the east into Elk river, has cut a deep V-shaped valley into and at right angles to the mountain range. The development of the coal field took place where the coal seams in their dip met the valley of Coal creek, permitting of adit levels or tunnels being driven north and south in from the creek valley on the coal seams, in the direction of their strike. The workings, when they started, had a little overlying covering to cause pressure on the coal roof, but as the work progressed into the hill this cover rapidly increased, until, in No. 2 mine, the covering rocks are now from 2,000 to 2,500 feet thick, representitg a pressure on the coal roof seldom equalled in the history of coal mining.

To add to the destructive effect of this pressure, the valley of Coal creek cutting across the measures leaves them supported at one end only, so to speak, like a beam supported at *only one end; whereas in most of the deep mines elsewhere the coal is reached by a shaft* and the measures have support from both sides—like a beam supported at both ends.

The result of the support of the measures being on one side only, is that the extraction of coal, starting from the creek or unsupported side of the measures, causes the measures to tend to slide towards that side, inducing a "creep" and tendency to overthrow the pillars of coal left for support of the roof, thus greatly increasing the destructive effect of the great roof pressure.

"Creep" is less dangerous with large pillars than with small ones, but, unfortunately, in the mine the pillars left are unusually small, as will be seen in the accompanying plan of the mine.

DESCRIPTION OF COAL MEASURES.

The overlaying measures consist of very hard sandstone, conglomerates and argillites, so tough and strong that they do not "cave" and fill up the space where pillars are drawn over smaller areas. These measures are rigid and inflexible and press down as one solid mass upon the remaining pillars.

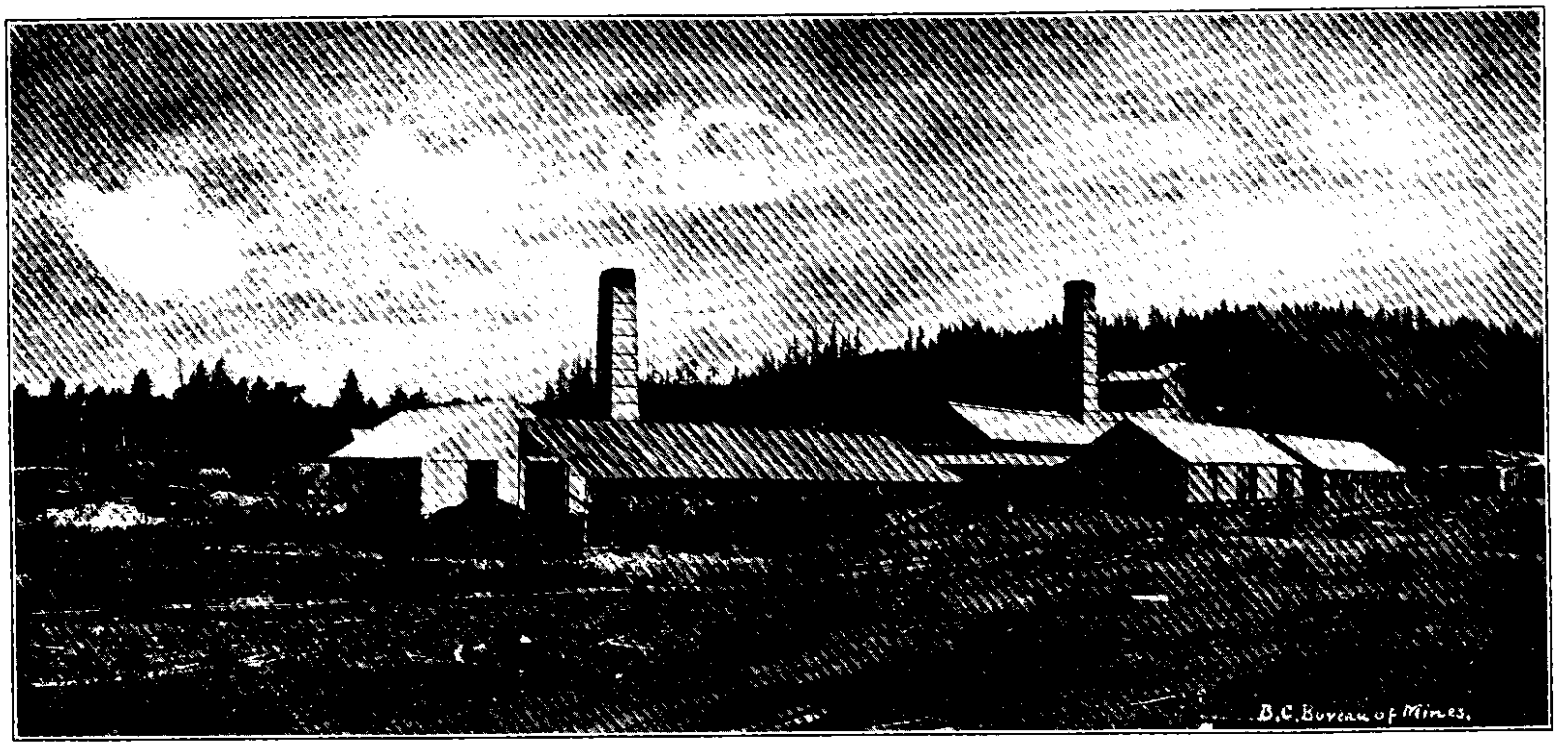
Immediately overlaying the coal seam there is, varying from one to three feet in thickness, a very hard shale—a false roof—which parts readily from the main roof above, and, while it is strong enough to stand in most instances with little or no timber, under sudden concussion, or in course of time, it is liable to fall in the roadways and openings and has been the cause of a number of serious minor accidents.

The coal seam varies in thickness, say from six to twelve feet; the coal is strong and firm, as is shown by the pillars remaining intact, save where such pillars are small and have stood for considerable time.

The "pavement" or strata underlying the coal seam is a shale much softer and more friable than the overlaying strata, containing much carbonaceous matter, and presumably carrying and harbouring considerable gas.

EXTENT OF WORKINGS.

Main Entry.—The workings of No. 2 mine extend into the mountain for about 4,000 feet in a straight line from the tunnel mouth, and have an average width at right angles to this line of about 3,000 feet; the workings therefore, extending over an area of about 275 acres.



VANCOUVER FIRE CLAY CO.'S PLANT CLAYBURN, NEW WESTMINSTER M. D.

The coal seam is not in a true plane—that is, the dip varies somewhat—and while some attempt has been made to keep the main entries straight, or nearly so, this has only been accomplished at the expense of varying grades or of taking down roof and taking up pavement. This could scarcely be demanded in the subordinate levels and roadways, and these have more or less closely followed contour levels or grades. Consequently, these subordinate drivages are very crooked, causing the pillars left to be rather irregular in shape and size, as will be seen by reference to accompanying plan of the workings.

While there was some excuse for these very irregular workings, they were admittedly not in accord with the best coal mining practice, which fact the company evidently recognised, as at about 2,800 feet in on the Main entry, at No. 2 West level, a change of plan was adopted and this and subsequent levels were driven straight and the workings therefrom set off with regularity and according to plan, leaving pillars larger than formerly and laid out with considerable regularity. This more regular work continued to the No. 5 West level and most of the pillars between No. 2 and No. 5 were thus able to be and were extracted—practically the only part of the mine where this has been done except in an adjoining area, to the east of the High Line entry and worked from that entry.

Inside of No. 5 West level the workings have been extended for some 500 to 600 feet and some "long-wall" work carried on for a time, but afterwards abandoned for pillar and bord workings, which again assumed a very irregular form with little regard to any defined shape of pillar, although the pillars left were larger than formerly.

High Line Entry.—The High Line entry is a practically level entry branching off the Main entry, some 100 yards from the tunnel mouth, bearing to the westward and running on a contour line around the western edge of a local sag or basin in the coal seam. For about 3,000 feet in on this entry, viz., as far as No. 1 East level, all the workings off this entry are exclusively to the right (west) side; for the remaining 2,000 feet the entry has been driven, the workings continue on the west, but levels have been run to the east, and these east workings join the workings to the west of the Main entry. To the west of the High Line entry the coal rises, eventually outcropping in a cross gulley which flows into Coal creek. In consequence of this rise, and the configuration of the hill, the workings to the west of the High Line have a comparatively light and decreasing overburden, and no great difficulties have been met with in this section due to weight of overburden. The workings off to the east of the High Line, for the purposes of this report, might be considered as part of the workings off the Main entry, of which they really form a part, although the coal therefrom came out the High Line entry.

No. 3 Mine.—To the east of the Main entry the workings are to the dip, and are operated through two slopes, Nos. 1 and 2. No 1 slope goes down to the dip from the surface, just outside of the Main entry, and was formerly considered a separate mine—No. 3 mine. The No. 1 slope workings have been conducted with greater regularity as to plan, and the pillars are more regular and larger, while at the same time they underlie the valley of Coal creek and have not as yet worked under the mountain to any extent, so, consequently, have not as yet met with excessive pressure from overburden. These workings have not been troubled by "bumps" or similar manifestations. No. 2 slope, or "Beaver's Deeps," branches off the Main entry (at some 1,700 feet in) to the east, and towards the dip, for some 1,300 feet. From this slope workings have been pushed to the south for about 1,000 feet at the upper part of slope and about 600 feet at the bottom of the slope. In the upper workings the pillars are small and irregular, but have as yet given no serious indication of weakness. In the lower of these workings the pillars are larger. All these workings are getting under the mountain and are subject to heavy pressure, but have not as yet shown dangerous symptoms.

PRESSURE ON PILLARS.

The pressure on the coal roof induced by an overburden of 2,000 feet in thickness would be about 160 tons per square foot, over the whole roof surface and when pillars alone are left to support it, the weight is concentrated on to the area of these pillars. The pillars left standing represent, approximately, only 50 % of original coal area, and, consequently, the pillars have to sustain about double the roof pressure, or about 320 tons per square foot. This they appear to have so far been able to do, but, as pillars deteriorate from exposure and other causes, they are gradually approaching the limit of endurance.

"BUMPS"—LOCATION OF AREA AFFECTED.

There have been from eight to ten important "bumps" in No. 2 mine, and these seem to be increasing in violence as time goes on. Several years ago slight "bumps" were reported, but they were unimportant in effect, and it was not until June, 1906, that they were noted as dangerous. In January, 1907, the first "bump" causing loss of life occurred, since when there have been three others, the last on July 31st, 1908, when 24 men were cut off and all would have been suffocated had it not been for a supply of fresh air supplied by a break in the compressed air pipes, enabling 20 men to be saved. The report of this last "bump" shows a great accumulation of gas to have been liberated, with a breaking down of return air overcasts and a complete blocking up of the Main entry for some 600 feet.

The location of the eight more serious "bumps" are marked on the plan by a red ink cross (x) and are lettered in order of sequence. A reference to this plan will show that the area of disturbance in which all these "bumps" have occurred is between the Main entry and the High Line entry and immediately surrounding and including the area from which the pillars have been extracted, an area of about 1,500 by 1,000 feet, and this area stretches across from one entry to the other. These facts would indicate that the sagging of the roof over the area from which the pillars had been extracted caused an undue pressure on the immediately surrounding pillars, which, transmitted to the pavement, apparently caused it to burst upwards, with the liberation of gas and accompanying shock. There was apparently no serious caving of overlaying measures, that might fill up the space and relieve the pressure. The area of pillar extraction—some 30 to 35 acres—is located in the centre of the mine workings and under an overburden of about 2,000 feet. In the present case the disturbances have, so far at least, been localised—whether they will spread to the rest of the workings, time only will show. I think there will be no sudden outburst, provided no further attempts are made to extract pillars, from a central area which has stood for some time. If the extraction of pillars had been commenced within a reasonable time and from the outcrop, the roof might probably have subsided behind such workings quietly and no serious disturbance have taken place.

CONCLUSIONS ARRIVED AT.

The mines of this company have admittedly been opened up and carried on with little regard to any defined regularity of plan, and with more regard to the then present than to the future and the development of what must become very extensive mines. The imperative demand for coal during the earlier history of the mines caused the company to try to meet that demand from an insufficient mine development. The result was that the future of the mine was neglected, and it has now come to a pass where strenuous measures have to be adopted by the company to overcome the difficulties brought about by what seemed then to be expediency and to lay the foundation for extensive workings. The pillars left are so small and irregular, particularly in the earlier workings, and have been left standing so long, that it is a question if they could be now extracted with either safety or profit. While the presence of

these pillars does not constitute a direct menace, the absence of sufficient barrier pillars to protect the roadway and airways renders it undesirable that extended workings be continued through them.

The "bumps" have occurred only in the immediate vicinity of an area where the pillars have been extracted, and it is highly probable that they will be confined to such locality, so that no extended danger is expected outside of this vicinity, provided no further extraction of pillars is undertaken in the old workings where the overburden is excessive. The zone of danger from "bumps" extends completely across the mine from Main entry to High Line entry, inside No. 1 West level, Main, and No. 1 East level, High line.

REGULATIONS RECOMMENDED.

In view of the foregoing, I would recommend—

1st. That the company be prohibited from continuing any of the present workings of No. 2 mine, lying between the Main entry and the High Line entry inside of No. 1 West level, Main entry, and No. 1 East level, High Line, or of extracting pillars within this area of this mine. Such prohibition to include the Main entry and parallels inside of No. 1 West level. (Outlined in red ink.)

2nd. That such proscribed area may be enlarged, should it be found in course of time that serious "bumping" or other disturbances have taken place beyond the present limits.

3rd. That future workings into the virgin coal field, lying inside of present workings of No. 2 mine, be not permitted to be made through the proscribed section of No. 2 mine.

4th. That a solid barrier pillar, at least 300 feet thick, be maintained between any new workings in virgin field mentioned and the proscribed area.

5th. That, as far as possible, the proscribed area be shut off from the remainder of No. 2 mine by substantial stoppings, and the return air from ventilation thereof be conveyed to main return airway by separate air return.

I might say that I believe the present general manager, Mr. J. D. Hurd, to be in accord with the above proposals—in fact, he has already anticipated them and his new plans have been so made. The only necessity for the restrictions being legally placed would be to guard against a change of policy on the part of the company.

PLANS FOR FUTURE WORKINGS PROPOSED BY PRESENT MANAGEMENT.

The plan proposed by Mr. Hurd for the development and working of the coal field lying inside of the present or No. 2 Mine is shown in yellow pencil on accompanying blue print, and consists in running two parallel drivages or slopes for a distance of from 2,600 to 3,000 feet into the virgin coal field, starting at a point in the lower Beaver's Deeps workings. From the end of these drivages, levels and counters would be driven off in either direction. After leaving solid pillars of 300 feet on either side of drivages, 900-foot panels would be opened up towards the old workings, opened up for a distance of 1,000 feet above the levels by four inclines 300 feet apart. From these inclines rooms would be set off, starting from the top of incline, to be immediately followed by the extraction of pillars in the upper rooms, simultaneously with the completion of the lower rooms. This extraction of pillars would continue to within 300 feet of the level, when a 300-foot pillar would be left to protect the level. Between one panel and the next there would be left a solid pillar of 200 feet.

This proposed plan is, of course, dependent on the finding of suitable coal in the new field, and, therefore, for the present, the work being done is prospecting work only.

The roadway from the tunnel mouth to the beginning of the new drivages would be made through the old workings of Beaver's Deeps, which have as yet shown no sign of weakness and will, in all probability, be found safe. If not so found, it may be necessary to drive independent tunnels from Coal Creek valley to connect with the new drivages, possibly through an underlying seam.

I might say that Mr. Hurd has already started to establish this system of working in all the company's collieries. Properly carried out, the proposed system would seem to correct many of the troubles met with in these mines, and is a substantial guarantee that the company is determined to abandon the—to a certain extent—make-shift policy which has been forced on it by circumstances, and to adopt a systematic plan of exploitation which will assure the safety of the mine and of the mine workers.

The cost of this change will be great, both in the outlay of money and the curtailment of production for the next year or two. Some future regulations may have to be made as to the height of these new drivages, so as to guarantee they would not be completely closed up by a raising of the pavement. There is also some question as to whether the extraction of pillars from the panels, as planned by Mr. Hurd, might not induce "bumps" as in the present case, and also whether it will be practicable to maintain such long single inclines in the panels; but the scheme given is only an outline and subject to variations as conditions demand.

THE CLAY DEPOSITS AND INDUSTRIES OF THE COAST.

NOTES BY THE PROVINCIAL MINERALOGIST.

It is only within recent years that there has been any general demand in British Columbia for brick and other clay products for building purposes, as in the younger days of the coast cities wood was used for most buildings, since it permitted of more rapid and economical construction, and, owing to the mildness of the climate, was amply sufficient. Of recent years, however, the growth of the cities with their more condensed population, and the necessity, within "fire limits," for at least partially fire-proof construction, has made a large demand for clay products for building purposes. This demand has probably been further increased by a feeling among the population of less temporary settlement, which calls for a more permanent class of building.

The demand for brick and similar clay manufactures is consequently insistent and ever-increasing; therefore, the ability of the district to supply the raw products to meet this demand is a matter of great importance to the community, and British Columbia is fortunate in having in almost every district an abundant supply of clay suitable for ordinary brick-making purposes, while, in certain districts, there have already been proved to be clay deposits of a quality suitable for fire brick, pottery, ornamental brick, etc. The demand for the more permanent and fire-proof building materials, such as stone, brick and cement, naturally occurs chiefly in the larger cities, and as, in British Columbia, these are in the Coast district, it is in this district chiefly that the production of these materials has, as yet, received any marked development.

The Reports of this Bureau have already contained accounts of the "Stone Quarries of the Coast," of the Portland Cement Company's works at Tod inlet (1904), and also of the manufacture of silica-lime brick near Victoria (1907). It was, therefore, thought desirable that some description should be given of the clay industry of the Coast district and of such clay deposits as have been developed or are known as suitable for development; consequently, the Provincial Assayer was instructed to collect data and prepare a report on this subject, which he has been doing during the past two years; his report on the subject is appended hereto.

The value of a clay deposit depends upon so many varying factors, all of which must be taken into consideration, that no general rule can be followed, but each case must be considered separately on its relative merits from a purely commercial point of view, and the chemist can do little more than supply certain data which may be taken into account in such consideration. Among the questions to be considered are :—

Market.—Price obtainable and demand for class of product to be made:

Costs.—Of deposit, of labour, power, water supply, fuel, supplies and transportation of the product to market.

These considerations are general for a locality; the individual deposit must be considered with respect to facilities for operating, which includes yard-room, the amount of water to be encountered in the yard and workings, and facilities for getting rid of such, the physical condition of the deposit, namely, its freedom from boulders, gravel, etc.; the percentage of sand, whether too much or too little. It is only when the adaptability of a clay for a certain specified purpose is being considered that the laboratory need be consulted.

The "Ultimate" chemical analysis of a clay shows approximately what properties may be expected to be found in a clay, and, while it is a correct guide up to a certain point, it cannot be wholly relied upon, since the physical condition and particular state of combination of the various elements has an important bearing upon the resultant product. The clay chemist fully recognises this fact and has set about to evolve certain laboratory tests, which in character approach, as near as possible, actual working requirements. To this end he frequently substitutes for an *ultimate* analysis what is called a *rational* analysis, which method has for its object the determination of the percentages of the different mineral compounds present, such as quartz, feldspar, kaolinite, etc., and gives a much better conception of the true character of the material. For ordinary purposes the ultimate analysis is of greater value, and the rational analysis can be approximately calculated from it—although the process becomes complex—but clays agreeing closely in their ultimate analysis may still differ widely in their rational composition. A further examination, known as a "mechanical analysis," is frequently made to determine the mechanical condition of the ingredients of the clay, that is, what the proportions may be of clay material, silt, fine sand, medium sand and coarse sand.

Testing the Fusibility.

The question of the fusibility of a clay, or of any blende of clays or sand, is now tested, irrespective of any analysis, by a practical method giving results which appeal directly to the practical man, usually answering all that he requires to know. The system was devised by H. Seger, a German ceramist, and is based upon the fact that definite mixtures of certain substances have a definite melting or fusing point and will fuse at the same temperature if of the same shape and size. Mr. Seger devised a standard series of small cones, an inch or two in height, the ingredients of which were so proportioned that each one of the series melted at an approximately known temperature, so that when placed in a furnace the fusing of any of the standard series of cones shows the furnace to be up to the temperature of fusion of that cone, while the resistance to fusion of another cone shows the temperature to be below its fusion point. Seger's system is, therefore, a scheme of practical pyrometry, and Seger's cones have now become standard among clay workers, being obtainable, at a cost of a cent each, in Germany and the United States.

To test the fusibility of any particular clay mixture, it is moulded, in a standard mould, into cones of the exact size and shape of the Seger cones, and after drying, these are placed in a furnace with a number of Seger cones, so that the conditions as to temperature of all the cones will be as nearly uniform as possible. The heat of the furnace is then raised until th

cones of the clay being tested show, by drooping, that they are fusing; this same thing will have occurred at about the same time with one of the Seger cones, the number of which, its place in the series, is noted, and this gives very approximately the fusion point of the clay under examination.

The use of these cones has become so universal that the fusion point of a clay mixture is commonly stated by designating its equivalent number in the Seger standard series. The Seger cones are arranged in a series, numbered from No. 1, with a fusion point of 2,102° F., up to No. 36, with a fusing point of 3,362° F., while a descending series runs from No. .01, with a fusing point of 2,066° F., down to No. .022, with a fusing point of 1,094° F.

A most comprehensive and practical treatise on clays has been issued by the Geological Survey of the State of New Jersey, in which State the clay industry is one of the most important. It is written by Dr. Heinrich Ries, of Cornell University, and is entitled "The Clays and Clay Industry of New Jersey," and forms part of Volume VI. of Report of the State Geologist.

In New Jersey the practical running of a kiln is gauged by these cones, and the following are the cone numbers used in the different branches of the clay working industry in New Jersey, together with approximate fusing point of such cones, as given by Dr. Ries in the volume referred to:—

Product being Burned.	Number of Seger Cone.	Approximate Temperature in ° F. of fusing point.
Common red brick	.08 to .01	1,814° to 2,066°
Hard burned common brick	1 " 2	2,102 " 2,138
Buff front brick	6 " 8	2,282 " 2,354
Hollow blocks and fire proofing	.03 " 1	1,994 " 2,102
Terra cotta	5 " 7	2,246 " 2,318
Conduits	7 " 8	2,318 " 2,354
White earthenware	8 " 9	2,354 " 2,390
Fire bricks	9 " 12	2,390 " 2,498
Porcelain	11 " 13	2,462 " 2,534
Red earthenware	.08 " .05	1,814 " 1,922
Stoneware	6 " 8	2,282 " 2,354

CLAYS OF SOUTHERN COAST DISTRICT.

REPORT BY PROVINCIAL ASSAYER.

The clays of the southern part of the Coast district may be classified, according to their geological origin, into *Cretaceous* clays, clays of *Glacial period*, and clays of *Modern* origin.

1st. *Cretaceous* clays occur in and are associated with the coal measures of that age, and are somewhat developed at Comox, Extension and in the delta of the Fraser at Clayburn, from which are made pottery, fire-brick and other products requiring a clay having a high fusion point.

2nd. *Clays of the Glacial period*—which may be said to include all the deposits from which the common, or red, brick are now being made. These clays were produced by the grinding action of and deposited by an immense glacier, which, at one time, according to the observations of the late Dr. G. M. Dawson, occupied the whole of the Gulf of Georgia, discharging to the south, and having at its northern portion a maximum thickness of 3,000 feet. The glacial grooving and planing are to-day in evidence, to considerable heights, all

over the southern end of Vancouver Island and the adjoining mainland. With the melting of this glacier there was deposited by its waters in the existing depression of the land vast deposits of glacial drift, composed of clay, boulders, gravel and sand, sometimes separately and sometimes mixed, according to the conditions of the deposit.

This same cause was the source of the tremendous clay and sand deposits of the Puget Sound district of Washington, which extend—though to a lesser thickness—northwards into British Columbia, and, where they have not been subsequently denuded, are to be found covering most of the low and much of the higher ground on either side of, and the islands in, the Straits of Georgia, from the Seymour narrows south. As examples of such deposits may be mentioned Harwood, Savary, Sidney and a number of other islands in the Straits of Georgia, also the deposits of the Comox and Saanich peninsulas and those in the vicinity o Victoria.

The deposits in the vicinity of Vancouver and around the mouth of the Fraser river are also chiefly of this origin, although in the delta of the Fraser, in the low-lying areas, many of the clay deposits are modern. These glacial clays have a general chemical analysis about as follows:—

Silica	60 per cent.
Alumina	20 "
Iron oxide	9 "
Lime	4 "
Magnesia	1 "
Water and loss	5 "

Detailed analyses of each deposit are given in a list of analyses accompanying this report.

The fusion point of these clays is low, being represented by "Seger's Cones" Nos. 2 or 3, which renders them unsuited for purposes requiring the withstanding of a high heat, but they are admirably suited for making the so-called red brick, drain tile, etc., burning to a fine red colour, and making a brick which, when properly burned, retains its shape and size and will withstand a great crushing strain.

3rd. The clays of Modern origin would include those deposited by modern waters in depressions in the present surface of the ground, and are, therefore, entirely superficial, although, possibly, of considerable depth; they are made up of reconcentrations of older clay beds, or are the result of the decomposition of aluminous rocks—usually feldspathic, and the depositions of the clayey matter from suspension in waters.

Vicinity of Victoria.

The vicinity of Victoria has for many years been the most important brick-making centre of the Province, partly owing to its being the oldest point of settlement, but more particularly due to a larger supply of cheaper labour and to the climatic conditions of a dry summer and prevailing winds, which, together, greatly facilitate and hasten the drying of the green brick, which otherwise would have to be dried by artificial means, at an increased cost of production. That these advantages are real, is evidenced by the fact that to-day the Victoria brick-yards, although not over-well equipped or run on modern lines, do supply a considerable percentage of the brick being used in Vancouver, despite the fact that these brick must be hauled for two miles on waggon before being loaded on the scows on which they are towed across the Straits, a distance of 80 miles. The brick-making industry here is confined to the northern end of the city, but within the city limits. At present there are three brick-yards in operation and they are all adjoining. The clay deposit being worked by these yards is of Glacial origin, and it is of unknown depth, the work so far done in the vicinity having been confined to the utilisation

of a layer of clay some six to eight feet in thickness, lying on the surface and requiring very little stripping. No data exists as to the ultimate depth of the deposit, since the supply of clay, thus superficially obtained, is more economically procured by the processes in vogue, than it would be by deeper workings. The clay deposit carries with it nearly sufficient sand to admit of an admixture being made carrying the proper proportion of sand and clay to make good brick, some slight addition from a local sand-bed being required. The resulting brick from these yards is of standard size, of a moderate deep red colour and weathers well. When properly burned, the brick is sound and hard and will stand any usual specification requirements as to resistance to crushing strain. These yards all make a "soft mud" brick, and dry the green brick in racks. Following is a brief description of the individual plants:—

Baker Bros'. Brick-yard.

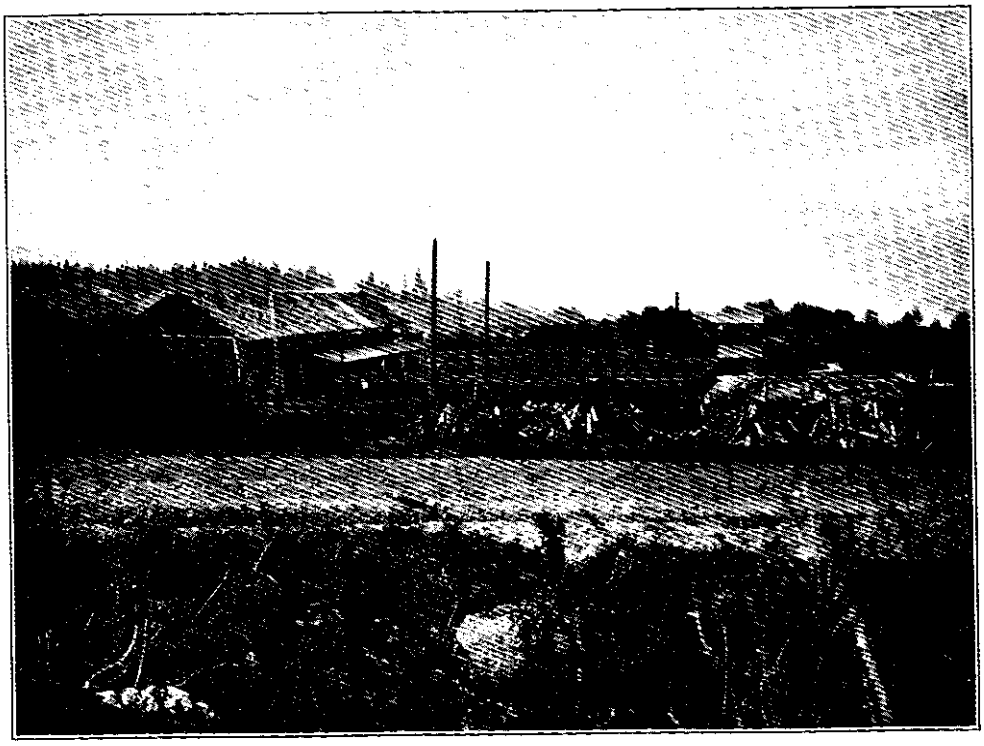
This yard faces on the Saanich road and the plant is located near the centre of the clay deposit. The clay is excavated by hand and is conveyed from the bank by horse and cart to the pug-mill, from which machine it passes to a "Monarch" soft mud machine, having a capacity of 40 to 50 M. brick in ten hours. The green brick are carried to the drying yard on pallets on small tram cars and dried on racks, subsequently covered over to dry. The brick, when dried, are burned in "clamp" kilns containing from 400 to 800 M. brick each, taking from 7 to 9 days to burn, the fuel used being cordwood. The output of the yard is about three and a half million common red brick a year. No re-pressed or face brick are made here. This yard also produces drain tile, which are made on an "American Clay Company's" tile machine, having a nominal capacity of 7,000 3-inch tile a day. These tile are from 3 inches to 8 inches in diameter by 12 inches long and are air-dried in racks, as are the brick, being burned in a downdraft beehive kiln, having a capacity of 20,000 3-inch and 10,000 4-inch tile and requiring four days to burn. The plant is operated by a 50 horse-power horizontal engine, supplied by steam from a 60 horse-power boiler, using coal as fuel.

Victoria Brick Co., Ltd.

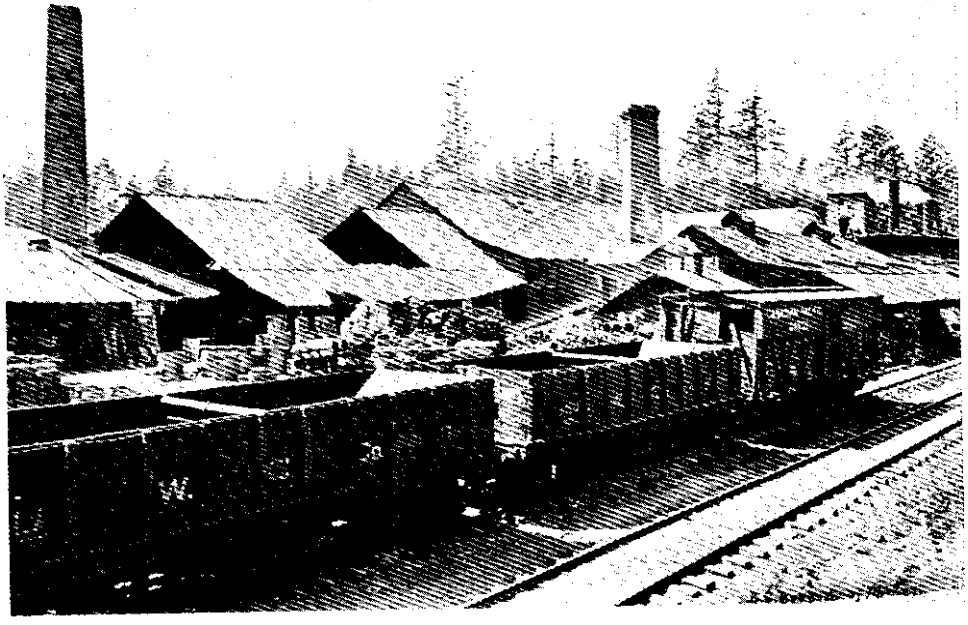
This yard (formerly Elford & Smith's) adjoins Baker Bros.' yard on the south, the plant being located on a portion of the clay bed from which the surface clay has been removed, The clay is dug by hand from a bank, having a face about 12 feet high, is then conveyed by horse and cart a distance of some 400 yards to a disintegrator, then to the pug-mill, and passes to a "Monarch" soft mud brick machine, having a nominal capacity of 40 M. brick a day. The moulded brick are carried on rubber-tired bearing-off barrows carrying eight pallets, each of six bricks to the pallet, to the drying yard, where they are stacked in racks and dried in the air. The greater number of the brick are burned in a "Boss forced updraft" kiln, having a holding capacity of 300 M. brick and requiring about eight days to burn. The fuel used is fine coal. This kiln is supplemented by the use, as occasion requires, of clamp kilns, using wood as fuel. The capacity of this yard is about three and a half millions common red brick a year. The company also manufactures drain tile of standard sizes in a manner similar to Baker Bros., having a capacity of about 12,000 a day. The plant is operated by a 60 horse-power horizontal engine, supplied with steam from a 60 horse-power boiler, using coal as fuel.

Humber Brick-yard.

This yard adjoins the Victoria Brick Company's yard on the south and is operated by the Humber Estate. This yard enjoys the distinction of still manufacturing by hand. The plant contains 6 or 7 pug-mills, some operated by horse and some by a 10 horse-power engine. The clay is dug by hand, carted to the pug-mill, and the soft mud is moulded by hand. The moulded brick are carried by hand to the yard and dried in the "open yard" system. The brick are burned in clamp kilns in the usual manner. The yard turns out about three and a half million common red brick a year.



NEW WESTMINSTER BRICK YARDS.



B. C. POTTERY CO.'S WORKS, VICTORIA.

B. C. Pottery Co., Ltd.

The works of this company are located in Victoria West on the old Esquimalt road and on the line of the E. & N. Railway, from which a switch runs into the works, over which is brought in the fire-clay used in the manufacture and other supplies, the product of the works being taken out direct on cars. The company makes sewer pipe, from 4 inches to 24 inches in diameter, chimney tile and ornamental chimney tops, partition tile, flower pots and ware of this class, being the only company in British Columbia which enters into this class of manufacture. The clay used is a Cretaceous fire-clay brought by railway from Extension or Cumberland, where it is mined in connection with the coal in the Wellington Colliery Co's. mines, and to this is added a more fusible Glacial clay, obtained in the immediate vicinity, in such proportions as each particular class of work requires. Analyses of these clays will be found in the tabulated form attached to this report. The fire-clay is broken up and is ground fine in a dry pan and screened through an 8 or 10 mesh piano wire inclined screen. The dried and screened fire-clay is then mixed with the desired amount of Glacial clay in two "wet pans," where by mechanical means the clays are thoroughly mixed in a wet state and brought to the proper consistency. This prepared mud is, for the manufacture of sewer pipes and partition tile, passed through two modern pipe presses, made by the Taplin, Rice, Clerkin Co. of Ohio. The chimney tiles are made by hand, and the flower pots, etc., by a Rockwood machine. The ware is all "floor-dried" by the waste heat from the kiln and the exhaust steam from the engine, after which it is burned in bee-hive kilns, and such ware as requires it is given a salt glaze. There are seven of these kilns and a test kiln of the following diameters inside: 1—10 feet; 3—22 feet; and 3—30 feet. The *capacity of the plant, all told, is about 50 to 60 tons of finished product a day.* The plant is operated by a 125 horse-power engine.

UNION BAY.

Some years ago the Wellington Colliery Co. established a brick-yard at Union Bay, to manufacture fire-brick from the Cretaceous fire-clay taken from the coal mines at Union; here were made the brick and blocks used in the construction of the coke ovens erected at that place, while, later on, fire-brick for the general market were produced. The plant was, however, shut down some two or three years ago and has not since been operated.

NANAIMO.

There is at present no brick-yard in operation near Nanaimo, but it is reported that, *many years ago, a superficial deposit of Glacial clay was worked there in a small way, making* a red brick from soft mud puddled by horse-power and moulded by hand.

SOMENOS.

At Somenos, some eight miles north of Duncan, on the line of the E. & N. Railway, a number of Chinamen have established a brick-yard, working on a deposit of Glacial clay, and *making a very fair quality of hand-moulded red brick*, which are shipped directly from the yard on cars to Vancouver and Nanaimo. (For analysis of clay, *see* No. 4 of tabulated assays herewith.)

NEW WESTMINSTER BRICK-YARDS.

A brick-yard is operated at New Westminster by John Coughlan & Sons, and is situated to the east of the city and adjoining the park. The deposit being worked is a Glacial clay, located about 1,000 feet east of the works; the clay is loaded into small cars, which are hauled by wire rope to the plant. A soft mud brick is made, being moulded in a "Martin" machine. The moulded brick are burned in clamp kilns and are shipped direct from the works to Vancouver on the cars of the B. C. Electric Ry. Co.

ANVIL ISLAND.

The Columbia Clay Co. has established on Anvil island, 23 miles from Vancouver, the largest brick-yard in the Province. Anvil island is a high peak of granite, and on the southern end of the island there is an extensive depost of Glacial clay, of composition shown in analysis No. 9, which is exceptionally free from stones and very uniform in texture. A floor has been run into the clay deposit at an elevation somewhat above the level of the mixer and brick machine, so that when the clay is loaded into small cars at the clay bank, the cars run down by gravity to the mixer, into the hopper of which the clay is dumped. The green brick are dried in a house, by the waste gases from the kiln, and are subsequently burned in a continuous kiln with a fan draft. The kiln is located near the dock, and the brick, after being burned, are run directly by small cars on to scows. The capacity of the plant is about 30 M. a day.

PORT HANEY.

The plant of the Port Haney Brick Company, Limited, is situated at Port Haney, on the right bank of the Fraser river, and also on the main line of the Canadian Pacific Railway, 26 miles from Vancouver. The clay bank is immediately behind the plant, the run at present being from 200 to 300 feet; the clay is dumped into small bins and conveyed from the bins to the mill, and the necessary sand, about 20 %, added; it is then fed into an auger machine with side wire cutter. The machine has a capacity of 5 M. per hour; the plant is operated with a 100 horse-power steam engine. From the machine the bricks go to the drier, and after drying are burnt in the ordinary clamp kiln; the sand used is brought in by scow from Port Kells, on the Fraser river. The plant has turned out an average of 20 M. brick per day; there is a spur laid, and the company also has a wharf on the bank of the Fraser, from which they are distant some 500 feet. The company has only been in operation a year and intends building a down-draft kiln during the winter and making pressed brick and drain tile; the product is nearly all shipped to Vancouver. An analysis of the clay, as used at the machine, is given in the tabulated analysis (No. 8) attached to this report.

CLAYBURN.

The head office of the Vancouver Fire Clay Co., Ltd., is in Vancouver; its works, however, are located at Clayburn, in the Matsqui District, on the south side of the Fraser river, about three miles from Mission Junction and on the Seattle branch of the C. P. Railway; a spur line, one mile long, starting from Clayburn station having been built out to the company's works at Clayburn. The clay beds being worked by the company are about three miles east of Clayburn and are connected with the company's works by a line of narrow gauge railway, having a down grade to the works of about 3 % and operated by a small steam locomotive. The clay beds are of Cretaceous origin, forming part of the coal-bearing rocks of that age found here, dipping at a low angle to the north and being overlain by clays and drift at the Glacial period. The clays from the various beds, of which there is quite a series, differ very materially in character and in analyses. The following different beds of clay have been recognised and named by the company:—

No. 1 Bed.—This bed is about 15 feet thick and lies immediately under a thin seam of coal; it is very refractory and makes a high-grade fire-brick. (*See* Analysis No. 11.)

No. 2 Bed.—Is a bed of fire clay, varying from 10 to 20 feet in thickness, immediately overlying and separated from No. 1 bed by the thin seam of coal. This clay is not as refractory as is that of No. 1 bed, but makes a very good fire-brick, though not as good as No. 1. This bed is not being worked at present.

No. 3 Bed.—This bed, locally known as "China clay," is below the No. 1 bed, being separated therefrom by four feet of clay that is discoloured by iron oxides. The bed is about 20 feet thick and the clay is very refractory, having a high fusion point and burns white. (*See* Analysis No. 12.)

No. 4 Bed.—This bed has been opened up at the Thornton mine, a mile nearer the works than are the other seams, and is about 18 feet in thickness, being overlain by a hard conglomerate. The clay is not so refractory as the other seams, but makes a good facing-brick of a buff colour.

No. 5 Bed is a bed of shale, about 8 feet in thickness, situated about 180 feet above the railway track, and it burns to a cherry red colour.

No 6 Bed lies above No. 5, and is a bed of plastic blue clay which, when burned, is yellow.

No. 7 Bed lies above No. 6, being overlain by a sandy shale, and is a bed of clay about 8 feet thick which burns to a red colour.

The clay from the mines is delivered by the narrow gauge railway in front of two drying pans, where it is crushed and elevated to screens and to the mixer, from which it is fed into two dry press brick machines, having two moulds each. The moulded brick are burned in kilns, the burning plant consisting of seven bee-hive kilns, holding from 40 to 75 M. brick each, and one Millar down-draft kiln holding 180 M. fire-brick. The fuel used is coal from the Nicola Valley Coal & Coke Company's mine at Nicola. The company has made some good fire-brick and blocks for coke ovens; this product having been used in the construction of the new coke-ovens recently built by the Crow's Nest Pass Coal Company. Facing-brick have also been made which have been used in a number of buildings, both in Victoria and Vancouver.

Unworked Deposits.

At Nanoose bay, on the east coast of Vancouver Island, north of Nanaimo, there is a large deposit of Glacial clay which has not been developed.

On the Alberni canal, on the west coast of Vancouver Island, there is, near Alberni, on Lot 1, Rogers creek, a bed of Glacial clay of considerable, though undetermined, thickness (*see* analysis No. 5 of Tabulated Assays), which has never been worked, but the clay therefrom burns to a deep red colour and has a low fusion point.

On Lot 7, near Somass falls, there is a clay deposit, interbedded with sand, having similar properties to the Rogers creek clay. (*See* analysis No. 6.)

At Smith's landing, about 25 miles down the Alberni canal, there is a large deposit of clay, free from stones and very conveniently located. (*See* analysis No. 7.)

On Sidney island, Mr. George Courtney and others are engaged at present in opening up a large brick-yard, but the work had not advanced far enough at the time to be reported upon.

TABULATED ANALYSES OF CLAYS OF COAST DISTRICT OF BRITISH COLUMBIA.

Local Clays of the Glacial Period.

No. of Analysis.	Designation and Location of Clay, etc.	Silica.	Alumina.	Iron Oxide Fe_2O_3.	Lime.	Magnesia.	Alkalies.	Organic Matter.	Water and Loss.	Seger Fusion Cone.
1	Clay, Brethour's road, Sidney	60.0	20.8	7.6	4.6	0.7	.....	.....	5.1	3
2	" Chinese yard, "	60.2	15.5	9.4	5.3	1.5	.....	.....	6.8	
3	" Atkins' lot, Esquimalt	63.6	19.0	7.6	3.6	0.2	.....	.....	6.0	3
4	" Duncan	67.6	13.6	8.8	3.6	0.2	.....	.....	5.6	
5	" Roger Creek, Alberni Dist.	56.8	17.5	10.8	3.1	0.3	.....	.....	6.8	
6	" Lot 7, "	57.5	22.8	9.2	4.0	0.5	....	.....	6.0	
7	" Smith's Landing "	57.5	20.2	9.2	7.0	3.2	.....	.....	2.9	
8	" Port Haney	58.5	21.1	8.6	6.5	0.5	.....	.....	4.8	
9	" Anvil island	58.6	26.7	7.5	4.0	trace.	0.2	.....	3.0	2
10	" Howe sound	60.6	24.0	7.6	1.0	0.3	.....	.....	7.0	2

Local Refractory Clays of the Cretaceous Period.

11	Clay, No. 1 bed, Clayburn	60.85	35.27	2.75	0.25	trace.	1.88	.....	.....	31
12	" No. 3 " "	58.80	30.55	0.65	None.	0.50	... ..	.....	9.50	33
13	" Extension Mine, used by B. C. Pottery	59:4	19.7	8.7	1.3	0.7	.....	.....	10.4	8

For purposes of comparison, the following table of analyses of foreign clays of established reputation has been compiled from recognised authorities:

ANALYSES OF STANDARD FOREIGN CLAYS.

Foreign Clays, Shales, Etc.	Silica.	Alumina.	Iron Oxide Fe_2O_3	Lime.	Magnesia.	Alkalies.	Organic Matter.	Water and Loss.	Seger Fusion Cone.
Pure hydrated clay	46.3	39.80	.....	.....	.....	.....	.....	13.90	
" dehydrated clay	57.42	42.58	.....	.....	.....	.....	.....	.....	
Chinese porcelain clay	50.50	33.70	1.80	.....	0.80	1.90	.....	11.20	
English "	40.6	24.15	.....	4.50	.....	3.00	.....	.....	
" Cornwall China clay	46.3	39.70	0.30	0.40	.....	0.50	.....	12.80	
Battersea B. crucible clay	70.0	26.04	2.68	.....	0.16	1.00	.....	0.10	
Glenboig, Scotch fire brick	65.41	30.55	1.70	0.69	0.64	0.55	.....	.....	
Stourbridge, English fire clay	70.55	20.27	1.45	0.75	0.24	... .	.....	6.74	
Ohio sewer pipe clay	54.53	27.88	2.41	0.42	0.68	3.43	.....	1.26	
" "	77.65	12.78	3.32	0.55	0.45	1.30	.....	4.10	
Arkansas paving brick clay	58.43	22.50	8.36	0.32	1.14	3.21	.....	6.87	
Illinois "	67.80	11.55	4.31	8.90	5.32	2.62	.....	.....	
Ohio, "	67.65	18.36	8.34	0.80	1.02	2.58	.....	.....	
Ohio, paving brick shale	57.80	21.57	7.41	0.29	1.55	4.09	.....	6.08	
Iowa, "	60.34	24.26	7.73	1.35	0.70	3.12	.....	1.66	
London, common brick clay	49.44	34.26	7.74	1.48	5.14	.....	.....	1.94	
Fine terra cotta clay	15.17	48.26	7.67	trace.	.....	0.82	.....	27.21	
Cream front brick	38.22	9.75	4 00	26.44	15.83	2.81	.....	2.80	
Celebrated North Wales red facing brick	63.00	20.10	4.80	none.	5.47	.....	.....	5.08	

INSPECTION OF METALLIFEROUS MINES.

:o:

Since the close of the year 1908 a change has been made in the system of mine inspection, by the appointment of a Chief Inspector of Mines, Mr. Francis H. Shepherd, with head-quarters at Nanaimo, who has direct charge and control over the District Inspectors, who report to him direct.

WEST KOOTENAY AND BOUNDARY DISTRICTS.

Report of James McGregor, Inspector.

I have the honour to submit my annual report for the year 1908, with respect to the condition of the metalliferous mines in my Inspection District.

Boundary District.

The shipping mines in this district have not all operated continuously during the year, yet many improvements were completed, which has resulted in a much increased output since operations were resumed. Several other properties in this district are preparing to place themselves on the shipping list, and, no doubt, a much increased output can be looked for during the present year. There is also an increased amount of prospecting being vigorously carried on. Upon inspection of the mines, I have found their equipments modern and in good condition, the Act being generally observed.

Nelson District.

There has been considerable improvement in this district during the year, several new mines being opened ready for shipping, while others are being actively developed, with satisfactory results. Upon inspecting these properties I have always found them safe.

Lardeau District.

The shipping mines in this district have not increased during the year, but a great amount of prospecting and developing has been accomplished. I have always found, upon inspection, care being exercised with regard to safety.

Kamloops District.

The only perceptible change in this district consists in the increased amount of developing and prospecting.

Similkameen District.

The principal mines in this district have operated almost continuously during the year. In addition, much developing and prospecting have been in operation. The mines coming under the Inspection Act I have found in a safe condition.

Rossland District.

The principal mines in the Rossland district have worked continuously during the year, with increased output. Development on a large scale has been carried on, especially in opening up new ground on the lower levels. Prospecting and developing, with satisfactory results, have been actively prosecuted in what is known as the South Belt. Upon inspection of the equipments and the mines, I have found them to be safely operated.

SLOCAN DISTRICT.

The district has improved somewhat during the year, the number of shipping mines having increased; also a greater activity in developing and prospecting, with favourable results. The mines, coming under the Inspection Act, I have found safe.

AINSWORTH DISTRICT.

In this district general conditions have improved, the working mines having increased their output, while others in the stage of development are progressing satisfactorily. Upon inspection, I have found them conforming to the Act and in a safe condition.

I herewith append a list of accidents which occurred during the year.

EAST KOOTENAY DISTRICT.

REPORT OF THOS. MORGAN, INSPECTOR.

I have the honour, as Inspector of Metalliferous Mines for the East Kootenay District' to submit my annual report for the year 1908.

The *St. Eugene* mine, at Moyie, and the *North Star* mine, at Kimberley, have been worked continuously throughout the year, while the *Sullivan* mine, near Kimberley, was worked until March, when all work was stopped, for some reason unknown to me.

These are the only mines working in my district, and I have always found them all to be well timbered and the requirements of the "Inspection of Metalliferous Mines Act" carried out as nearly as reasonably possible. The mines are ventilated by natural draft, assisted by compressed air and fans in places where required.

I append a list of the accidents which have occurred during the year in the metalliferous mines within my district.

INSPECTION OF COAST DISTRICT.

The Inspector, Mr. Archibald Dick, writes that he has no accidents to report as occurring in the metalliferous mines within his district during the past year.

LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1908.

Reported by Thomas Morgan, Inspector, East Kootenay District.

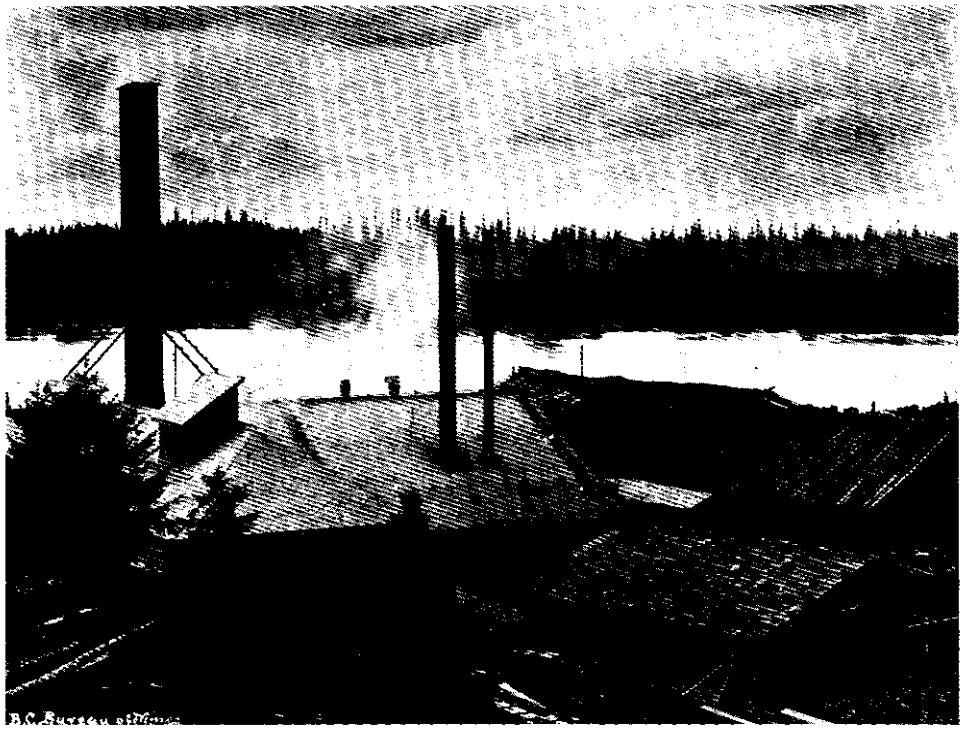
No.	Mine.	Date.	Name.	Occupation.	Details.
1	St. Eugene.....	Feb. 5	Nick Olizozo ..	Shoveller ...	Arm cut.
2	"	" 20	John Stewart .	Timberman..	Cut on right leg. They were working on staging and had two drills for supports instead of regular timbers. When they lifted a piece of timber the drills bent and the staging collapsed.
3	"	March 7	Paddy O'Brien.	Miner	Killed. It is supposed that he was picking down loose rock from roof which fell on some powder that had been left on a ledge, causing it to explode.
4	"	" 7	John Daly	"	Was working with O'Brien, and received injuries to his eyes and body by the explosion described above.
5	"	" 8	Mike Kowrek .	Shoveller ...	Hand cut by a piece of rock while loading ore into a chute.
6	"	" 14	Chas. Livesley.	Timberman..	Ruptured himself while lifting a piece of timber.
7	"	" 17	Dave Peter ...	" ..	Back bruised by some loose ground falling on him.
8	"	" 18	Arthur Pilman	Nipper.....	Fell about 10 feet off a staging and cut his head.
9	"	" 18	John Tipper ..	Shoveller ...	While breaking rock a piece flew off and cut his neck.
10	"	April 16	Angus McNeill	Machineman	Eye injured by a piece of steel off a drill.
11	"	" 18	James Musso..	Shoveller ...	Some ground fell from the hanging wall and broke his shoulder.
12	"	" 26	Sam Potter ...	Machinist...	Scalded by hot water from a pipe while repairing a valve.
13	"	" 28	Mike Boyce...	Shoveller ...	While pushing a car, caught his finger against a chute and cut it.
14	"	" 30	Fred. Walters.	Timberman .	Hip bruised by a piece of falling rock.
15	"	May 30	Dominic Gova-[larto.	Shoveller ...	Fell down chute while dumping a car.
16	"	June 27	Oscar Nordman	Shaftsman ..	Caught his little finger between the chuck of the drill and the rock, cutting the tip off.
17	"	Aug. 1	John Mullin ..	Machineman	Caught his finger between wrench and chuck of machine, cutting it badly.
18	"	" 7	K. D. Stinson .	Shift boss...	Leg broken by a piece of ground falling on him.
19	"	" 9	Pat Head.....	Timberman .	Slipped off a ladder and threw his arm around a sprag, cutting his armpit.

LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1908.—*Continued.*

No.	Mine.	Date.	Name.	Occupation.	Details.
20	St. Eugene.....	Sept. 20	Wm. Hamilton	Shoveller ...	Skull fractured by a piece of rock falling on his head.
21	"	Oct. 4	Erick Sahler ..	Machineman	While picking down rock from the roof some of it fell on him, cutting his hands and head and breaking his left leg.
22	"	" 9	Alf. Liljenberg	"	Killed. He was barring down some rock and it fell on him.

REPORTED BY JAMES MCGREGOR, INSPECTOR, WEST KOOTENAY DISTRICT.

23	War Eagle, Rossland ..	Jan. 30	John Casto-[bodie	Trammer ...	Rib broken by a plank falling down a chute.
24	Centre Star, Rossland..	Feb. 3	George York ..	Miner	Fatally injured by a motor train, dying the following day.
25	Granby, Phœnix.....	" 23	E. Swanson ...	Shoveller ...	Fell into a chute and broke his skull.
26	Nickel Plate, Hedley ..	Mar. 11	John Kaskie ..	Miner	Killed by drilling into a partly unexploded hole.
27	" " ..	" 11	Munson Han-[son	"	
28	Old Ironsides, Phoenix.	April 26	Chris Martin..	"	Killed by falling off a bench.
29	" " ..	" 26	K. Smith	"	Killed by the same accident.
30	Snowshoe Siding, [Phoenix	" 28	David Garland.	Carpenter's [helper	Severely injured by falling off a car.
31	Mother Lode, Green-[wood	May 22	Rowland Foth-[ergill	Car loader ..	Right hand blown off by powder while preparing to blast chute.
32	Centre Star, Rossland..	" 24	M. Powers	Mine fore-[man	Killed by explosion of a new powder known as "Mitchellite," while charging a hole with it.
33	Surprise, Kaslo.....	June 5	John Anderson	Miner	Killed while drilling into an old hole containing powder.
34	Mother Lode, Green-[wood	" 16	Frank Taylor..	Oiler	Fatally injured while oiling the crusher plant. His right arm was torn off by the belt.
35	Centre Star, Rossland..	" 26	J. A. Cameron.	Miner	Fatally injured by travelling through the smoke after a blast.
36	" " ..	.....	John Erickson.	"	
37	Old Ironsides, Phœnix..	July 13	Egner Floren..	Head brake-man	Fatally injured by a car on the ore train and died on the 15th July.
38	Mother Lode, Green-wood	Aug. 17	Mrs. J. K. Dimmick	Resident....	A rock from the quarry fell through the roof of her house and broke both her legs.
39	" "	" 17	Eunie Dimmick	Child	Fatally injured by the same accident.
40	Granby, Phœnix.....	" 23	Roland Jones .	Chute-man ..	Fatally injured while barring rock in chute. He developed an abscess of the liver and died on Sept. 25th.
41	Bighorn, Ymir	Sept. 2	W. T. Edgar..	Miner	Killed by a blast while doing assessment work.



PORT HANEY BRICK-YARDS.

ANVIL ISLAND BRICK-YARD.

LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1908.—*Concluded.*

No.	Mine.	Date.	Name.	Occupation.	Details.
42	Granby, Phœnix.....	Sept. 14	J. F. Thomas .	Blaster	Fingers cut off by falling rock.
43	Mother Lode, Greenwood	" 30	Hugh Stephens	Skip tender .	Killed by a skip in the shaft.
44	Granby, Phœnix.....	Nov. 25	J. H. Wray...	Miner	His machine bar fell on him and broke his nose; he developed meningitis and died the next day.
45	"	Dec. 18	John Anderson	"	Killed by a blast.
46	"	" 18	Chas. Johnson.	"	Killed by the same accident.

TABULATED LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1908.

	Cause of Accident.	Extent of Injury.			Total.
		Fatal.	Serious.	Slight.	
A	Blasting	6	2	0	8
B	Defective powder	1	0	0	1
C	Drilling into old holes containing powder	3	0	0	3
D	Powder in muck.....	1	1	0	2
E	Shafts and cages, accidents connected with.....	1	1	0	2
F	Falling down shafts or winzes.....	1	0	0	1
G	Falling down chutes	0	0	0	0
H	Mine cars.....	2	1	0	3
I	Rock falling in stopes, levels, etc.....	1	4	2	7
J	Rock falling down chutes or openings.....	0	1	0	1
K	Timbering	0	0	0	0
L	Miscellaneous, underground	4	2	10	16
M	Surface	1	1	0	2
	Totals	21	13	12	46
Accidents for each 100,000 tons ore mined.....		1.01	.62	.58	2.21
Accidents for each 1,000 men employed.....		5.93	3.68	3.39	13.00

COAL MINING IN BRITISH COLUMBIA.

———:o:———

The coal mines of the Province have, for many years, been sufficiently developed to supply the domestic demand, and they, therefore, have had to look to the export market to increase their sales: unlike the metalliferous mines, whose product is taken to the market to be sold, the coal mines must wait until the market comes to them, or within their reach. The market for coal is, therefore, directly dependent upon, and in proportion to, the industrial activity of the district supplied, and, to a certain extent, may be taken as a measure of such activity. The greater market for coal must come from an increased activity and growth within the field of possible operations, and the widening of such a field by the increasing facilities of transportation, which enable more remote points to be profitably reached, so enlarging the field as to include new markets.

This enlarging of the market must necessarily be gradual in a new country—and all the Pacific Coast is industrially new—but that an increase has taken and is taking place, a glance at the coal statistics will show. This increase has been fairly regular, amounting to an average yearly increment of between 50,000 to 60,000 tons of coal, while at the same time, in ten years, the annual output of coke has increased from 35,000 tons to 247,000 tons, due to the growth of a special industry—ore smelting.

While the production of the collieries of the Province for the year 1908 is less than that of the preceding year, it is still as much greater than that of 1906 as should be normally expected for two years. The year 1907 may be placed to one side as abnormal, its output having been unduly stimulated by a sudden demand for fuel, occasioned by the excessively high price of metals, causing the metalliferous mines and smelters to feverishly push their output to its limit in order to take advantage of the high prices. Yet, despite the "slump" which followed the excessively high metal market as a reaction to be expected, the increase in the coal consumption has more than held its own and must be taken as an indication of the increasing industrial activity of this part of the country.

The actual production of the collieries for 1908 was 1,677,849 tons (2,240 lbs.) of coal, worth $5,872,472, and 247,399 tons (2,240 lbs.) of coke, worth $1,484,394; a total value of $7,356,866. The coal output this year was 122,218 tons less than in 1907, but was, at the same time, 162,546 tons greater than that of 1906; while the coke for 1908 was 24,486 tons greater than that of 1907, and 48,172 tons greater than that of 1906. In money values, the total outputs of the collieries were in 1906, $5,548,044; in 1907, $7,673,713, and in 1908, $7,356,866. The collieries which in 1908 produced the greater percentage of the output were practically the same as the preceding year, viz.:—The Crow's Nest Pass Coal Company's collieries in the East Kootenay coal field in the south-eastern part of the Province, and, on Vancouver Island, the Western Fuel Company's collieries at Nanaimo and the Wellington Colliery Company's collieries at Extension and Comox.

In addition to these larger producers, the Hosmer Colliery, in East Kootenay, began shipments in December of 1908, and, while its actual production, being for but one month of the year, is small, its development and equipment places it among the large mines, and it will have to be reckoned with next year.

The colliery of the Corbin Coal and Coke Company, in this same district, also began shipping regularly during the year, making a small output, and, although not as extensively developed or equipped as the Hosmer mines, may be counted upon for a very much larger one in the near future.

In the Nicola valley section of the Coast District, the Middlesboro Colliery, which was only opened up last year, has this year shipped 26,000 tons of coal, and this output might have been doubled with more favourable freight rates to the Coast.

On Vancouver Island, the Fiddick Colliery, also opened up last year, has produced 17,000 tons of coal, chiefly from development workings, and next year, when it has its own railway to salt water and shipping facilities, the output will be very much greater.

Two other collieries on the Island made small shipments, the Gilfillan Colliery and the New East Wellington Colliery, but have not as yet become very important factors in the total output.

The available supply of coal in the Province seems to be unlimited, particularly in the Rocky Mountain coal field, in which might be included several coal mines in Alberta, just over the Provincial borders, and it would seem that this Province controls the coal situation of the whole Pacific coast, since the quality of the coal found to the south of the International line is admittedly of inferior quality.

During the past year about 37.5 % of the total coal sold from British Columbia mines was exported to the United States; the export trade to other countries was insignificant, being less than 2 % of the total sales.

The collieries of the East Kootenay district exported to the United States about 57 % of the coal they sold, while the Coast collieries exported to the same country about 30 % of theirs.

Formerly, in 1902, the Coast collieries exported to the United States 75 % of their coal, but the percentage exported since then has been gradually diminishing, owing to an increasing home market and to the use in California of crude oil as fuel.

The gross amount of coal mined in the Province in 1908 was 2,109,387 tons (2,240 lbs.); of this, 431,538 tons were converted into coke, of which there was made 247,399 tons.

The distribution of this output of coal and coke is shown in the following table:—

Coal and Coke Produced, Exported, &c., by Province during Year 1908.

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	918,872		209,317	
" export to United States	567,274		37,314	
" " to other countries	29,883			
Total sales		1,516,029		246,631
Used in making coke	431,538			
Used under colliery boilers, etc.	174,640			
Total for colliery use		606,178		
		2,122,207		
Stocks on hand first of year	58,935		8,782	
" last of year	46,115		9,550	
Difference { *added to / †taken from } stock during year		†12,820		*768
Output of colliery for year		2,109,387		247,399

By-products—Fire-clay, 4,949 tons.

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	100	.....	88	.....	188	.....
Whites—Miners	1,899	.....	.....	.....	1,899	.....
Miners' helpers	682	.....	.....	.....	682	.....
Labourers	771	.....	520	.....	1,291	.....
Mechanics & skilled labour.	465	.....	449	.....	914	.....
Boys	167	.....	57	.....	224	.....
Japanese	110	.....	37	.....	147	.....
Chinese	235	.....	490	.....	725	.....
Indians	3	.....	.....	.....	3	.....
Totals	4,432	.....	1,641	.....	6,073	.....

COLLIERIES OF THE COAST DISTRICT.

The gross output of the Coast Collieries, including the Nicola valley, for the year 1908, was 1,226,182 tons (of 2,240 lbs.) of coal actually mined, while some 13,921 tons were taken from "stock," making the actual consumption of coal 1,240,103 tons.

Of this gross consumption, 1,048,292 tons were sold as coal, 120,523 tons were consumed by the producing companies as fuel, while 71,288 tons were used in making coke, of which there was produced some 12,530 tons (2,240 lbs.) of which 6,022 tons was sold and 6,508 tons added to stock.

The following table gives an aggregate summary of the output of the Coast Collieries for the year 1908 and shows the dispositions made of such product:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	717,964	.....	2,904	
" export to United States	300,445	.....	3,118	
" " other countries	29,883	.....	.....	
Total sales	.....	1,048,292	.....	6,022
Used in making coke	71,288	.....		
" under colliery boilers, etc	120,523	.....		
Total for colliery use	.....	191,811		
		1,240,103		
Stock on hand first of year	58,935	.....	1,779	
" last of year	45,014	.....	8,287	
Difference {*added to / †taken from} stock during year	.....	†13,921	.....	*6,508
Output of colliery for year	.....	1,226,182	.....	12,530

By-products .....Fire-clay (tons), 4,949.

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	48		52		100	
Whites—Miners	1,130				1,130	
Miners' helpers	462				462	
Labourers	482		77		559	
Mechanics and skilled labour	80		174		254	
Boys	136		41		177	
Japanese	110		37		147	
Chinese	235		482		717	
Indians	3				3	
Totals	2,686		863		3,549	

COLLIERIES OF THE EAST KOOTENAY DISTRICT.

The gross output of the collieries of the East Kootenay District for the year 1908 was 883,205 tons (2,240 lbs.) of coal actually mined, of which 1,101 tons were put into stock, making the actual consumption of coal 882,104 tons. Of this gross consumption of coal, 467,737 tons were sold as coal, 54,117 tons were consumed as fuel by the producing companies, while 360,250 tons were converted into coke, of which there was produced 234,869 tons, while 5,740 tons of coke were taken from stock, making the coke sales for the year 240,609 tons.

The following tables gives an aggregate summary of the output of the East Kootenay Collieries for the year 1908 and shows the dispositions made of such product :—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	200,908		206,413	
" export to United States	266,829		34,196	
" " other countries				
Total Sales		467,737		240,609
Used in making coke	360,250			
Used under colliery boilers, &c.	54,117			
Total for colliery use		414,367		
		882,104		
Stock on hand first of year	*nil.*		7,003	
" last of year	1,101		1,263	
Difference { *added to / †taken from } stock during year		*1,101		†5,740
Output of colliery for year		883,205		234,869

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	52		36		88	
Whites—Miners	769				769	
Miners' helpers	220				220	
Labourers	289		443		732	
Mechanics and skilled labour	385		275		660	
Boys	31		16		47	
Japanese						
Chinese			8		8	
Indians						
Totals	1,746		778		2,524	

PROSPECTIVE COAL MINES.

A coal property, to be commercially successful, must have so many conditions favourable—such as market, transportation, quality of the coal, thickness and continuity of seam, comparative freedom from faults, character of roof and pavement, etc.—that the future of even the most promising prospect cannot be determined until these points have been satisfactorily proven, and to do this requires extensive development work; consequently, until such is done they must be classed as practically prospects, more or less assured.

In the East Kootenay District there has been a great deal of work going on in the valley of the Elk river, above Michel creek, proving up what appears to be a large coal field, probably an extension of the field so extensively developed and worked a short distance to the south. There are several areas there, owned by various companies, which have been developed sufficiently to prove most of the required conditions, although the questions of transportation and of a market in competition with the neighbouring large producing companies, remain unsettled. The properties owned by the Imperial Coal and Coke Company are probably the most assured of these prospects; although others have demonstrated that they have a very large amount of coal.

On the headwaters of the Flathead river, and to the north, some successful prospecting has taken place, which will undoubtedly be more energetically pushed now that railways from the south are entering the district.

In the vicinity of Princeton the question of railway transportation promises to be settled satisfactorily within a short time, when the large deposit of lignitic coal held by the Vermilion Forks Co. will become available. This coal deposit has been sufficiently developed to prove its extent and the quality is known, and while it may not prove to be a coking coal, it will serve to supply the requirements of the vicinity and of the approaching railway.

The development work done in the coal outcrops on Granite creek and Collins gulch, on the Tulameen river, have proved them to be in the same coal field, and has indicated their probable economic importance, mention of which is made in the report of Mr. Camsell, of the Geological Survey, reproduced in this Report on page 135.

In the Nicola valley, the Diamond Vale Company has, at least temporarily, abandoned its first locations, where so much trouble was experienced with water in the surface gravels, and is developing another part of its property, with, according to the report of the Inspector, very satisfactory results.

The B. C. Amalgamated Coal Company has been doing some prospecting in the district by drilling, but no information has been received of any important coal discovery.

On Vancouver Island, Mr. T. P. Pearson has been engaged in developing the coal seam described in the Report of 1907 (page 150), on the West Arm of Quatsino sound, with results satisfactory as far as they go, but more work must be done before the ultimate value of the property will be known.

On the west shore of Malcolm island, and on the adjacent shore of Vancouver Island, a large number of coal areas have been taken up, including the land under the water separating the two islands; boring operations have been in progress for some time, the exact results of which are not known, but they are understood to have been very satisfactory.

A number of coal areas have been taken up on the east coast of Vancouver Island and on islands in the Straits of Georgia; these are probably all in the coal-bearing formation, but the work of determining whether they contain commercially valuable coal seams has not been completed.

In the Skeena District, on the Telkwa river, prospecting and development of the coal-beds has progressed slowly, evidently being held back until the ultimate route of the G. T. P. is fixed.

Mr. Leech, of the Geological Survey (*see* page 168) notes the discovery of coal on the headwaters of Zymoetz river, but very little development has taken place, and unless that river is chosen as the route for the G. T. P. Railway, the coal would be too remote to be of present value.

On the upper Skeena river, a Toronto syndicate holds coal areas which will probably prove important, and upon which annual work is done, to satisfy the legal requirements rather than to make permanent development, as the question of transportation has yet to be settled.

INSPECTION OF COAL MINES, 1908.

VANCOUVER ISLAND AND COAST INSPECTION DISTRICT.

REPORT OF ARCH. DICK, INSPECTOR.

SIR,—I have the honour to herewith submit my annual report for the collieries in this district for the year ending 31st December, 1908, together with a list of all accidents and the *colliery returns*.

The collieries operating during the year, including the new mines that have been started, were :—

NANAIMO : The Western Fuel Company—No. 1 shaft, Protection shaft, and No. 4 Northfield mine.

South Wellington Coal Mines, Limited—Fiddick Colliery, South Wellington, Cranberry District, 1 tunnel, 1 shaft.

Gilfillan Colliery, Wellington No. 1 slope.

New East Wellington Colliery, Mountain District, Nanaimo, No. 1 slope.

EXTENSION : The Wellington Colliery Company—Nos. 1, 2, and 3 mines. All worked from what is known as the No. 1 tunnel.

CUMBERLAND : The Wellington Colliery Company—Nos. 4 and 7 slopes, and Nos. 5 and 6 shafts.

NICOLA VALLEY : The Middlesboro Colliery, Nicola Valley Coal and Coke Company's Nos. 1 and 2 mines.

Diamond Vale Colliery Company—Nos. 1, 2 and 3 mines.

The Western Fuel Company.

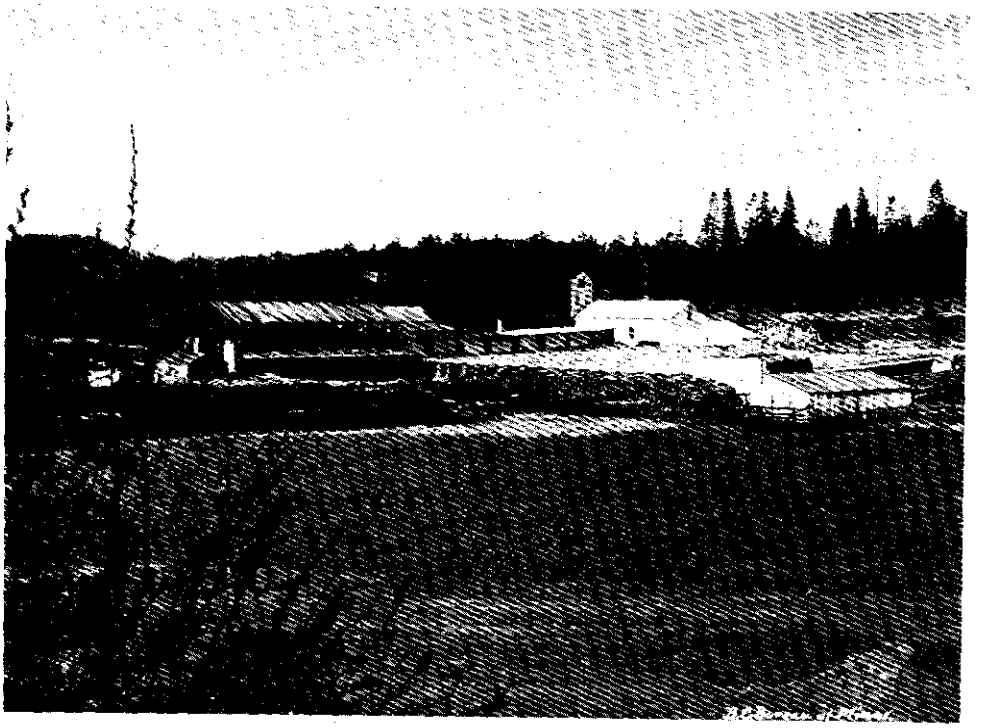
Head Office—San Francisco, Cal.

Officers.	*Address.*
John L. Howard, President or Chairman,	San Francisco, Cal.
Jas. B. Smith, Vice-President or Vice-Chairman,	San Francisco, Cal.
D. C. Norcross, Secretary,	San Francisco, Cal.
Joseph L. Schmidt, Treasurer,	San Francisco, Cal.
Thomas R. Stockett, General Manager,	Nanaimo, B. C.
Thomas Graham, Superintendent,	Nanaimo, B. C.

Capital of the Company, $1,500,000.

The above company has operated the following collieries at Nanaimo during the past year, viz. :—No. 1 or Esplanade shaft, Nanaimo ; Protection Island mine ; No. 4 Northfield mine.

BAKER & SONS' BRICK-YARD, VICTORIA.



VICTORIA BRICK CO.'S YARD, VICTORIA.

The following returns show the combined output of the company's mines for the past year:—

Returns from Western Fuel Co.'s Mines for Year 1908.

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	189,419							
" export to United States	148,643							
" " to other countries	4,777							
Total sales			342,839					
Used in making coke								
" under colliery boilers	49,308							
Total for colliery use			49,308					
			392,147					
Stocks on hand first of year	18,022							
" last of year	17,589							
Difference taken from Stock during year			433					
Output of Colliery for year			391,714					

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	19		23		42	
Whites—Miners	347				347	
Miners' Helpers	29				29	
Labourers	326		16		342	
Mechanics and Skilled Labour	60		57		117	
Boys	54		24		78	
Japanese						
Chinese			113		113	
Indians, natives of B. C.	3				3	
Totals	838		233		1,071	

No. 1 Shaft, Esplanade, Nanaimo.

Chas. Graham, Manager; John Newton, Overman.

During the past year I have examined all the accessible parts of this mine.

No. 1 shaft and the Protection Island mine may properly be regarded as one mine, since underground they are connected in many places, are ventilated by the same ventilating fan and partly by the same ventilating system, while many of the men working in the No. 1 mine are lowered to their work and hoisted again through the Protection shaft. The underground workings of this No. 1 mine are very extensive, extending, from face to face, for fully five

miles. There are two seams of coal being worked in this mine known as the Upper and Lower seams; the Lower seam is about 60 feet below the Upper, being separated therefrom by a hard conglomerate rock. Two slopes, No. 2 and No. 3, each 7 by 10 feet in size, have now been driven from the Upper seam workings, through this intervening rock, to the Lower seam.

Lower Seam.

The coal in this Lower seam varies from 30 to 40 inches in thickness, is of excellent quality, very hard and stands handling well. This seam is worked on the "long-wall" system, to which it is well adapted, compressed air-driven coal mining machines being extensively used with great success, both as regards cost and quantity of production, and a greater percentage of lump coal produced.

In the Upper seam the workings on the north side were confined to what are known as No. 2 and No. 3 inclines, off the No. 1 North level, where all the mining has been at pillar coal. Recently work on No. 2 incline has been stopped for a time.

The coal from these inclines is run down to and collected on the North Level road, to which road the coal from the Lower seam is also hoisted through the slopes. All the cars of coal collected here are made up into trains, sometimes as many as 90 cars in one train, and hauled by two electric locomotives to the bottom of No. 1 shaft, up which they are hoisted to the surface.

No. 1 Slope.

This slope, which branches off to the east from No. 1 North level, at a point about 70 yards from the bottom of the shaft, is down 6,513 feet. From the slope, at a point 5,055 feet down from the level, No. 7 East level branches off, and is the deepest working in the mine, being about 1,200 feet vertical below the mud-flats of the Nanaimo river. This level has been driven for a distance of 6,000 feet from the slope and was not advanced any during the past year.

On the lower or dip side of the level quite a number of working places have been driven down for quite a distance, the coal there having been found to be of good quality, although at times the seam becomes very thin.

On the upper side of the level all the coal mined is from pillar workings and is of good quality, the seam being in places 10 feet thick.

These workings continue up until they connect with the workings off the Diagonal slope, and form the return airway from the No. 7 level district, as well as serving as a travelling road between the two districts.

At a point about 3,000 feet down the No. 1 slope the Diagonal slope branches off to the east.

The coal from both these workings is raised through No. 1 slope and from there taken to the bottom of the shaft by an endless wire rope.

As was mentioned in a previous report, this Diagonal slope was driven down into a basin, the coal rising all around to a rim. The main landing on the Diagonal slope having been shown by levels to be at the elevation of the rim, a rock tunnel was here started to cut across the basin and strike the coal on the opposite side. This tunnel has now been completed, is 7 by 10 feet in size, and a fine piece of work; after having been driven level for 1,200 feet through rock, the tunnel struck the coal on the far side of the basin, from which point almost level workings continue for 1,200 feet farther.

A rope haulage is now being put in to haul the coal along this 2,400 feet of level track to the Diagonal slope.

The district opened up by this tunnel promises to make a large production, as the coal is very good and the seam is over 9 feet thick.

No. 1 North Level.

The ventilation in this mine is very good, an average of 70,000 cubic feet of air a minute passing out of No. 1 North level, in addition to 23,000 cubic feet going to the Newcastle shaft. All this air is taken down the Protection shaft, except about 5,000 cubic feet from No. 1 slope. In this division of the mine there are employed, on the average, about 118 men and 21 mules on a shift.

For the ventilation of No. 1 slope, in the south return air district, which includes No. 7 East level and the Diagonal slope, there were 39,000 cubic feet of air passing in a minute, supplying 129 men and 24 mules.

My inspections are made with a Wolf safety lamp, and it is very seldom that I can find a trace of explosive gas in these mines. The Wolf safety lamp is used exclusively in the mines of the Western Fuel Co., and is found to give good satisfaction.

In addition to the manager and overman, there is employed in the mine a large staff of firemen and shotlighters, continually on the move, so that any derangement of the ventilating system should be promptly detected and remedied. As an additional precaution, the company employs a fireman whose work it is to watch and examine all the old workings, as far as they are accessible.

A gas committee, employed and paid by the men, makes an examination of the whole mine once a month, such examination requiring several days, and posts in a conspicuous place the results of its findings.

PROTECTION ISLAND MINE.

No work was done in this mine during the past year, further than taking out enough coal to keep the engines going and making some repairs, so as to keep the mine in condition to start when the market justifies it.

MODE OF VENTILATION.

For the past 18 years this mine has been ventilated by a large Guibal exhaust fan, 36 feet in diameter and 12 feet wide, with single inlet, running 45 revolutions a minute, producing a water gauge column of 2 inches. For the last few years this fan has been assisted by a blower Guibal fan, 20 feet diameter and 7 feet wide, running 75 revolutions a minute, with a $1\frac{3}{4}$-inch water gauge. These two fans combined produced at the uptake a total ventilation of 156,400 cubic feet of air a minute.

The management, taking into consideration how extensive the mine had already become, and with an eye to the future, decided to instal a new fan, and this has been done, the installation being completed on December 26th, 1908. This new fan, a Sirocco fan, was installed at No. 1 Shaft without interfering with the big fan, which is being renovated and repaired, and will be held in reserve or for emergencies. The new fan is a speed, double inlet fan, 90 inches outside diameter and 78 inches inside, connected by a $1\frac{1}{2}$-inch hemp rope continuous drive with a 250 h.p. Robb-Armstrong Corliss valve engine, giving a speed ratio between the fan and engine of 4.25 to 1. The fan is set on reinforced concrete foundations, with steel housing, and is connected with the air shaft by two reinforced concrete drifts, each having a sectional area of 56 square feet. The fan will deliver 200,000 cubic feet of air a minute against a 4-inch water gauge. In a trial run in December, the engine running at 62 revolutions and the fan at 623 revolutions, a ventilation of 224,000 cubic feet a minute was

produced, against 5-inch water gauge. The mechanical h.p. developed by the engine was 200 h.p., and the mechanical efficiency of the fan was 88.25 %. The fan is so constructed that, should future development of the mine demand it, a second engine could be coupled to the other end of the shaft, and with such increased power the fan, running at 405 revolutions, is expected to be able to produce a current of air of 300,000 cubic feet against an 8-inch water gauge.

The following are the official returns from the No. 1 Shaft and Protection Island mines for the year 1908 :—

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	153,680							
" export to U. S.	87,919							
" " to other Countries	4,777							
Total Sales			246,376					
Used in making Coke								
" under Colliery Boilers, &c	27,451							
Total for Colliery use			27,451					
			273,827					
Stock on hand first of year	13,997							
" last of year	13,789							
Difference taken from stock during year			208					
Output of Colliery for year			273,619					

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	11		14		25	
Whites—Miners	216	3.30 - 6.50			216	
Miners' helpers	19	2.86			19	
Labourers	197	2.86 - 3.30	12	2.75	209	
Mechanics and skilled labour	41	2.86 - 3.30	38	3.00 - 4.50	79	
Boys	46	1.10 - 2.45	16	.50 - 1.65	62	
Japanese						
Chinese			77	1.50 - 1.75	77	
Indians, natives of B. C.	3	2.86			3	
Totals	533		157		690	

Mine worked 223 days during year.

Northfield Mine, Nanaimo Colliery.

Thomas Graham, Manager; Henry Devlin, Overman.

This property has fulfilled its promise of becoming an important producer, as the returns herewith show, but these do not do the mine justice, as, but for the slackness in the coal market, the output could easily have been doubled.

Lower Seam.

In this mine the Lower seam is being worked, which varies from 30 to 40 inches in thickness, but the coal is very hard and of very good quality.

The travelling road into this mine is by an adit tunnel, lighted up for a considerable distance by electricity. The hoisting is done through a shaft 60 feet deep, from the bottom of which a slope extends for nearly a mile, passing under Exit passage and Newcastle island, and on which the hauling is done by an endless rope system, the engine of which is on the surface.

The workings of the mine are designated as Right or Left off the main slope. To the Right there are Levels Nos. 1, 2 and 3, of which only No. 2 is working at present. To the Left are Levels Nos. 1, 2½, 3 and 4. The mining in this colliery is all "long-wall" work, to which the seam is well adapted, a large number of compressed air mining machines being used; much timber is used in cogging the roof; the roadways are made full height, the "brushing" being chiefly taken from the floor. This seam, although thin, has proved very regular and of uniform good quality, and is very extensive, having been also found at No. 1 shaft and Protection island, where it has the same characteristics.

Upper Seam.

The Upper seam in this mine was formerly known as the "Douglas coal," which was very hard and of unusually good quality, although the seam was faulted in places. There are three tunnels from the Lower seam up to the Upper. One of these tunnels starts off the main slope abont 800 yards down, on the right side, and is a self-acting incline with grades of 1 in 4. From this incline connection is made with the old Fitzwilliam or Newcastle mine, which affords a good travelling road out and a good air intake. Another incline branches No. 4 Left level, but in this only a few men have been working, and very little development has been done here; this incline also connects with a shaft from Lower seam to surface.

The ventilation in this mine is very good; the amount of air travelling on the main air return was 84,000 cubic feet a minute, split as follows:—

No. 1	Left level,	15,300	cubic feet	for 38	men and	5	mules.
No. 2½ and 3	"	24,300	"	65	"	6	"
No. 4	"	14,500	"	36	"	3	"
No. 2	Right level,	13,500	"	36	"	2	"
No. 1	Incline,	6,500	"	17	"	1	"
No. 2	"	6,800	"	5	"	1	"
	Total	80,900	"	197	"	18	"

Showing that the leakage is 3,100 cubic feet a minute.

I have frequently examined all parts of this mine, well up into the breaks in the roof, with a Wolf safety lamp, but have never been able to find even a trace of explosive gas.

In addition to the manager and overmen, there is a force of 9 firemen and shot-lighters constantly on the move to see that everything is all right.

The company has installed at this mine also a new ventilating fan, a Clifford-Capell fan, single inlet, 11 feet diameter, 4 feet 4 inches wide, connected by a multiple 1.3-inch hemp rope drive with a 120-h.p. Erie engine; the spread ratio of fan and engine being 1.5 to 1. At 180 revolutions the fan developes 100,000 cubic feet of air a minute against a 3-inch water gauge. At present the fan is running at 150 revolutions and moves 74,000 cubic feet of air a minute against a 2-inch water gauge, which is ample for the present requirements of the mine. This new fan is set on re-enforced concrete foundations, with a steel housing, and is connected with the slope by a re-enforced concrete tunnel of 80 square feet sectional area. The Murphy fan formerly in use here will be kept in order as a reserve or auxiliary to the new fan.

The following are the official returns of the Northfield colliery for the year ending the 31st December, 1908:—

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	35,739	....	.....	....	.....	....	.....	....
" export to U. S	60,724	....	.....	....	.....	....	.....	....
" " to other Countries	.....	....	.....	....	.....	....	.....	....
Total Sales	.....	....	96,463	....	.....	....	.....	....
Used in making Coke	.....	....	.....	....	.....	....	.....	....
" under Colliery Boilers, &c	21,857	....	.....	....	.....	....	.....	....
Total for Colliery Use	.....	....	21,857	....	.....	....	.....	....
			118,320					
Stocks on hand first of year	4,025	....	.....	....	.....	....	.....	....
" last of year	3,800	....	.....	....	.....	....	.....	....
Difference taken from stock during year	.....	....	225	....	.....	....	.....	....
Output of Colliery for Year	.....	....	118,095	....	.....	....	.....	....

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	8	.....	9	.....	17	.....
Whites—Miners	131	3.30 - 5.00	.....	.....	131	.....
Miners' helpers	10	2.86	.....	.....	10	.....
Labourers	129	2.86 - 3.30	4	2.75	133	.....
Mechanics and skilled labour	19	2.86 - 3.30	19	3.00 - 4.00	38	.....
Boys	8	1.10 - 2.20	8	1.00 - 2.25	16	.....
Japanese	.....	.....	.....	.....	.....	.....
Chinese	.....	.....	36	1.50 - 1.65	36	.....
Totals	305	.....	76	.....	381	.....

Mine worked 225 days during year.

Wellington Colliery Company, Limited.

Head Office—Victoria, B. C. Capital $2,000,000.

Officers.

Hon. James Dunsmuir, President, Victoria, B. C. H. M. Hills, Secretary, Victoria, B. C.
F. D. Little, Vice-President, " J. A. Lindsay, Treasurer, "

The Wellington Colliery Company, Limited, has been operating the following mines during the year 1908, under the general management of F. D. Little, M.E.

The Extension Colliery, in Cranberry District (Extension); Andrew Bryden, Manager.

The Union Colliery, in Comox District, John Matthews, Manager.

The amount and disposition of the output of the company s collieries cannot be given, as this company has refused the required permission, being the only company in the Province so refusing.

EXTENSION COLLIERY.

Andrew Bryden, Manager.

The general supervision of all the mines of this colliery is entrusted to Mr. Andrew Bryden, who has an overman in charge of each separate mine. In addition to the mines in actual operation, subsequently mentioned, the company is now opening up two new mines in the vicinity, one by a slope and the other by a shaft, which are expected before a year has passed to be able to make a good production.

No. 1 or Tunnel Mine.

William Jones, Overman.

All the mining being done at this colliery is pillar coal work and the mining of the fire-clay underlying the coal.

The mine was originally worked on the pillar and stall system, fully two-thirds of the coal being left in the mine as pillars and top coal. The extracting of the pillars was begun some years ago, but this year mining has been confined to this class of workings although there is still further untouched coal in the mine which may be worked at some future time, with which in view, the roadways are being kept in good order.

The ventilation of the mine is good; there are two air intakes, known as East and West headings, which are also used as travelling roads for the men and also for the mules.

The ventilation in the East heading is 18,400 cubic feet a minute, and in the West heading 12,500 cubic feet, a total of 30,900 cubic feet.

There are 21 men and 4 mules employed in the mine. I have frequently examined all parts of the mine with a Wolf safety lamp, but have been unable to detect any explosive gas.

No. 2, Extension.

Alexander Stuart, Overman.

This mine starts at the inner end of the Big or No. 1 tunnel, a tunnel a mile long driven entirely in rock. All the coal from No. 1, No. 2 and No. 3 mines is now brought out through this tunnel by electric motor haulage. The three slopes formerly used as haulage ways, before connections were made with the tunnel, are still kept open, and are used as travelling ways and return air courses for their respective mines.

In No. 2 mine all the working places are to the dip of the inner end of the Big tunnel. About 240 yards to the east of the tunnel are two slopes, known as No. 2 East slope and the Diagonal slope. This latter was driven down into and across a basin, but now that the motor road has been extended, a road has been made around the eastern end of the basin and the slope done away with, except that there is a travelling way and ladder therefrom out of the mine. The coal in this part of the mine is very thick; about 50 % of it is left as pillars, to be removed at some future time.

In No. 2 West slope most of the mining done is the extraction of pillars, although some pillar and stall work is carried on. The coal from here is of excellent quality, but the seam is thinner than it usually is; there is, however, a very solid conglomerate roof requiring little timber, and adding to the safety of working. The prospects for a supply of coal from here for some years to come seems good.

I have frequently examined the mine in all its accessible places, and I have always found the mine well timbered and a plentiful supply of timber on hand; while, although I have always tested the air with a Wolf safety lamp, it was very seldom that I could obtain even a trace of explosive gas.

The amount of air supplied for ventilation is as follows:—

New travelling road, east split	19,000	cubic feet	a minute.
" " west "	17,600	"	"
Slant slope	10,250	"	"
No. 1 tunnel	24,360	"	"
Total	71,210	"	"

for 80 men and 10 mules.

In addition to the manager and overman, there is a staff of 9 firemen continually on the move throughout the mine.

No. 3 MINE, EXTENSION.

Alexander Bryden, Overman.

This mine is a continuation of the West level from the inner end of the Big tunnel, and most of the coal now being obtained here is derived from pillar workings, of which there is a large area extending down to the No. 7 level, in which about two-thirds of the original coal had been left in the pillars. The coal is very hard and about 12 feet thick. A large amount of coal has been taken from these pillar workings during the past year, but in addition to this there is a large area being worked on the pillar and stall system. In this mine, after crossing the basin, noted in No. 2 mine, a large upthrow fault was encountered, after passing through which good coal was encountered, and it is here that the pillar and stall work is in progress.

The mine is worked from a slope, as well as in the pillars to the rise workings, from which the coal is brought down by inclines to the No. 3 motor road.

Another motor road, starting from near No. 1 tunnel, has been driven down on a moderate slant by which the coal from the lower levels is now brought up.

There are four openings from the mine to the surface, three of which are always open, one being the main air intake, and another being near the workings now in progress.

Where the pillars are being extracted there is very shallow cover, so that, after the roof has been caved, daylight and much fresh air is admitted.

All the upper workings and places referred to are ventilated from the travelling road, but the slope workings, and the workings through the fault, are ventilated from the No. 1 tunnel, in which 25,000 cubic feet of air is passing for 34 men and 7 mules.

As already mentioned, the coal from this mine is taken out by the Big tunnel, which is double-tracked, one for the incoming and one for the outgoing motor. There are two large motors in use, each frequently hauling a train of over 100 loaded cars.

In addition to the manager and overman, there are 9 shot-lighters or firemen employed in the mine.

UNION COLLIERY.

John Matthews, Manager.

No. 4 Mine.

David Nellist, Overman.

No. 1 Slope.

This slope was not advanced any during the past year; No. 11 West level has also been at a standstill with the exception of the removal of pillars, at which a number of men are employed. Pillar and stall work is also being carried on in No. 14, 15 and 16 West levels, and in No. 16 East level.

Ventilation to the amount of 51,210 cubic feet a minute is provided for 71 men and 16 mules.

No. 2 Slope.

This slope branches off No. 1 slope to the right, a short distance in from below the surface, and is now, at its bottom, the deepest working in No. 4 mine. Some years ago this mine was on fire and had to be flooded, which did much damage, but the water has since been pumped out and work resumed at the face in very good coal. The following levels are now working: Nos. 11, 12, 13, 14, 15 and 16 East, and Nos. 12, 13, 14, 15 and 16 West levels. In both the East and West workings, above No. 13 level, the work being done is pillar work. The West levels are working towards No. 1 slope, and the East levels and slope into new ground. A travelling road has been put down parallel with the slope and separated from it by a thick pillar, and is used by both men and mules.

There are two systems of ventilation in this mine, the one ventilating a part of No. 1 slope and the other the remainder of No. 1 and all of No. 2 slope. The ventilation in No. 2 slope is 27,300 cubic feet a minute; travelling road, 6,250 cubic feet a minute. Total, 33,555. Split as follows: West side, 20,000 cubic feet for 65 men and 10 mules; east side, 13,000 cubic feet for 42 men and 7 mules.

I have examined the mine frequently during the year and have found very little standing gas at any time, and frequently only a trace in the airways. The bratticing is always kept close up to the face.

No. 5 Shaft.

John Kesley, Manager.

There has been no mining done in the Lower seam of this mine during the past year, the work having been confined to the Upper seam, in which the coal is very hard and of good quality, although in both seams it contains much impurity.

The embargo which has heretofore been on this mine and also No. 6—limiting the number of men employed under Section 28 of the Act, on account of their having but one shaft or opening—has now been removed, as the two mines have been connected by a good travelling road, with double doors, as each mine has its own ventilating system.

The ventilation of the mine is good, and is produced by a fan 14 feet in diameter and 5 feet wide, which gives a current of 24,375 cubic feet a minute for 44 men and 7 mules. I have examined the mine frequently with a Wolf safety lamp, and on almost every occasion I have been unable to find even a trace of gas. Sometimes a blower of gas issues from the floor, but it is carried away at once in the general ventilation.

The landing at the Upper seam is an open shaft, but it is protected by having iron gates, in addition to which there are iron catches to prevent the cars running into the shaft.

No. 6 SHAFT.

John Kesley, Manager.

This mine is now working on the Upper seam, the same as in No. 5 shaft, and the coal is of the same quality. For some time coal mining machines were used in this mine to undercut the coal before it was blasted, giving nearly all lump coal with a decreased consumption of powder and other mining costs, but for some reason, which I do not know, the use of these machines has been abandoned.

As has been already noted, this mine is connected now with No. 5, but has its own ventilating system; the ventilation is good, there being 36,250 cubic feet of air travelling through the workings, split as follows: East side, 20,000 cubic feet for 50 men and 6 mules, and north side, 16,000 cubic feet for 24 men and 4 mules.

I have frequently examined the workings for explosive gas, but have never been able to find even a trace. There is so much powder used in the mine that it requires a strong ventilation to take away the smoke.

The shaft landing is equipped similarly to No. 5 mine.

No. 7 MINE.

Wm. H. Wall, Manager; David Walker, Overman.

This mine is about two miles in a north-westerly direction from No. 4 mine and about four miles from No. 5, from which latter the standard gauge railway is extended to No. 7, where extensive sidings and labour-saving appliances have been installed to handle economically a large tonnage.

There are two slopes driven into the mine, the No. 1 being now down 1,300 yards, having been considerably extended this past year. There has been considerable trouble with water and faults, but the coal now seems to be more regular and 44 inches thick, under which there is quite a thickness of rock and coal, and whether this will eventually become a part of the seam remains to be seen. The coal from this mine is of good quality and very hard, being known commercially as "Cumberland anthracite."

The ventilation of the mine is very good; it is produced by a fan 30 feet in diameter and 11 feet wide, and amounts to 38,650 cubic feet of air a minute, of which 16,800 cubic feet goes to the No. 1 slope and 21,760 cubic feet to the No. 2 slope. In December there were employed in the mine 54 men and 5 mules. I have frequently examined the mine for explosive gas, but have been unable to find even a trace.

Macgowan & Co.

Head Office—Vancouver, B. C.

Officers.	*Address.*
A. H. B. Macgowan, President,	Vancouver, B. C.
Max. Macgowan, Vice-President,	"
Roy Macgowan, Secretary-Treasurer,	"
John John, Superintendent,	Wellington, B. C.

GILFILLAN COLLIERY, NEAR WELLINGTON.

John John, Manager.

This is a comparatively new mine, having been opened up only within the last two years, and is adjoining the old Adit mine of Robt. Dunsmuir & Sons, being a continuation of the famous "Wellington coal." The top bench of the coal seam is 5 feet 6 inches thick, the lower bench having so much rock matter mixed in it that it is not mined. The entrance to the mine was by a slope having an easy grade, which flattened out, after getting down 200 feet, while at 500 feet down the coal gave out. The coal was worked on the pillar and stall system, with only 18 feet of cover, composed of sand and clay, so that as the roof caved it came through to daylight, giving plenty of ventilation.

The mine was well equipped to handle several hundred tons of coal a day, with railway sidings, etc., but I regret to say the mine has been closed down indefinitely and much of the machinery taken away. The Company has another location in view, however, and may start again.

The following are the official returns of the Gilfillan Colliery for the year ending 31st December, 1908 :—

Sale and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons	Tons.
Sold for consumption in Canada	9,000			
" export to U. S				
" " other countries				
Total sales		9,000		
Used in making coke				
" under colliery boilers, &c	350			
Total for colliery use		350		
		9,350		
Stock on hand first of year	35			
" last of year	450			
Difference added to stock during year		415		
Output of colliery for year		9,765		

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	1				1	
Whites—Miners	24	$3.30			24	$3.30
Miners' helpers						
Labourers	6	2.75	3	$2 75	9	2.75
Mechanics and skilled labour			2	3 25	2	3.25
Boys						
Japanese						
Chinese			4	1 50	4	1.50
Indians						
Totals	31		9		40	

Name of Seams of Pits :—Gilfillan mine is a continuation of the old original Wellington seam, owned by the Dunsmuir interests, and lies west of their border line.

Description of seams, tunnels, levels, shafts, &c., and number of same :—The seam is 5½ feet in thickness of a top bench, with 2 feet of coal underneath, having two sandstone streaks, one of 8 inches, the other 4 inches, thickness, varying somewhat. Owing to the refuse in the lower bench, the upper or top bench only was worked. The above was worked by slope, dipping to the north about 1 foot in 6, which flattened after a depth of 200 feet, and continued so for 300 feet. At 500 feet a perpendicular wall of clay cut the coal out entirely. The coal was worked on pillar and stall system, stalls running east and west off main slope, cars being hauled out by means of engine stationed at mouth of slope.

Description and length of tramway, plant, &c.:—The tipple was situated at the north end of property, connected with the slope by a tramway 800 feet in length. Coal hauled on to tipple by a 30-h.-p Ledgerwood hoist. Steam generated by a 60-h.p. return tubular boiler. Owing to litigation the mine has been closed indefinitely.

South Wellington Coal Mines, Limited.

Head Office—Victoria, B. C.

Capital, $200,000.

Officers.	*Address.*
John Arbuthnot, President,	Victoria, B. C.
S. H. Reynolds, Managing Director,	"
Jas. Savage, Secretary-Treasurer,	"
George Wilkinson, Superintendent,	Nanaimo, B. C.

Capital of Company, $200,000. Value of plant, $25,731.22.

FIDDICK COLLIERY, SOUTH WELLINGTON.

George Wilkinson, Manager.

This is also a new colliery, having started operations on what is known as the "Fiddick" and "Richardson" estates, near to the old Alexandra mine of the Wellington Colliery Company. The mine is four miles from Nanaimo, on the E. and N. Railway, and is on the seam of coal known as the "South Wellington." A tunnel goes under the E. and N. Railway into the mine, while a shaft 40 feet deep has been sunk to the coal, on the opposite side of the railway from where the tunnel comes out.

The coal seam being worked is what was known as the old "South Wellington coal," a continuation of the "Douglas" coal at Nanaimo. Three slopes are now being driven, the main slope, 13 feet wide, and two parallels, each 10 feet wide. No. 1 East level has now been driven 800 feet from the slope. The seam varies from 6 to 16 feet in thickness, is of good quality, and is worked on the pillar and stall system. Farther down the slope two levels are being put off to the east and one to the west, each driven with a counter level.

The mine is now producing about 200 tons of coal a day, of which 90 % is from development workings, the stalls being only "turned away" and left standing, ready for starting when the proper shipping facilities are completed, when an output of 500 tons a day can be made. The No. 2 Slope is on the Richardson Estate and is now down 350 feet, but is stopped at present, owing to the construction of a new tipple. The one engine will hoist the coal from both slopes.

The ventilation is good, is produced by a Sheldon reversible fan, made by Sheldon's, Ltd., Galt, Ont., and amounts to 87,500 cubic feet of air a minute, against a 1-inch water gauge. The reversing of the air current is a very simple matter with this fan, an excellent feature in case of a mine fire.

The surface arrangements are very complete. The power-house contains a Goldie-McCulloch 100 h.-p. boiler, with steam pressure of 150 lbs. The new tipple, now nearing completion, is fitted with all modern appliances to save the breaking of the coal; quality rather than cost seeming to be the principle the company is working on.

The company is erecting at Boat harbour, on salt water, washers, bunkers and a loading wharf where ships of deepest draught can be loaded promptly. A railroad, 7 miles long, is being constructed as rapidly as possible, to connect the mine with the shipping point, when a locomotive and 20 40-ton cars will be employed.

Extensive boring operations are being carried on on adjoining properties, with the intention of opening new shafts.

The ventilation of the mine is good, and amounts to 56,000 cubic feet of air a minute for 34 men and 2 mules.

At Suquash the company has started operations and has a shaft down 120 feet, and expects to strike coal at 160 feet, which should be done in January, 1909, when, if the coal is found to be satisfactory, development of the mine will be vigorously prosecuted.

At McNeil bay, wharves and other shipping facilities will be constructed, as two seams of coal have been found there; the upper seam is 2 feet thick and was found 20 feet from the surface; the lower seam is 5 feet thick and was encountered 160 feet down.

The following are the official returns for the year 1908:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	15,443			
" export to U. S.	610			
" " other countries				
Total sales		16,053		
Used in making coke				
Used under colliery boilers, etc	600			
Total for colliery use		600		
		16,653		
Stocks on hand first of year				
" last of year	2,500			
Difference added to stock during year		2,500		
Output of colliery for year		19,153		

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	2		2		4	
Whites—Miners	36	3.30 - 4.50			36	
Miners' helpers	8	2.75			8	
Labourers	10	2.75			10	
Mechanics and skilled labour			8	3.00	8	3.00
Boys	2	1.00			2	
Japanese						
Chinese			12	1.50	12	
Indians						
Totals	58		22		80	

Name of Seams or Pits—No. 1 (Fiddick) slope. Upper seam: No. 2 (Richardson) slope. Upper seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—Two slopes, sectional area, 12 by 6 feet; one adit level, sectional area, 12 by 7 feet; one air shaft, 10 by 12 feet. Seams are what is known as the Upper seam or Douglas seam, averaging from 6 feet to 16 feet in thickness and of good quality.

Description and length of tramway, plant, etc.—One return tubular boiler, 100 horse-power, 150 pounds steam pressure and fittings complete; one vertical boiler, 8 horse-power, 120 pounds steam pressure and fittings; one Ingersoll air compressor, 12 by 18 feet, air pressure 130 pounds; one Sheldon's, Limited, fan and engine, fan 9 feet in diameter, engine 9½ by 12 feet; one 7 by 5 by 7 feet Fairbanks-Morse duplex pump, for fire service and boiler feed; one 5¼ by 3½ by 5 feet Fairbanks-Morse pump, for pumping water from mine; one pair of 12 by 16 feet hoisting engines, with friction drums for hauling coal from two slopes; one 8 by 10 feet tipple engine; one 6½ by 8 feet donkey winch; one 5 by 8 feet donkey winch; one air receiver 2½ by 10 feet; one water tank 6 by 9 feet; 2,000 feet of 1½-inch pipe-line; 1,000 feet of 3-inch pipe-line; 700 feet of ½-inch pipe-line; 600 feet of 2-inch pipe-line; 800 feet of tramway to old tipple; 600 feet of trestle to old tipple; one tipple platform 100 by 20 inches, with chute; one blacksmith shop, 2 forges; one power-house, 22 by 50 feet; one hoisting engine-house, 22 by 20 feet; one new tipple building just completed, ready for installation of machinery.

The Vancouver-Nanaimo Coal Mining Co., Ltd.

Head Office—Vancouver, B. C.

Capital, $250,000.

Officers.	*Address.*
H. W. Maynard, President,	Vancouver, B. C.
Alvo V. Alvensleben, Vice-President,	"
W. R. Phillips, Secretary-Treasurer,	"
J. J. Grant, Superintendent,	Nanaimo, B. C.

Value of Plant, $9,538.

NEW EAST WELLINGTON COLLIERY.

J. J. Grant, Superintendent.

This is another new mine which has been started to the east of the old "East Wellington Colliery," in the Mountain District, only about one mile west of the City of Nanaimo, and is operated by the Vancouver-Nanaimo Coal Mining Co., Ltd.

This mine, or prospect, is being opened up by a slope, angling across the pitch of the coal to the east, which is now down 750 feet, at a pitch of 29°, carrying in it a little coal all the way down, the roof and floor never having been lost. This slope is down on the northern side of Little mountain; the workings are headed for the valley where the coal may be expected to flatten out, and at the bottom of the slope the measures are now beginning to do so; there is now 9 inches of very hard coal of good quality, with 18 inches of coal and shale below it, which may possibly prove to be the upper seam, but work is being pushed farther to prove the question. The company has done a great deal of work and its prospects of finding coal look much brighter, and it is to be hoped that success will follow.

The following are the official returns for the year 1908:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	1,702			
" export to U. S.				
" " other countries				
Total sales		1,702		
Used in making coke				
Used under colliery boilers				
Total for colliery use				
Stocks on hand first of year				
" last of year				
Difference added to stock during the year				
Output of colliery for year		1,702		

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	2	4.00	1	4.00	3	4.00
Whites—Miners	6	3.30			6	3.30
Miners' helpers						
Labourers	3	2.77	1	2.75	4	2.76½
Mechanics and skilled labour	1	3.50	4	2.85	5	2.98
Boys						
Japanese						
Chinese			4	1.75	4	1.75
Indians						
Totals	12		10		22	

Name of Seams or Pits—East Wellington Seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—One slope. Course of the same 70° south-east, with an average dip of 27°. Length of slope, measured along the same, 280 yards. Practically no coal in the slope except at the top; tapped a small seam of coal at the bottom of slope, 2 feet thick. A pair of levels were driven off the slope near the surface, 205 yards, in an average of 5 feet of coal; course of same, 58° south-east.

Description and length of tramway, plant, etc.—Length of underground haul 300 yards, length of surface haul 70 yards. Plant includes two vertical boilers; two air compressors, which gives power to work two underground pumps and ventilate the slope; one double cylinder steam hoist, with which the material is hoisted out of the mine.

Nicola Valley Coal & Coke Co., Ltd.

Head Office—Vancouver, B. C.

Capital, $1,500,000.

Officers.	*Address.*
John Hendry, President,	Vancouver, B. C.
W. H. Armstrong, Vice-President and General Manager,	"
J. J. Plommer, Secretary-Treaserer,	"
Alexander Faulds, Mine Superintendent,	Merritt, B. C.

Value of plant,, $115,000.

MIDDLESBORO COLLIERY.

Alexander Faulds, Mine Manager.

This colliery has just completed its first full year's operations, and has made quite an output, as will be seen by the accompanying returns. The development and prospecting work done this past year seem to indicate a large amount of coal for future operations.

No. 1 Mine.

Hugh Gillespie, Overman.

This mine is operated through an adit tunnel, now driven in 1,400 feet, with which is connected, at a point 550 feet from the portal, a slope run down from Coal gully, which serves as a return air-way. This adit tunnel is 7 feet high by 7 feet wide, and is a fine road-way; the working places so far laid off from it are not very extensive, but preparations for extended workings are under way. The seam is 18 feet thick, but from the way the work is laid out and is progressing it would appear to be the intention of the management to work off the top bench first.

The ventilation of the mine is good, there being some 6,600 cubic feet of air passing up the Coal gully slope for the use of 15 men and 1 horse. I have often examined the mine with a Wolf safety lamp for explosive gas, and have not as yet been able to find any, although I know that it is given off at times.

A tipple was built on the line of a siding in from the C. P. Railway, the top of which was at the level of the adit tunnel. This tipple had been in operation only a short time when it, unfortunately, burned down and had to be rebuilt, causing quite a delay to operations in the mine.

No. 2 Mine.

Hugh Gillespie, Overman.

This mine is also in the side of a small hill, somewhat similarly situated as is No. 1 mine, but about half a mile farther south, and is in a higher coal seam. This mine has also been opened up by an adit tunnel, now driven in 1,400 feet to a fault. The seam is about 6 feet thick, good coal with a bright, black lustre and clean to handle, but in the seam there is considerable stone mixed with the coal. The coal is mined on the long-wall system under a cover of about 50 feet of a rather soft sandstone, which has upon several occasions broken, and each time causing considerable trouble.

The ventilation of the mine is good, about 18,000 cubic feet of air being supplied for 48 men and 2 horses. There are two separate return air-ways to the surface, one by a slope run down from the hill to intersect the tunnel, and another by a shaft that was put down this year near the face of the workings. I have frequently examined the workings for gas, but have been unable to find even a trace.

The mine is provided with a good tipple and bins, into the top of which the mine cars run on a level from the tunnel.

No. 4 MINE.

The Company is opening up two other seams of coal, one of which openings is known as No. 4 mine, and this is directly above and several hundred feet higher than No. 1 tunnel. The coal from No. 4 is sent down an outside chute to near the entrance of No. 1 mine, where it is put into cars and dumped into the No. 1 tipple.

There were 8 men employed here, some on rock and some mining coal, and from all appearances the prospect will make a mine.

No. 5 MINE.

The other new opening is the No. 5 mine, discovered this past year between No. 1 and No. 4 mines. It is being opened out by a tunnel starting about 300 feet from No. 1 adit, and on the same level, so as to use the No. 1 tipple. This tunnel is now in 230 feet in a seam of coal 6 feet thick, of excellent quality and very hard, said to be the best quality coal the company has yet found.

No. 3.

There is another seam between No. 4 and No. 5, known as No. 3, but very little development has been done here so far.

The following are the official returns of this colliery for 1908:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	26,000			
" export to U. S.				
" " other countries				
Total sales		26,000		
Used in making coke				
" under colliery boilers, &c.	227			
Total for colliery use		227		
		26,227		
Stocks on hand first of year	948			
" last of year	321			
Difference taken from stock during year		627		
Output of colliery for year		25,600		

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	.....	.....	2	10.00	2	10.00
Whites—Miners	37	4.50	.....	.....	37	4.50
Miners' helpers	16	2.50	.....	.....	16	2.50
Labourers	.....	.....	15	2.50 - 2.75	15	2.50 - 2.75
Mechanics and skilled labour	.....	.....	4	3.30 - 5.00	4	3.30 - 5.00
Boys (for 3 months only)	.....	.....	4	1.00	4	1.00
Japanese	.....	.....	.....	.....	.....	.....
Chinese	.....	.....	.....	.....	.....	.....
Indians	.....	.....	.....	.....	.....	.....
Hindus	.....	.....	.....	.....	.....	.....
Totals	53	.....	25	.....	78	.....

No. 1 mine—Main gangway or tunnel 9 feet by 7½ feet, to and in "Jewel Seam" 18½ feet thick, is in 1,284 lineal feet, forming main haulage and intake air-ways. Slope, 6 feet by 6 feet, is 830 feet long, forming main return air-way. Ordinary rooms or galleries, including cross-cuts and counter levels, are about 3,200 lineal feet into the ordinary working places.

No. 2 mine—Main gangway or tunnel 12 feet by 6 feet in "Ells Seam" 6 feet thick, is in 1,560 lineal feet, forming main haulage and intake air-ways.

Slope, 6 feet by 5 feet, is 150 lineal feet to intersection of working places, and a shaft 7 feet 8 inches by 7 feet 8 inches by 46 feet with stair therein. Slope and shaft forming the two main return air-ways and escapes.

Ordinary chute-ways, including cross-cuts and counter levels, are about 3,800 lineal feet into the long-wall working faces.

No. 3 mine—Main gangway or tunnel, exploratory, 6 feet by 5 feet, is in 38 lineal feet, and slope, 6 feet by 4 feet, is down 22 lineal feet in the coal seam 3¾ feet thick.

No. 4 mine—Main gangway or tunnel, 9 feet by 7½ feet, in "Major Seam" 14¼ feet thick, is in 326 lineal feet with counter level 255 lineal feet, forming haulage and intake air-ways.

Ordinary rooms or galleries, including cross-cuts and counter levels, about 715 lineal feet into the ordinary working places and thence to air shaft, 7 feet 8 inches by 7 feet 8 inches by 52 feet.

No. 5 mine—Main gangway or tunnel, 9 feet by 7½ feet, in "Ells Seam" 6 feet thick, is in 268 lineal feet, forming main haulage and main intake air-ways.

Slope, 6 feet by 5 feet, is down 130 lineal feet, forming main air-way with counter therefrom, in 10 lineal feet.

Modes of working—Mines Nos. 1, 4 and 5 are being worked pillar and stall. Mines Nos. 2 and 3 are worked long-wall.

Main gangways or tunnels—Are all provided with drainage ditches, travelling or manways and single track graded generally to 1 in 200.

Haulage above and under-ground by horse power; surface tramways to tipples being 430 530, 390 and 396 lineal feet respectively at mines Nos. 1, 2, 4 and 5, with trestles 210, 140 and 65 lineal feet respectively at mines Nos. 1, 2 and 4.

Tunnels and tramways all laid to a 36-inch gauge, with flat bottom steel rails, fish-platted, weighing 28 to 30 lbs. per lineal yard.

A Phillips tipple at each of Nos. 1, 2 and 4 mines.

A Jeffray coal-cleaning plant, of a capacity of about 30 tons per hour, and an electric lighting plant, are installed at No. 1 mine, and a good water supply from a Worthington steam pump of 150 gallons a minute capacity located near No. 2 mine. Also two Beatty hoisting engines for general purposes.

Diamond Vale Collieries, Limited.

Head Office—Vancouver, B. C.

Capital, $750,000.

Officers.	*Address.*
T. J. Smith, President,	Vancouver, B. C.
J. H. Sanderson, Vice-President,	"
F. J. Lumsden, Secretary-Treasurer,	"
Benj. Browitt, Superintendent,	Merritt, B. C.

DIAMOND VALE COLLIERY.

Benjamin Browitt, Manager.

This company's property lies immediately to the south of the Middlesboro Colliery, and across the Coldwater river.

The two shafts mentioned in my last report as being sunk near the river opposite the Middlesboro Colliery, have since been abandoned for the present.

No. 2 SHAFT.

The No. 2 shaft was put down 65 feet to the seam of coal that had been cut by bore holes, and considerable work was done on the seam, but the seam did not improve under the development sufficiently to justify work being continued on it, so the work in connection with the shaft was stopped.

No. 3 MINE.

While the work was going on in No. 2 shaft, prospecting was being done about two miles farther up the valley, where another seam was found cropping out. This was opened up by a slope, dipping about 40 degrees, now known as No. 3 mine, which is down 450 feet, in coal all the way, with a counter slope on either side. From the slope two pairs of levels have been broken away; the upper pair has been run in for some distance, but the lower pair has only recently been started. The seam is 54 inches from floor to roof, but there is a rock parting 12 inches thick, which reduces the available seam to 42 inches of clean coal, of good quality and a bright black lustre, typical of the better coals of the district.

The ventilation of the mine is good; it is produced by a small fan. I tested the air with a Wolf safety lamp, but was unable to find a trace of explosive gas.

The steam hoist and other machinery used here were brought up from the No. 1 shaft.

COAL PROSPECTS.

Near the entrance of Nanoose bay, a short distance north of Nanaimo, on Vancouver Island, an attempt is being made to open up an old property formerly known as "Jack's Mine." Very large wharves are under construction; a large amount of work has been done about the mine, and some coal and fire-clay were shipped, but during the greater part of the year the property has been at a standstill, and last time I was there nothing was being done at the mine.

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 1908.

Until within this last year there has been only one company actually producing coal in the East Kootenoy District, that is, the Crow's Nest Pass Coal Co., although this company operated three separate collieries, but during the year two new companies have begun to produce, namely, the Hosmer Mines, Limited, at Hosmer, and the Corbin Coal and Coke Co., at Corbin. These new companies only began to ship coal towards the latter part of 1908, and, consequently, their outputs this year have not been large, but they have extensive and fully equipped collieries, and in the future will be important factors in the production of the district.

Crow's Nest Pass Coal Co., Ltd.

Officers.	*Address.*
G. G. S. Lindsey, K. C., President,	Toronto, Ont.
Hon. Robt. Jaffray, Vice-President,	"
R. M. Young, Secretary,	"
E. R. Wood, Treasurer,	"
J. D. Hurd, General Manager,	Fernie, B. C.
Chas. Simister, General Superintendent,	"

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 fron Fernie.

Carbonado Collieries, situated on Morrissey creek and connected by a branch railway 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. This colliery has been shut down for more than a year, but is now being opened up again.

The total output of the Company's collieries for the past year was 876,467 tons. Of this 359,703 tons were used in the manufacture of coke, yielding 234,098 tons, which, with 6,146 tons of coke taken from stock, makes the amount of the coke sales 240,244 tons, of which

206,048 tons were sold for consumption in Canada, and 34,196 tons were exported to the United States. The coal exported to the United States amounted to 263,267 tons, while 199,729 tons were sold for consumption in Canada.

The amount and disposition of this combined output is more fully shown in the following table :—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	199,729	.....	206,048	.....
" export to U. S	263,267	.....	34,196	.....
" " other countries	.....	.....	.....	.....
Total sales	.....	462,996	.....	240,244
Used in making coke	359,703	.....	.....	.....
" under colliery boilers, &c.	52,916	.....	.....	.....
Total for colliery use	.....	412,619	.....	.....
		875,615		
Stocks on hand first of year	*nil.*	.....	7,003	.....
" last of year	852	.....	857	.....
Difference added to stock during year	.....	852	.....	6,146
Output of colliery for year	.....	876,467	.....	234,098

Number of Hands Employed, Etc.

Character of Labour.	Number Employed.		Total Number Employed.
	Underground.	Surface.	
Supervision and clerical assistance	42	27	69
Whites—Miners	684	.....	684
Miners' helpers	126	.....	126
Labourers	199	378	577
Mechanics and skilled labourers	385	225	610
Boys	28	15	43
Japanese	.....	.....	.....
Chinese	.....	.....	.....
Indians	.....	.....	.....
Total	1,464	645	2,109

COAL CREEK COLLIERY.

Elijah Heathcote, Manager.

This colliery is situated on Coal creek, about five miles east of Fernie. The following mines have been in operation during the year :—

Nos. 5 and 9, on the north side of Coal creek, and Nos. 2 and 6, on the south side of the creek ; Nos. 11 and 12 mines, about midway between Fernie and Coal creek, on north side of the creek ; the last two mentioned mines have, however, been closed down since the early part of the summer and all the rails taken out.

At each of the collieries of this company the plan of the mine is posted up at the mouth of the tunnel, the general and special rules and a barometer are hung up, so that every man can see them as he goes to the lamp-house for his lamp. The Wolf safety lamps are cleaned, put together, locked magnetically and tested by the lamp-man, and are again tested by the firemen as the men enter the mines.

No. 2 Mine.

Robert Middleton, Overman.

No. 1 District.

On December 3rd, the date of my last inspection of this mine, I found all the workings of this district to be in good order, well timbered, and the ventilation good, 30,000 cubic feet of air a minute passing for the use of 15 men and 1 horse. No blasting is allowed in the district, and no powder is used, and safety lamps are used exclusively. The seam is here from 6 to 8 feet in thickness, of good hard coal, and is worked on the pillar and stall system.

Beaver's Deeps District.

At my last inspection I found all the workings of the district in good order, well timbered and clear of any impurity in the air, the ventilation being good, 24,000 cubic feet of air passing a minute for the use of 14 men and 1 horse. Explosives are not used, and safety lamps only are used in the district. There are only two places being worked here at present.

No. 1 Mine.

William Wilson, Overman.

The present No. 1 mine is on the same seam of coal as was the old No. 1 mine, the new workings being to the west of the old workings, and are entered by an adit level driven in on the outcrop some distance to the west of and higher up than the old No. 1 tunnel. The mine is just being opened up; the only work being done is a level and counter and the putting up of an incline and counter incline, all narrow work. I have found everything in the mine in good order, the timbering good, and the ventilation sufficient, amounting to 23,200 cubic feet of air a minute for the use of 18 men and 1 horse. The coal is mined by machines and blasted down, a permitted explosive being used. Safety lamps only are used throughout the mine.

No. 5 Mine.

Thomas Spruston, Overman.

Slope District.

Upon my last examination of this district, on December 4th, I found gas over the timbers in rooms Nos. 10 and 11, off No. 1, north level, and also in four rooms off No. 2, north level, due to a canvas curtain having been knocked down, which disarranged the air current, but when the canvas was replaced all these places were cleared out. I found all the remainder of the district clear, well timbered and the ventilation good, there being some 38,400 cubic feet of air a minute in circulation in the district, divided into two splits, that to the north of the slope having 20,400 cubic feet for the use of 43 men and 4 horses, and that on the south side of the slope 18,000 cubic feet of air for 23 men and 2 horses.

On the following day I returned and made a second inspection of the portion of this district which I had found a little out of order on my previous visit, when I found all these places clear of gas, except that there was a little gas in two stalls above the timbers, where the air current could not get at it.

No. 1 Incline District.

I examined all the workings in this district and found them all in good order, well timbered and 18,200 cubic feet of air a minute circulating for 46 men and 3 horses.

Main East Level District.

I examined all this section of the mine and found everything in good order, the mine well timbered and the ventilation good, with 42,000 cubic feet of air circulating for 54 men and 6 horses. The total amount of ventilation, as taken at the fan shaft, was 112,000 cubic feet a minute, which shows that there was a leakage of 13,400 cubic feet a minute through doors and stoppings.

The mine is worked on the pillar and stall system; no blasting is done in the mine, and safety lamps only are used.

No. 9 Mine.

David Martin, Overman.

Slope District.

In my inspection of this mine on December 2nd, 1908, I found a little gas on the upper side of the counter level of the main level and a little in the slope in No. 1 North level; all the rest of the mine was clear and well timbered where it was required; the ventilation was good, 40,000 cubic feet of air being in circulation for the use of 29 men and 4 horses.

High Line District.

This district is worked on the pillar and stall system and narrow work, at the present time. There is little blasting done in this mine, and when it is done all shots are fired by a battery; safety lamps exclusively are used.

The following are the official returns for the Coal Creek collieries for the year 1908:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	63,088		80,447	
" export to U. S	191,704		24,423	
" " other countries				
Total sales		254,792		104,870
Used in making coke	153,380			
" under colliery boilers, &c	32,630			
Total for colliery use		186,010		
		440,802		
Stocks on hand first of year			2,615	
" last of year	201		67	
Difference {*added to / †taken from} stock during year		*201		†2,548
Output of colliery for year		441,003		102,322

Number of Hands Employed (Including Fernie Coke Ovens).

Character of Labour.	Number Employed.		Total Number Employed.
	Underground.	Surface.	
Supervision and clerical assistance	22	12	34
Whites—Miners	380		380
Miners' helpers			
Labourers	70	138	208
Mechanics and skilled labour	184	114	298
Boys	13	4	17
Total	669	268	937

Mechanics and skilled labour include :—

Underground—Drivers, motormen, rope riders, hoistmen, trackmen, bratticemen, timbermen, pumpmen, fanmen, carpenters.

Above ground—Lampmen, weighmasters, tipplemen, firemen, machinists, carpenters, blacksmiths, engineers, electric plant, fanmen.

Name of seams or pits—Nos. 1, 2, 5 and 9 mines working.

No. 1 mine was re-opened June 1st, 1908, by a drift in the ravine between Nos. 5 and 9 mines.

Nos. 11 and 12 mines at "Rock Cut" or "Sitkum" were discontinued and the equipment of the mine withdrawn September 1st, 1908.

Description of seams, tunnels, levels, shafts, etc., and number of same—Nos. 2, 5 and 9 mines same as last year; No. 1 seam is 7 feet 6 inches thick, is being opened up by means of a pair of levels driven on the strike of the seam, and a pair of inclines, off of which rooms will be opened, driven to the raise.

Description and length of tramway, plant, etc.—No. 2 mine: Main and tail rope haulage system has been discontinued and compressed air haulage substituted.

No. 5 and 9 mines: Electric locomotive haulage has been discarded and replaced by compressed air locomotives.

No. 1 mine: The coal is taken from this mine by a tramway 400 feet long to an incline 650 feet long, by which it reaches the tramway from No. 5 mine and is transported over the same to the tipple.

The boiler plant has been concentrated on the No. 1 side of the valley in a new brick building. A new compressor house has been erected to house a new Canadian Rand, four-stage, high pressure, air compressor; capacity, 1,300 cubic feet free air per minute, compressed to 1,200 lbs. per square inch, and used in the air locomotives at a pressure of 125 lbs.

At Fernie the slack bins at the coke ovens were destroyed by fire August 1st. Temporary bins were erected and in operation by August 28th. These will be replaced by a new permanent structure next spring.

There has also been erected at Fernie a building which houses a car repair shop, a car building shop, machine and blacksmith shop, railroad warehouse, and railroad and coke oven office. The building has a timber frame with corrugated iron roof and sides, and has two railway tracks running through it. This replaces the various coke oven and railroad buildings destroyed in the fire of August 1st.

MICHEL COLLIERY.

James Derbyshire, Manager.

This colliery is situated at Michel, about 24 miles in a north-easterly direction from Fernie. The following mines have been in operation during the year: Nos. 3, 4 and 5 on the south-west side, and No. 8 on the north-east side of Michel creek.

No. 3 MINE.

Joseph Thomas, Overman.

I examined this mine last on December 10th and found it all in good order, well timbered, clear of gas and the ventilation good, there being 15,000 cubic feet of air a minute circulating on the west side for 30 men and 2 horses, while on the east side there were 14,400 cubic feet for 25 men and 2 horses.

Blasting is permitted in the mine, negro powder being used, ignited by a battery; Wolf safety lamps only are used.

No. 4 MINE.

This mine is entered by the same tunnel as is No. 3 mine. In my examination of this mine I found just a "cap" of gas in No. 2 east level and its counter, but these places were not being worked; all the remainder of the workings were clear of gas and well timbered; the ventilation was good, there being 18,000 cubic feet of air in circulation for 20 men. The aggregate amount of air in circulation in both No. 3 and No. 4 mines was 47,400 cubic feet, while the amount of air returning to the common fan shaft was 145,800 cubic feet a minute, which indicates that the leakage through doors, stoppings, etc., was 94,400 cubic feet a minute.

No. 5 MINE.

Joseph Thomas, Overman.

Inspected this mine on December 11th and found all the workings in good order, well timbered, and the ventilation good. The mine is worked on the pillar and stall system. The mine is wet and blasting is permitted, "negro" powder, ignited by a battery, being used; safety lamps exclusively are being used.

The quantity of air circulating in the No. 2 west level district was 9,600 cubic feet a minute for 25 men and one horse; in the No. 2 east level district there was 12,000 cubic feet travelling for 30 men and 3 horses, while in the No. 1 west level section there was 10,080 cubic feet for 20 men and 3 horses, making a total of 31,680 cubic feet of air, but the return air at the fan shaft amounts to 84,000 cubic feet a minute, showing that there is a leakage of 52,320 cubic feet of air a minute through the doors and stoppings.

No. 8 MINE.

John Bastian, Overman.

Slope District.

I last examined this district of the mine on December 8th, when I found it all in good order and well timbered. The ventilation was good, there being 3,200 cubic feet of air in circulation for 12 men and 1 horse.

No. 5 and No. 6 Incline District.

I found everything in order here, with 17,500 cubic feet of air passing a minute for 59 men and 7 horses.

No. 4 Incline District.

I found this district all in good order, well timbered and with good air in all parts, except in No. 9 and No. 10 stalls, in which I found gas, but the fan had been stopped the night before and the gas had not cleared away; the stalls were, however, not being worked and

would not be until a cross-cut had been put through to bring the air to the faces. These stalls are very high and too much bratticing has to be used, and the air was leaking over the timbers, etc. There was 37,000 cubic feet of air in circulation in the district, for 13 men and 1 horse.

The seam is pitching on an average of 20° to 30°; the coal is good for steam and coking purposes; and is worked on the pillar and stall system. Blasting is not allowed in any part of the mine, and Wolf safety lamps are used exclusively.

No. 3 Incline District.

Inspected this district on December 9th and found everything in good order; the workings well timbered and free from gas; the ventilation was sufficient, amounting to 18,300 cubic feet of air a minute for 63 men and 4 horses. Blasting is permitted at night only when the men are out of the mine, negro powder being used, and the shots fired by a battery.

No. 17 Chute District.

I examined this district throughout and found all the workings in good order and well timbered; the ventilation was good, there being 17,600 cubic feet of air in circulation for 47 men and 5 horses. Blasting is permitted in this section, also, under the same conditions, but it is not required in many of the stalls, as the coal can be mined without it.

No. 7 Mine.

This mine is reached by a tunnel driven through the strata from No. 8 mine, and is in what is called the No. 5 seam, mined on the other side of the creek. There are only two levels and their counters being driven at present. The roof is hard and strong, requiring very little timbering; the coal is hard and requires to be blasted.

No gas has been found in the mine as yet; the ventilation is good, there being 5,000 cubic feet of air a minute circulating for 18 men and 1 horse. The total amount of air travelling in the fan shaft was 93,600 cubic feet, showing the leaking through doors, stoppings, &c., to be 28,300 cubic feet a minute.

The following are the official returns of this colliery for the year 1908 :—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	136,604		125,601	
" export to U. S.	49,019		9,773	
" " other countries				
Total sales		185,623		135,374
Used in making coke	206,323			
Used under colliery boilers	20,069			
Total for colliery use		226,392		
		412,015		
Stocks on hand first of year			4,388	
" last of year	170		790	
Difference {*added to / †taken from} stock during year		*170		†3,598
Output of colliery for year		412,185		131,776

NUMBER OF HANDS EMPLOYED (INCLUDING COKE OVENS).

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	16		12		28	
Whites—Miners	256				256	
Miners' helpers	126				126	
Labourers	129		226		355	
Mechanics and skilled labour	187		99		286	
Boys	15		11		26	
Japanese						
Chinese						
Indians						
Totals	729		348		1,077	

Name of Seams or Pits—Nos. 3, 4, 5, 7 and 8 mines working.

Description of seams, tunnels, levels, shafts, &c., and number of same—Same as last year. No. 7 mine was opened by a rock tunnel, cross-cutting the measures, driven from a point in the main east level of No. 8 mine, a distance of 2,000 feet from the mouth of the tunnel. The seam is seven feet thick, and is being developed by means of a pair of levels driven on the strike of the seam in both directions right and left from the rock tunnel; at a distance of 700 feet on either side of the rock tunnel a pair of inclines is being driven to the raise, off of which rooms will be opened and the coal extracted either by the room and pillar or retreating long-wall systems.

Description and length of tramway, plant, &c.—The tipple at Michel having passed its useful stage, a new steel tipple is being erected, which, it is expected, will be in operation by February 15th, 1909. It is 664 feet long and 14 feet wide, and has the most modern machinery for the preparation and loading of coal. There have been installed during the year eleven new return tubular boilers; capacity, 1,650 h.p. A Walker low pressure compressor; capacity, 3,500 cubic feet free air per minute compressed to 100 lbs. per square inch. A Canadian Rand high pressure compressor; capacity, 1,300 cubic feet free air per minute compressed to 1,200 lbs. per square inch. A steel fan, made by Walker Bros., Wigan, England; size, 20 feet in diameter; capacity, 200,000 cubic feet of air per minute, at 3-inch water gauge for the purpose of ventilating mines Nos. 7 and 8. Other plant same as last year.

CARBONADO COLLIERY.

Edward Bridge, Manager.

The company has started to open up mines at Carbonado again. Two new tunnels have been started on the upper side of the tipple and level with it. They were progressing slowly with the work.

No. 7 MINE.

I examined this mine on December 16th last and found all the workings in good order and well timbered; the ventilation was good, there being 18,000 cubic feet of air a minute for 20 men and 2 horses, produced by a small Guibal force fan, 10 feet diameter and 34 inches wide. The tunnel is 12 feet by 7 feet in the clear, and is now in 1,400 feet, paralleled by a counter. The seam pitches at an angle of 70°.

No. 8 Mine.

I found this mine also to be in good order and well timbered; the ventilation was good, amounting to 25,000 cubic feet of air a minute for 5 men and 1 horse. The main tunnel is 7 by 12 feet in the clear, and is now in 1,050 feet, with a parallel counter. The seam is 50 feet thick, and dips at an angle of 70°. A little blasting is done in this mine, as the coal is hard to dig. Wolf safety lamps are used exclusively in both these mines, and, as in all the mines of this Company, the general and special rules and a plan are posted up.

The following are the official returns of this colliery for the year 1908 :—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	37			
" export to U. S	22,544			
" " other countries				
Total sales		22,581		
Used in making coke				
Used under colliery boilers, etc	217			
Total for colliery use		217		
		22,798		
Stocks on hand first of year				
" last of year	481			
Difference added to stock during year		481		
Output of colliery for year		23,279		

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	4		3		7	
Whites—Miners	48				48	
Miners' helpers						
Labourers			14		14	
Mechanics and skilled labour	14		12		26	
Boys						
Japanese						
Chinese						
Indians						
Totals	66		29		95	

Note.—Mechanics and skilled labour include:

Underground—Drivers, motormen, rope riders, hoistmen, trackmen, bratticemen, timbermen, pumpmen, fanmen, carpenters.

Above ground—Lampmen, weighmasters, tipplemen, firemen, machinists, carpenters, blacksmiths, engineers, electric plant, fanmen.

Name of Seams or Pits—Nos. 7 and 8 mines.

Description of seams, tunnels, levels, shafts, &c., and number of same—No. 7 tunnel is now in a distance of 1,500 feet, and the coal is 28 feet thick. No. 8 tunnel is in a distance of 1,200 feet, and the coal is 9 feet 6 inches thick. These seams were opened up about the first of the year, and all work done to date has been simply of a prospecting nature. The main tunnels will be driven about 1,000 feet farther before a plan of mining is decided upon.

Description and length of tramway, plant, &c.—Same as last year.

Hosmer Mines, Limited.

Head Office—Montreal.

Officers.	*Address.*
W. D. Matthews, President,	Toronto, Ont.
B. T. Coon, Treasurer,	Bankhead, Alta.
Louis Stockett, General Manager,	Hosmer, B. C.
R. G. Drinnan, General Superintendent,	"

Capital of Company, $1,500,000.

Value of plant, $1,000,000.

HOSMER COLLIERY.

J. K. Millar, Manager of Mine.

(A description of this plant will be found on page 86 of this report.)

This colliery has been opened up by two parallel tunnels driven in, cross-cutting the measures and the various coal seams. These tunnels are now in 3,700 feet, and the work of opening out has been begun on No. 2 and No. 6 seams.

No. 2 Mine.

The South level of No. 2 seam has been driven 200 feet from the tunnel, and the North level 150 feet, both with counter levels; the seam is 12 feet thick, of good hard coal, and dips at an angle of 62°. I found everything in good order and the ventilation good, there being 10,000 cubic feet of air a minute for 20 men and 1 horse. The air is taken in from the Main tunnel along the level and returns by the counter level, which has been driven above the Main tunnel to the second tunnel, which is the main return air course. The North level, at the present, gets its air from the Main tunnel.

No. 6 Mine.

The No. 6 seam is 8 feet 5 inches thick and pitches at an angle of 35°. The South level has been driven in about 100 feet, while the North level has just been started. I found all the places in good order, well timbered with heavy sets, and the ventilation good, with 10,000 cubic feet of air circulating for 70 men and 3 horses, which goes into No. 6 mine and to the face of the tunnel. The amount of air travelling in the fan shaft was 20,000 cubic feet, this being produced by a fan 6 feet in diameter by 2 feet 6 inches wide.

This company only began shipping on Decemben 1st, 1908, and the following are the official returns for that month :—

Sales and Output for Year.	Coal.		Coke.	
	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	630		365	
" export to United States				
" " other countries				
Total sales		630		365
Used in making coke	547			
" under colliery boilers	1,201			
Total for colliery use		1,748		
		2,378		
Stock on hand first of year				
" last of year	249		406	
Difference added to stock during year		249		406
Output of Colliery for year		2,627		771

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	8	3.75 - 5.00	7	3.00 - 5.00	15	
Whites—Miners	64	3.00 - 3.75			64	
Miners' helpers	74	2.50 - 2.75			74	
Labourers	90	2.50	58	2.25	148	
Mechanics and skilled labour			48	2.75 - 4.00	48	
Boys	3	1.25	1	1.25	4	
Japanese						
Chinese			8	1.50	8	
Indians						
Totals	239		122		361	

Commenced shipment of coal and coke December 19th, 1908. Returns for month of December.

Corbin Coal & Coke Company.

Head Office—Spokane, Wash.

Capital of Company, $1,000,000.

Officers.	*Address.*
Albert Allen, President,	Spokane, Wash.
J. K. O. Sherwood, Vice-President,	New York, N. Y.
A. T. Herrick, Secretary-Treasurer,	Spokane, Wash.
E. J. Roberts, Superintendent,	"
Evan Evans, Mine Manager,	Corbin, B. C.

Value of Plant, $25,000.

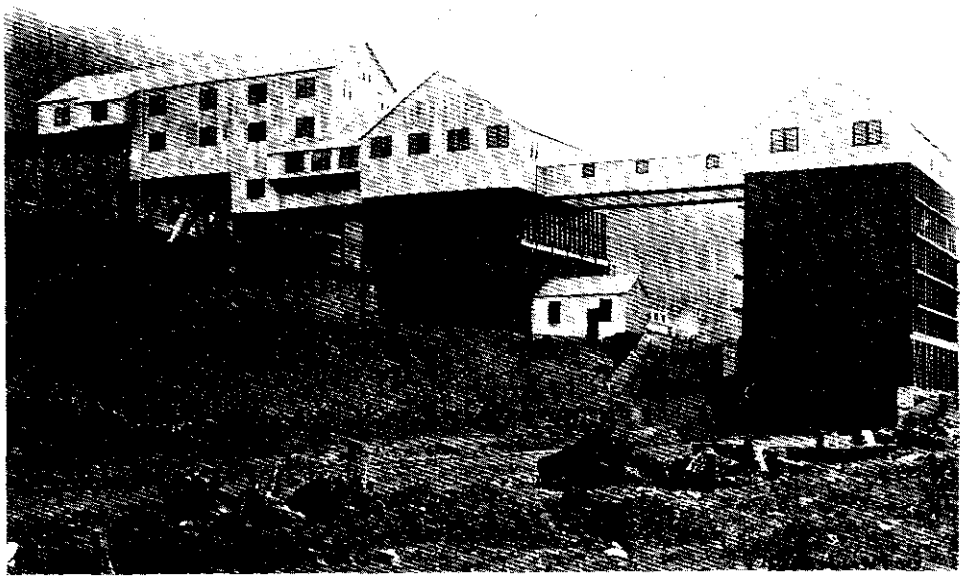
CORBIN COLLIERY.

Evan Evans, Manager.

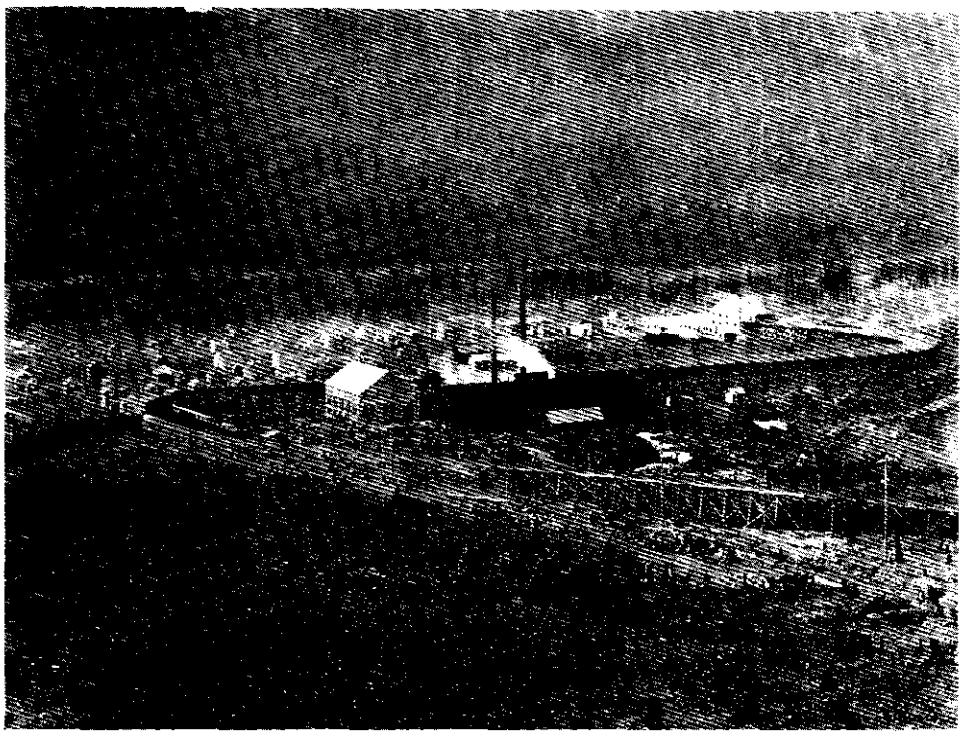
This colliery is only being opened up at present and this is being done by driving in two tunnels; the big Main tunnel is 14 by 8½ feet in the clear, and is now in 386 feet, while the small tunnel is 11 by 8½ feet, and is now in 328 feet. The seam is 40 feet thick and dips at an angle of 70°. The small tunnel is 70 feet higher than the Main tunnel, and the cross-cut between them makes a good natural ventilation in the Main tunnel and out the upper. No gas has been seen in either of the tunnels as yet.

The following are the official returns of this colliery for the year ending 31st December, 1908:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lbs.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	549			
" export to United States	3,562			
" " to other countries				
Total sales		4,111		
Used in making coke				
" under colliery boilers				
Total for colliery use		4,111		
Stocks on hand first of year				
" last of year				
Difference added to stock during year				
Output of colliery for year		4,111		



STEEL TIPPLE, HOSMER MINES, LTD., HOSMER, B. C.



GENERAL VIEW PLANT OF HOSMER MINES, LTD.

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	2	$5 20	2	$5 30	4	$5 25
Whites—Miners	21	3 50	.....	.....	21	3 50
Miners' helpers	20	2 75	.....	.....	20	2 75
Labourers	.....	.....	7	2 50	7	2 50
Mechanics and skilled labour	.....	.....	2	3 72	2	3 72
Boys	.....	.....	.....	.....	.....	.....
Japanese	.....	.....	.....	.....	.....	.....
Chinese	.....	.....	.....	.....	.....	.....
Hindus	.....	.....	.....	.....	.....	.....
Totals	43	3 23	11	3 23	54	3 23

Name of Seams or Pits—No. 1 seam.

Description of seams, tunnels, levels, shafts, &c., and number of same—Seam has a northerly and southerly strike, dipping some 60 degrees to the east. Two tunnels, one for main entry, and another 70 feet above, for air-course, each about 500 feet in length.

Description and length of tramway, plant, &c.—No surface plant.

ACCIDENTS IN BRITISH COLUMBIA COLLIERIES DURING 1908.

Causes of Accident and Nature of Injury.	Name of Colliery.																												Total for 1908.			
	Nanaimo.			Union.			Extension.			Fiddick.			3 other collieries.			Gilfillan.			Middlesboro.			Crow's Nest.			Hosmer							
	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Total.
Gas—Explosion of	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
Fatal	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	....
Serious	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Slight	..	..	..	..	..	4	..	..	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	8	....
Falls of Coal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19
Fatal	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	....
Serious	..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	6	..	....
Slight	..	..	6	..	..	1	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	....
Falls of Rock	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	22
Fatal	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	5	..	..	....
Serious	..	4	..	..	3	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	10	..	....
Slight	..	..	4	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	....
Mine Cars	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35
Fatal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	....
Serious	..	3	..	..	4	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	..	..	19	..	....
Slight	..	..	7	..	..	1	..	..	5	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	15	....
Shot or Powder	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
Fatal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Serious	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	....
Slight	..	..	..	..	..	3	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	....
Ropes, Hoisting or Haulage	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
Fatal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	....
Serious	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	4	..	....
Slight	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Post or Timber	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Fatal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	....
Serious	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	3	..	....
Slight	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Miscellaneous—Underground	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
Fatal	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	4	..	..	.. ..
Serious	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	....
Slight	..	..	1	..	..	1	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	...
Miscellaneous—Surface	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	2	..	..	9
Fatal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	4	..	....
Serious	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	3	....
Slight	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	
Total	2	8	18	3	11	10	1	6	17	..	1	..	..	..	..	..	2	..	..	..	2	12	24	3	..	..	..	18	50	52	120
Number of men employed	1,071			1,119			1,128			80			109			40			78			2,109			361			6,095			

SUMMARY—TABLE SHEWING ACCIDENTS OCCURRING IN B. C COLLIERIES IN TEN YEARS—1899 TO 1909.

For the year	1899.				1900.				1901.				1902.				1903.				1904.				1905.				1906.				1907.				1908.				Total for 10 years.			
Output of coal—tons.	1,306,324				1,590,179				1,691,557				1,641,626				1,481,913				1,685,698				1,825,832				1,899,076				2,219,608				2,109,387				17,451,200			
No. persons employ'd	3,780				4,178				3,974				4,011				4,264				4,453				4,407				4,805				6,059				6,095				46,036			
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	3	9	18	30	..	2	22	24	2	2	12	16	1	..	8	9	21	..	16	37	7	..	8	15	..	..	9	9	..	..	1	1	1	1	18	20	1	..	8	9	36	14	120	170
Falls of coal.....	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	5	6	3	14	8	15	7	30	3	6	10	19	37	83	35	155
" rock	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	7	8	7	22	2	7	8	17	5	10	7	22	52	80	41	173
Mine cars.....	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	2	13	13	28	8	22	15	45	1	19	15	35	35	112	75	222
" timber	..	..	..	..	..	1	1	2	...	2	..	2	2	..	..	2	1	2	..	3	..	2	..	2	1	2	..	3	..	1	1	2	..	4	1	5	1	3	..	4	5	17	3	25
Hoisting, ropes, &c .	..	..	..	..	1	..	..	1	...	2	..	2	...	2	..	2	..	4	1	5	..	2	..	2	..	..	1	1	..	2	1	3	..	..	3	3	1	4	..	5	2	16	6	24
Powder, &c., explo'n	..	2	1	3	1	3	6	10	...	4	6	10	...	..	1	1	1	7	..	8	1	..	1	2	1	1	3	5	..	1	1	2	1	2	4	7	..	2	4	6	5	22	27	54
Underground — Miscellaneous	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	3	..	2	3	5	1	1	4	6	4	2	5	11	5	7	13	25
On surface — miscellaneous.	1	..	..	1	3	1	..	4	2	2	2	6	...	3	1	4	2	..	1	3	3	3	0	6	1	2	..	3	1	3	2	6	10	9	2	21	2	4	3	9	25	27	11	63
Fire in Mine	..	..	..	..	..	..	..	..	19	..	..	19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19	..	..	19
	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	15	36	32	83	31	61	62	154	18	50	52	120	424	378	331	1133

DETAILED STATEMENT OF ACCIDENTS IN B. C. COLLIERIES DURING 1908.

COAST COLLIERIES.

REPORTED BY ARCHIBALD DICK, INSPECTOR.

No.	Colliery.	Date.	Name.	Occupation.	Details.
1	Northfield	Jan. 6	John McCourt	Miner	Leg broken while at work in his place by a piece of rock falling on him.
2	"	" 14	William McEwen..	Ropeman	Was taking the grip off the rope while the car was in motion when his foot got caught in the switch; the car ran over his foot and bruised it.
3	Union	Feb. 5	Charles Good.....	Pusher	Compound fracture of leg. He fell off an empty car in No. 4 mine and the wheels passed over his leg.
4	Extension	" 3	John Manners.....	Miner	Broke the small bone of his leg with his shovel handle while at work in No. 3 mine.
5	Fiddick.....	" 12	Thomas Hope	"	Hope had built a temporary scaffold to enable him to raise a timber; the scaffolding slipped and he fell, breaking his shoulder blade.
6	Northfield	" 17	G. Gusmarak.....	Pusher	While in front of a car lowering it down a slant road he put his hand against a prop to steady himself and the car came against his elbow and broke his arm.
7	Union	" 18	— Nioyhai.....	Miner's helper...	Side bruised by a piece of coal falling on him while at work in No. 4 mine.
8	Extension	" 21	J. Albertine	Miner	Slightly burned about the face and hands by kindling some gas. He was provided with a safety lamp and told to use it, but went to work with a naked light.
9	Nanaimo	Mar. 3	Alfred Williams...	Machine runner .	While running a power drill in No. 1 shaft a piece of rock fell from the roof and struck him on the arm, inflicting a flesh wound.
10	Union	" 10	John Kesley	Manager No. 6 Mine.	Slightly cut about the head and ribs bruised.
11	"	" 10	O. P. Stevens	Miner	Arms broken, chest severely burnt and head lacerated.
12	"	" 10	Francis D. Little ..	General Manager, Wellington Colliery Co.	Ribs and right arm broken, head cut and legs badly bruised.
13	"	" 10	— Satto	Miner's helper...	Badly cut on the hands and face and bruised about the eyes and ribs. [The above four accidents were caused by a premature explosion of "Mitchellite," a powder which was being tested on this occasion. The charge went off while there was only two or three inches of tamping in the hole.]

ACCIDENTS IN COAST COLLIERIES.—*Continued.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
14	Union	Mar. 12	Jung Sing Chung ..	Stableman	While attempting to get into the cage while it was away from the landing in No. 6 mine he fell to the bottom of the shaft and was killed.
15	Northfield	" 30	Benjamin Senior...	Track-layer	Leg and ankle bruised by a passing car jumping the track.
16	Nanaimo	April 2	William White....	Miner	Back bruised while at work in No. 1 shaft by a piece of coal falling on him.
17	Union	" 3	Frank Bradley	Rope-rider	When stepping off the front car of a loaded trip the car caught him and broke his forearm.
18	Northfield	" 6	Fred Hillery	Miner	While replacing some timber, which had been disturbed by a shot, some rock fell on him cutting his hand and bruising his back.
19	Nanaimo	" 6	Sam Wallace.....	Track-layer	Took a small car off the track in No. 1 shaft to let the trip pass. One of the rear cars was off the track and hit the small car, bruising Wallace's leg.
20	Extension	" 7	Charles Goire	Pusher	Arm broken by being caught between a mine car and a prop in No. 3 mine.
21	Extension.....	" 16	John Banasky.....	Pusher	Cut under the eye by a piece of coal flying from a shot. The miner (Geo. Muir) who lit the shot did not take the proper precautions to keep people away and the pusher entered the place as the shot went off.
22	Northfield	" 17	John Barr	Labourer	Was taking down coal from over the roadway when some fell on him, bruising his back and legs.
23	Extension.....	" 22	Chris. Thompson ..	Miner	While taking down top coal some of it fell on him, bruising his shoulders.
24	Union	" 28	A. Machin	"	Was preparing for a shot with black powder in No. 6 mine. When he had 18" of tamping on the powder the shot went off, injuring his face and eyes.
25	"	" 27	Angus McLeod....	Loader	While getting out of the way of falling coal was struck by a car which broke two small bones in his leg.
26	"	May 7	Fred Good	Miner	Slightly burned by an explosion of gas. He had been warned to use a safety lamp, but went to work with a naked light and ignited the gas.
27	Extension.....	" 12	Frank Forrest.....	"	While loading a car in No. 3 mine some shale fell and struck him, spraining his ankle and breaking his nose.

ACCIDENTS IN COAST COLLIERIES.—*Continued*

No.	Colliery.	Date.	Name.	Occupation.	Details.
28	Middlesboro ..	May 15	James George	Miner and loader	These two men were driving a cross-cut from level to the counter level in No. 1 mine. They had left the working face for a few minutes and had just returned when one of them ignited a body of gas which had recently accumulated. They were both slightly burned about face and arms.
29	" ..	" 15	Samuel Poole.....	"	
30	Extension	June 2	Robert Pethnage ..	Switchman.....	Caught his heel in the frog of a switch and was struck by the motor, which bruised his leg.
31	Union	" 11	— Ogata.....	Miner's helper...	While loading a car at the face in No. 4 mine a small piece of rock fell from the roof, breaking his leg.
32	Extension	" 15	John Williams	Miner	Foot bruised while at work by a piece of rock falling on it.
33	"	" 20	Lon Song	Tippleman	While oiling the tipple his hand got caught in the gearing and two of his fingers were taken off.
34	Nanaimo	" 22	Chas. Killeen	Rope-rider.....	While he was riding between two timber cars the first car jumped the track and got caught against the rib, jamming his leg between the timber and the second car and bruising it.
35	Extension	" 27	Peter Cain.....	Miner	There had been a small cave from the roof at the face where some gas had collected. Cain was putting up some timbers when he ignited the gas. He stood up to save the timber from falling and got his hands and the back of his neck slightly burned.
36	"	" 27	John Chapman	"	Collar-bone broken by falling on a rail.
37	Nanaimo	" 26	John Beresford....	Mule driver.....	Was holding back some cars when the bumper of the first car caught his heel and twisted his foot, breaking a small bone.
38	Northfield	July 9	Peter Gourly.....	"	While riding on top of a loaded car Gourly got caught in a low part of the roof and injured his spine.
39	Extension	" 9	Mat. Alton	Timberman	While digging a hole for a timber a piece of rock fell on him from the rib, breaking his leg.
40	Northfield	" 22	William Hutchison	Miner	Thigh bruised by a piece of coal falling on him while at work.
41	Extension	" 22	Victor Morrell	Mule driver.....	Kicked in the stomach by a mule.
42	"	" 23	Matthew Simpson .	Pusher	Omitted to put a sprag in the wheels of a loaded car which he was taking away from a stall when he knocked away the block. He was in front of the car which ran over and seriously injured him.

ACCIDENTS IN COAST COLLIERIES.—*Continued.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
43	Extension	July 23	George McKay	Mule driver.....	In stepping off a trip of cars he fell in front and got bruised on the thigh.
44	Nanaimo	" 30	Andrew Rose	"	Was riding behind a loaded car when it jumped the track, throwing him against the roof and breaking a small bone of his shoulder.
45	Extension	" 31	S. Gordon	"	Jumped off the motor to get ahead of it, but fell and got caught against the water box, receiving a bruised leg.
46	Gilfillan	Aug. 1	William Fox	Engineer	While washing his hands at a water tank fed by a hose from the boiler the nozzle blew off the hose and struck his face and he was scalded by steam.
47	Union	" 4	Lee Lung Quong...	Miner's helper...	A shot had been fired that failed to bring down the coal and rock. Lee Lung Quong went to work there and the coal and rock fell on him and killed him.
48	"	" 4	Lew Hoy	" ...	Fatally injured in the same fall and died about four hours afterwards.
49	Nanaimo	" 12	James Robinson ...	Loader	Was loading a car with coal when a small piece of coal and rock fell on his head, inflicting a scalp wound.
50	Gilfillan	" 13	Adam Ross	Pusher	Was taking an empty car into a stall when another car above him on the grade ran away and jammed Ross' arm between his car and a prop, injuring it slightly.
51	Northfield	" 27	William Rickaby ..	Loader	A piece of rock fell with some top coal he was taking down and broke his wrist.
52	Nanaimo	Sept. 5	John Potter.....	Faceman	Fatally injured at the face of No. 3 slope, where he had gone to tamp some shots, his naked light igniting a small quantity of gas, which burned him about the face. He was thought not to have been seriously injured, but he died on Sept. 16th, at Nanaimo Hospital.
53	Union	" 5	Wong Lai Pong ...	Pusher	R. Henderson, shotlighter, found that a curtain had been torn down by a passing car in No. 14 West level, which had allowed an accumulation of gas to occur in an abandoned place that the curtain was intended to ventilate; Henderson told the brattice-man of the gas, but told him not to replace the curtain till he (Henderson) came back. The brattice-man evidently misunderstood his orders for he put up the curtain and drove the gas down on to the level where Pong, who was passing along the level, ignited it with his open light and was slightly burned about the face and hands.

ACCIDENTS IN COAST COLLIERIES.—*Continued.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
54	Union	Sept. 5	Kwong Kwak Kwing	Mule driver.....	Slightly burned about the face and hands by the explosion referred to in No. 53.
55	Nanaimo	" 8	Thomas Moore	Machine helper..	While scraping out the dirt from the machine a piece of coal fell from the face, cracking his ankle bone.
56	Extension	" 10	Martin Woodburn.	Mule driver.....	While turning his mule got his arm jambed between the mule and rib, and broken.
57	"	" 15	Fred. Greaves.....	Miner	Was mining to ease a shot he was about to fire when the top coal fell on him. He was fatally injured and died eight hours afterwards.
58	Nanaimo	" 23	Peter Wilson	Timberman	While engaged in putting in some props a piece of rock fell on his right leg, breaking his thigh bone.
59	Extension	Oct. 5	Steve Lapansky ...	Mule driver.....	His mule ran away from him, and while running after it he got caught by the slope trip which bruised his leg.
60	Union	" 5	Tim Yuen	Track-layer	Was taking a short cut to another level, crawling behind the brattice, where there was not more than 30 inches between the gob and the roof. He kindled some gas which had accumulated in a small cave there and got slightly burned about the face and hands.
61	Nanaimo	" 6	Fred. Polkinham ..	Mule driver.....	Kicked in the face by a mule in No. 1 mine, and had his nose broken.
62	Extension	" 7	Charles Meacham..	Door-keeper	Left his post to take a ride on a car. He jumped off to open the door but was not quick enough, and the car caught him and bruised his leg.
63	Northfield	" 9	William Polkinham	Face timberman.	Bruised about the hips by a piece of falling rock while sitting with the machine man.
64	Union	" 9	James Peacock	Mule driver.....	Skull and face bone fractured by a small piece of rock which fell on him.
65	Extension	" 17	Thomas Rickard...	Miner	A piece of rock fell on his foot from the rib; while trying to free himself he twisted his ankle.
66	"	" 17	John Jones	"	On going into his stall after firing a shot a piece of coal fell on him, spraining his ankle and bruising his back.
67	Union	" 22	Sing Lung	"	Leg broken by a piece of coal which fell on him while he was undermining.
68	Nanaimo	" 24	E. McDonald	"	Bruised about the hips by a piece of coal which fell off the face.

ACCIDENTS IN COAST COLLIERIES.—*Concluded.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
69	Nanaimo	Nov. 17	James Devlin	Miner	Leg broken while at work by a piece of rock falling on him as he was working coal down.
70	"	" 19	Daniel Scales.....	"	Back bruised and head and face cut, while at work, by a fall of coal.
71	Union	" 19	Emil Ross	Mule driver.....	Fell off one of the loaded cars of the slope trip, and the last car passed over his leg and broke it, crushing the bones. He had been cautioned against riding on the cars, which was against the rules of the mine.
72	"	" 24	Dang San	Miner	Arm and bones of hand broken, while at work, by a fall of coal.
73	"	Dec. 1	William Biggs.....	Mule driver	Was driving two cars when the first jumped the track and broke his right leg, which got jammed between the cars.
74	Extension	" 3	Robert Smith	Miner	Fired a shot which failed to bring down the coal. He started to work it down when it fell, bruising his legs and body.
75	Nanaimo	" 3	S. Heniwick	Brusher	While moving a car away from the face it got away from him and crushed him against the side, injuring his head and back.
76	"	" 9	John Miles.....	Machine helper..	A piece of coal fell from the face and bruised his hips while he was scraping the dirt from his machine.
77	Extension.....	" 9	Arthur Dibbs	Pusher	A car squeezed him against the rib and broke two of his ribs.
78	Nanaimo	" 17	David Cook	Miner	Was setting up some timbers with his partner when a rock fell from the roof and struck his back, breaking it and injuring him internally. He died the next day.
79	Union	" 22	Frank Crawford...	Boss driver	Nose broken by a mule which kicked him as he was picking up the tail chain.
80	Northfield	" 24	M. Fred	Pusher	Was ahead of a loaded car easing it down a slant. There was another loaded car on the track on far side of canvas door, and he was caught between the two cars, having his arm broken.
81	Union	" 26	P. Zefereno	Miner	Leg broken by the fall of some centre rock which he should have had propped.

CROW'S NEST COLLIERIES.

REPORTED BY THOMAS MORGAN, INSPECTOR.

No.	Colliery.	Date.	Name.	Occupation.	Details.
1	Michel	Jan. 8	Mike Hussak	Back-hand	A fall of coal in No. 8 mine knocked him from the bench and broke his arm.
2	"	" 11	Joe Boline	Jigger	No. 8 mine. Received signal from the rope-rider to let the trip go before the cars were coupled on to the rope; the slack end came up and struck Boline, breaking his nose and cutting and bruising his head.
3	Coal Creek....	" 14	Joseph More	Miner	Leg bruised and broken by a fall of clod while at work in No. 2 mine.
4	Michel	Mar. 2	Ben Marsland	Rope-rider	Was at the top of a slope in No. 8 mine with an empty car when a trip came out of the level and put his car off the track, breaking his leg.
5	Coal Creek....	" 2	Wilfred Bridger...	Driver	A car took the wrong track at a switch in No. 2 mine and struck Bridger on the left leg, causing a compound fracture.
6	Michel	" 13	J. T. Drumwright .	Miner	Leg broken by a "McGinty" post coming out in No. 3 mine.
7	Coal Creek....	" 16	Frank Malito	"	Chest crushed and severe internal injuries received in No. 5 mine. He was knocking out a post to allow his car to run down the room but did not step out of the way soon enough and was caught between the car and a post.
8	Michel	April 9	George Cleaves....	"	Cleaves' light went out in No. 5 mine. He was going to get it re-lighted and climbed on top of a coal car which was being pulled up the slope by a hoist and got squeezed against a timber where the roof is low, having three ribs and a collar bone broken.
9	Coal Creek....	May 6	John Cattell	Machinist.....	Killed outside No. 5 mine. Deceased was sitting on the front of the locomotive and while trying to improve his seat his foot caught underneath the bumper. He was dragged off and the train went over him.
10	"	" 10	Joe Emerson	Overman.....	Leg broken in No. 11 mine. He was helping to get a large timber up the hill to the mouth of the mine when the horse that was pulling the timber suddenly started and Emerson's leg was caught under a roller and broken at the ankle.

ACCIDENTS IN CROW'S NEST COLLIERIES.—*Continued.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
11	Coal Creek....	May 29	James Sargeant ...	Miner	Fatally injured in No. 2 mine. Sergeant was coming out of the haulage road when the engine started to haul on the tail rope. The rope slipped off the pulleys, flew across the road-way and struck him. He died on the 1st June.
12	Michel	June 2	William Steed	"	Was putting up a set of timbers in No. 8 mine; while lifting the stringer his foot slipped off the bench and and the stringer fell on him, breaking his skull.
13	Coal Creek....	" 4	Andrew Norton ...	"	While taking down some top coal in No. 2 pit a piece fell on his right leg, breaking it above the ankle.
14	"	" 10	John Ridyard.....	Rope-rider.....	Arm broken in No. 9 mine while riding the trip up a slope. The car got off the track and his arm was jambed against the roof.
15	"	" 19	George Neath	Miner	While at work in No. 2 mine, in the cross-cut off No. 1 room, in No. 6 west level, No. 3 district, a severe "bump" occurred, caving in the place, and all three men were presumably instantly killed by suffocation, as gas is given off in very large quantities when these "bumps" takes place.
16	"	" 19	Gus Rudolph.....	"	
17	"	" 19	Sity Sickuzack	Driver.....	
18	Michel	July 3	James Ferguson ...	Pipe-fitter	Killed while fitting pipes on a slope in No. 5 mine. A loaded timber truck ran away from the trip above him by the connecting chain breaking, and one of the props flew off the truck, striking Ferguson on the head, killing him instantly. An inquest was held, and the jury returned a verdict of "accidental death."
19	Coal Creek....	" 17	Joseph Buchanan..	Pipe-man	While a loaded trip was being lowered down an incline in No. 9 mine a car pin flew out and five cars went off the track near the hoist, knocking out a prop, which struck Buchanan on the left arm and broke it in two places.
20	Michel	" 20	Andrew Frew	Weigh-man	While walking down an incline in No. 8 mine he slipped on a rail and broke a small bone in his shoulder.
21	Coal Creek....	" 21	John Janeizak	Shift-man.....	While pushing a car in No. 9 mine it jumped the track, catching his hand against the roof and taking off the little finger.
22	"	" 21	James Maver.....	Car repairer.....	Right leg broken between two cars that he was uncoupling outside the mine.

ACCIDENTS IN CROW'S NEST COLLIERIES.—*Continued.*

No.	Colliery	Date.	Name.	Occupation.	Details.
23	Coal Creek....	July 22	David Evans	Miner	While he was lowering a car in No. 5 mine by means of a rope wound round a post, the rope caught his foot, and dragging him to the post broke his left leg.
24	"	" 31	David Powell	Shift-man.....	These four miners were killed by a caving of rock in the vicinity of the 3rd and 4th west levels and main entry in No. 2 mine, caused by a "bump," which also caved the main entrance for 600 yards. Hitchmough's body has not been recovered, and it is not known just where he is buried up.
25	"	" 31	Gilbert Hitchmough	Track-layer's helper	
26	"	" 31	Frank Beaver	Boss driver	
27	"	" 31	Philip Caldwell....	Timberman	
28	Michel	Sept. 7	Percy Randall.....	Rope-rider	A car jumped the track in No. 5 mine and jambed him against a prop, breaking two ribs.
29	"	" 29	Andy Dududich ...	Back-hand.....	A fall of coal in No. 5 mine broke four ribs and injured his foot.
30	Coal Creek....	Oct. 15	W. R. Parkinson ..	Machinist.....	While helping to lift a locomotive his little finger got nipped by a wheel and received a compound fracture.
31	"	" 10	Victor Protesor....	Timberman	Was replacing a timber in No. 5 mine when the roof gave way, crushing him under the cave and fracturing his pelvis. He died on the 12th October.
32	"	" 2	Richard Jones.....	"	While clearing up a cave in No. 5 mine a piece of rock fell on him, cutting his head and fracturing his skull.
33	Michel	" 6	Joseph Belog.....	Miner	Leg broken by two timbers that he had just put up in No. 8 mine falling on him.
34	"	" 6	Mike Palko	Labourer	Fatally injured while working under the tipple outside No. 8 mine. An empty car jumped the track and knocked out a board, which struck Palko on the head.
35	Coal Creek....	Nov. 17	William Pollard...	Miner	While he was waiting at the mouth of the tunnel at No. 1 mine a trip of cars jumped the curve at the mouth of the tunnel and pinned Pollard against the wall, breaking his left arm and injuring his skull.
36	Michel	" 7	Charles Coses	Motorman	Was going in to No. 8 mine on a trip when he was met by the loaded cars, which pushed him out and hurled him over the side of the tipple on to the C. P. R. tracks forty feet below. Coses sustained a broken arm and nose, and had his toes taken off.

Accidents in Crow's Nest Collieries.—*Concluded.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
37	Coal Creek....	Nov. 9	George Sulphur ...	Miner	A car in No: 2 mine was being lowered down the room by means of a McGinty when the connecting pin dropped out and the car ran away and hit an empty one attached. The rope pulled out and hit Sulphur, causing a compound fracture of the left leg.
38	"	Dec. 7	Robert Hubberstay	Motorman	Knee cap fractured. He was stepping into his motor when his knee gave way under him.
39	"	" 8	Martin Lioski.....	Rope-rider	Received injuries to back while trying to replace a car that had run off the track.

PROSECUTIONS.

As is incumbent upon the Inspector, he has been obliged to lay information before the local Magistrates in a large number of cases for infractions, by the workmen in the mines, of the general and special rules, which are provided solely for their own protection. These regulations are for the general safety of all the underground employees, and the carelessness of one man endangers all his fellow workmen, whose lives are practically in the hands of such foolishly careless or criminal person.

A number of convictions have been obtained during the year and the culprits fined by the Magistrate; the names of the offenders are on file in the Department, but are withheld from publication in the hope that the lesson may prove a warning to them without the disgrace of publication of their names.

It is felt by the Department that these offences are becoming too frequent, and that a small fine is not a sufficient deterrent; consequently, it is the intention in the future to enforce the provisions of the Act provided for such cases, and, upon the conviction of any person of an offence endangering the lives of others, to cancel or suspend the certificate of competency of an offender holding such, and if not a certificated workman, to see that he is excluded from all underground work as a dangerous person to be so employed.

The following convictions have been obtained during the year for the offences noted:—

16 convictions, for having matches in their possession inside a mine where safety lamps are required to be used.
4 " for having pipes or smoking tobacco in their possession.
1 " for refusing to be searched.
1 " for riding on car underground, contrary to regulations.
1 " for throwing a safety lamp at another man.
1 " for sticking his pick through lamp, by placing the lamp too close to swing of pick.
3 " found with hole through lighted safety lamp.
8 " for breaking safety lamps underground.
1 " for walking past a danger signal signifying gas to be present.

METALLIFEROUS MINES SHIPPING IN 1908

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CASSIAR.

ATLIN MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
New England	Rainy Hollow	Alaska Iron Co.	Casco Bank Bld., Portland, Maine.	Silver, copper.

QUEEN CHARLOTTE MINING DIVISION.

Ikeda Mines	Ikeda Bay	Awaya, Ikeda & Co., Ltd	Box 488, Vancouver	Gold, silver, copper.

EAST KOOTENAY.

FORT STEELE MINING DIVISION.

North Star	Kimberley	N. Mc L. Curran	Kimberley	Silver, lead.
St. Eugene	Moyie	S. G. Blaylock	Moyie	"
Sullivan Group	Kimberley	Sullivan Gr. Mining Co.	Spokane, Box 1774	"

GOLDEN AND WINDERMERE MINING DIVISIONS.

Giant	Spillimacheene	Golden Giant Mines, Ltd	Golden	Silver, lead.
Hot Punch	Toby Creek	J. E. Stoddart	Windermere	"
Monarch	Mount Stephen (3 miles east of Field)	Arthur Wheeler, Jr.	1600 Richmond Ave.,	"
Tilbury & B. C.	North Fork of Toby Ck.	F. G. Ball	Wilmer....[Victoria	"

WEST KOOTENAY.

NELSON MINING DIVISION.

Arlington	Erie	Leslie Hill	Nelson	Gold, silver.
Canadian King	Erie	"	"	"
Emerald	Salmo	John Waldbeser	Salmo	Silver, lead.
Ida D	N. Fork of Salmo River	J. E. Read	Erie	Gold, silver, copper.
Keystone	Erie	Frank Finney	"	" "
Kootenay Belle	Sheep Creek	Thomas Bennett	Nelson	Gold, silver.
Maggie	Near Sandon	Mrs. Carrie Duck	Milwaukee	Silver, lead.
Mother Lode	Sheep Creek	Thomas Bennett	Nelson	Gold, silver.
Nuggett	"	A. H. Gracey	"	"
Poorman Granite	Granite	Thomas Gough	"	"
Queen	Ten miles S.E. of Salmo.	Charles Lewiston	Salmo	"
Queen Victoria	" "	F. M. Bell	Box 501, Nelson	Silver, copper.
Second Relief	Erie	A. B. Cooper	Nelson	Gold, silver, copper.
Silver King	Toad Mountain	Kootenay Developme't Syndicate	"	Silver, copper.
Summit Group	Sheep Creek	F. E. Collins and Jas. Miller	Salmo	Gold, silver, lead.
Ymir	Ymir	Horace G. Nichols	Ymir	" "
Yukon	"	A. E. O'Neill	"	" "

AINSWORTH MINING DIVISION.

Bismark		Neil Mackay	Kaslo	Silver, lead.
Blue Bell	Riondel	Canadian Metal Co. (S. S. Fowler)	Riondel	"
Charleston		William Martin	827, Union Bank,	Gold, silver, lead.
Cork		Selkirk Mining Co. (A. Fournier)	Kaslo....[Winnipeg	Silver, lead.
Empress	Bear Lake	A. C. Van Moerkerke	Whitewater	Silver.
Jessie-Bluebird	Woodbury Creek	Eric Johnson	Kaslo	Silver, lead.
Krao	Ainsworth	W. E. Zuircky	"	"
Little Donald	"	Highlander M. & M. Co.	Ainsworth	Lead.

WEST KOOTENAY—*Concluded.*

AINSWORTH MINING DIVISION.—*Concluded.*

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Maestro	Ainsworth	H. Giegerich	Kaslo	Silver, lead.
Montezuma	South Fork	"	"	"
No. 1	Ainsworth	"	"	"
Province	S. Fork of Kaslo Creek	J. A. Whittier	Nelson	"
Silver Glance	Bear Lake	J. W. Power	Kaslo	Silver.
Wellington	Whitewater	W. G. Robb	"	Silver, lead.
Whitewater	"	S. S. Fowler	Nelson	Gold, silver, lead.
Whitewater Deep	"	"	"	" "

SLOCAN AND SLOCAN CITY MINING DIVISIONS.

Arlington	Springer Creek	R. P. Rithet	Victoria	Silver, lead.
American Boy	Cody	W. O. Jones	315, Jamieson Building, Spokane, Wash	"
Canadian Group		Ontario & Slocan Mines, Ltd	Silverton	"
Comstock	Sandon	T. G. Blaylock	Moyie	"
Early Bird	"	Geo. T. Gormley	Sandon	"
Elkhorn	"	"	"	"
Eureka-Richmond	"	Consolidated Mining & Smelting Co. of Canada	Trail	
Fisher Maiden		George Long	Silverton	Silver.
Hewitt	Silverton	G. Stilwell, Silver Cord Mining Co	"	Silver, lead.
Last Chance		L. Pratt	Nelson	"
Lone Batchelor	Three Forks	Geo. A. Petty	Three Forks	Gold, silver, lead.
Millie Mack	Cariboo Creek	H. E. Forster	Wilmer	" "
Mountain Con	Sandon	W. T. McClurg	Sandon	Silver, lead.
Queen Dominion	Slocan	A. W. Allen	Kaslo	Gold, silver, lead.
Rambler-Cariboo	McGuigan	W. E. Zwicky	"	Silver, lead.
Reco	Sandon	Fred. T. Kelly	Sandon	"
Rio	McGuigan Basin	J. W. Power	Kaslo	"
Ruby Silver	Surprise Basin	George F. Ransome	Sandon	"
Ruth	Sandon	James Anderson	Box 122, Kaslo	"
Silver Nugget		J. B. Smith	New Denver	Silver.
Slocan Sovereign	Reco Mountain	George F. Ransome	Sandon	Silver, lead.
Slocan Star	Sandon	Oscar V. White	"	"
Standard	Four-Mile Creek	G. H. Aylard	New Denver	"
Sunset	Cody	G. W. Hughes	Kaslo	"
Sunshine	Sandon	W. T. McClurg	Sandon	"
Vancouver Group	Silverton	Van-Roi Mining Co	Rossland	"
Westmont	10-Mile Creek	Westmont Silver Mining Co., Ld.	Slocan	"

TROUT LAKE MINING DIVISION.

Silver Cup	Ferguson	Ferguson Mines, Ltd.	Ferguson	Gold, silver, lead.
True Fissure	Trout Lake	C. H. Wooley	Trout Lake	Gold, Silver, copper.

LARDEAU MINING DIVISION.

Eva	Camborne	A. H. Gracey	Nelson	Gold.
Lucky Jack	"	W. J. Butler	Camborne	Gold, silver.

TRAIL CREEK MINING DIVISION.

Blue Bird	Rossland	Lyman Carter	E. 2.423, 3rd Avenue, Spokane, Wash	Gold, silver, lead.
Centre Star and War Eagle	"	Con. M. & S. Co. of Canada	Rossland	Gold, silver, copper.
Curlew	"	A. S. Goodeve	"	Gold, Silver.
Evening Star				Gold, silver, copper.
Giant-California	"	G. W. Wooster	Grand Forks	"
Homestake	"	Thos. S. Gilmour	Box 88, Rossland	Gold, silver.
I. X. L.	Sophie Mountain, Rossland	R. T. Evans	Rossland	"
Le Roi	Rossland	W. S. Rugh	"	Gold, silver, copper.
Le Roi No. 2	"	Paul S. Couldrey	"	"
Mayflower	South Belt, Rossland	John Blythe and R. Webb	"	Gold, silver, lead.
Nest Egg	Rossland	Robert Harvey	"	Gold, copper.
Red Eagle	South Belt, Rossland	Ner Smith	"	Silver, lead.
St. Elmo	Red Mountain	John P. Johnson	"	Gold, silver, copper.
Sunset	South Belt	John Ruffner	"	Gold.

BOUNDARY.

GRAND FORKS MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Athelstan		Dominion Copper Co	Boundary Falls	Gold, silver.
Lightning Peak		W. A. Calder	Edgewood	Silver, lead.
Mountain Rose		Dominion Copper Co	Boundary Falls	Copper.

GREENWOOD MINING DIVISION.

Brooklyn		Dominion Copper Co	Boundary Falls	Gold, silver, copper.
Rawhide		"	"	"
Sunset		"	"	"
Crescent	Skylark Camp	J. F. Feeney	Greenwood	Gold, silver.
Granby	Phœnix	The Granby Con. M. S. & P. Co.	Grand Forks	Gold, silver, copper.
Mother Lode	Deadwood Camp	B. C. Copper Co	Greenwood	"
Oro Denoro	Summit Camp	"	"	"
Sally		The Vancouver & Boundary Creek Dev. & Mining Co	"	Gold, silver.
Snowshoe	Phœnix	Con. M. & S. Co. of Canada	Trail	Gold, silver, copper.

OSOYOOS MINING DIVISION.

Nickel Plate	Hedley	The Yale Mining Co	Hedley	Gold, silver.
Dividend	Kruger Mountain	H. A. Bowerman	airview	Gold.

NICOLA MINING DIVISION.

Copper King	Coutlee	Robert Waitshoair	Coutlee	Silver, copper.

LIST OF CROWN-GRANTED MINERAL CLAIMS.

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CROWN GRANTS ISSUED IN 1908.

CASSIAR.

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Adams	Atlin	Michael Joseph O'Connor and Walter S. Brown	286	50.50	June 23
Arizona	"	Joseph H. Chisel	285	51.65	May 27
Magnesite	"	Alfred C Hirschfeld	721	42.63	July 31
Mocking Bird	"	Joseph H. Chisel and Michael Cassin	284	51.65	July 17
New York	"	Michael Joseph O'Connor and Walter S. Brown	287	43.15	June 23
State of Montana	"	Joseph H. Chisel	283	45.55	May 27
Wedge Frct	"	Julius M. Ruffner	521	10.98	June 12
Apple	Queen Charlotte	Awaya Ikeda & Co., Ltd	72	22.70	Sept. 18
Carnation	"	" "	71	51.31	Sept. 18
Lemon	"	" "	73	40.24	Sept. 18
Lily	"	" "	66	51.65	Sept. 18
Orchid	"	" "	70	36.83	Sept. 18
Pansy	"	" "	69	51.65	Sept. 18
Peach	"	" "	67	51.39	Sept. 18
Sweet Pea	"	" "	68	30.24	Sept. 18
Anaconda	Skeena	Robert Nowell and William Howden	223	50.97	Oct. 27
Argentile	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	379	46.55	July 6
Bonanza	"	Robert Nowell and William Howden	224	45.88	Oct. 28
Bonanza	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	381	7.60	July 6
Emerald	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	382	35.38	July 6
Empire	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	378	25.80	July 6
Homestake	"	Robert Nowell and William Howden	21	49.44	Oct. 27
Harkley	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	377	25.80	July 6
North Star	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	376	46.55	July 6
Summit	"	Robert Nowell and William Howden	226	45.92	Oct. 27
Verdure	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	383	19.84	July 6
Western Copper	"	Alexander McLeod, Charles W. Meldrum and James Bolivar Mathers	380	2.51	July 6
El Capitan	Omineca	Archie F. McLachlin, Octavius T. Miller, Joseph W. Coffey, Robert J. Miller, James Fulton, Malcolm C. Sinclair, Daniel S. Sinclair and Colin A. Macdougall	597	37.95	Sept. 26
Elgin	"	" " "	598	51.13	Sept. 28
Leland	"	" " "	600	37.04	Sept. 28
Talbot	"	" " "	599	48.79	Sept. 28

EAST KOOTENAY.

Call Back	Fort Steele	John Swenson	6863	48.06	May 21
Candy Frct	"	"	7217	8.89	May 21
Dominion	"	Ike M. Ely	9084	28.87	Dec. 11
Gold Cure	"	John Swenson	6865	46.54	May 21
John Bull	"	Ike M. Ely	9081	51.65	Dec. 10
Lady Grace	"	John Swenson	7216	41.80	May 21
Lake View	"	Ike M. Ely	9082	44.23	Dec. 17
Northern Light	"	John Swenson	6024	51.65	May 22
Porcupine	"	Ike M. Ely	9083	28.03	Dec. 10
Real Thing	"	John Swenson	6864	51.65	May 21
Roaring King	"	"	6025	51.65	May 22
Surething	"	"	6023	51.65	May 22
Viking	"	"	6866	47.19	May 21
Comstock	Windermere	Herbert Carlyle Hammond	4342	24.31	Mar. 12
Ground Floor	"	Robert Randolph Bruce, James C. Pitts, Sinclair Craig, James R. McLeod, and Henry G. Parson, Executor of the will of William A. Skelton, deceased	7556	51.65	Sept. 29
Heavenly Twins No. 1	"	" " "	7553	51.65	Sept. 29
Heavenly Twins No. 2	"	" " "	7554	45.69	Sept. 29
Parridice	"	Herbert Carlyle Hammond	4341	51.65	Mar. 12
Ptarmigan	"	"	4345	43.44	Mar. 12
Royal Stag	"	"	4343	50.79	Mar. 12
White Cat	"	Robert Randolph Bruce, James C. Pitts, Sinclair Craig, James A. Stoddart and Henry G. Parson, Executor of the will of William A. Skelton, deceased	7555	51.42	Sept. 29

WEST KOOTENAY.

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
April Fool No. 2 Frct	Nelson	Jons P. Swedberg	8058	33.09	May 27
Assurance	"	Thomas Wall	7237	51.65	June 23
Banner	"	Hugh Sutherland	3839	48.50	Feb. 10
Experiment	"	Thomas Wall	7238	37.40	June 23
Foghorn Frct.	"	Fred Eugene Robbins	8326	39.05	Nov. 19
Greenwood	"	Jons P. Swedberg and Oscar Johnson	4788	34.88	June
Greenwood Frct	"	" "	4787	20.19	June
Jack Pot Frct	"	" "	4789	31.56	May 6
Montreal	"	Alfred E. Gallupe	2132	51.65	Jan. 25
Orinoco	"	Michael Egan	5082	51.51	Mar. 31
Quebec	"	Alfred E. Gallupe	2133	48.09	Jan. 18
Red Point	"	Jons P. Swedberg and Oscar Johnson	4791	38.75	June 6
Sandaulphon	"	Oscar Anderson	4689	6.14	Nov. 21
Union	"	Hugh Sutherland	8324	23.19	Jan. 27
Vernamo	"	Jons P. Swedberg and Oscar Johnson	4790	27.31	June
Copper Cliff	Ainsworth	John J. Latta, William B. S. Trimble, Herbert E. White, Oscar V. White and Nicholas J. Cavanaugh	2731	49.32	Mar. 25
Extension of Perth	"	James Cronin	8795	50.58	Dec. 9
Perth	"	"	8794	33.35	Dec. 9
Pyrite	"	"	8793	33.59	Dec. 9
Souvenir	"	Albert Howard McNeill	5063	41.80	April 2
Yankee Girl No. 2	"	John Henry, Jr.	7840	33.70	April 2
Alameda	Slocan	Robert I. Kirkwood	8395	41.90	Aug. 14
Autumn	"	"	8396	45.39	Aug. 14
Copper Cliff	"	James Cronin	8792	39.59	Nov. 5
Copper King	"	"	8791	51.65	Nov. 5
Empress Frct.	"	Robert I. Kirkwood	8400	34.92	Aug. 14
Evelyn	"	Charles D. Rand	6526	36.93	Mar. 5
Frank Frct.	"	The American Boy Mining and Milling Co., (Foreign)	4547	0.92	Oct. 19
Great Western	"	Robert I. Kirkwood	8771	25.18	Aug. 14
Ivan	"	George Boulter	8332	19.01	Nov. 5
Lailey Frct	"	Robert I. Kirkwood	8397	48 82	Aug. 14
Mabou	"	Robert I. Kirkwood and Duncan A. Grant	8399	51.65	Aug. 14
Milton Frct	"	Robert McPherson	3825	29.20	Jan. 31
Ohio	"	Robert I. Kirkwood and Frank A. Wells	8769	51.64	Aug. 14
Riverside	"	Robert I. Kirkwood	8394	36.07	Aug. 14
Sweet Grass	"	George Boulter	8329	35.97	Nov. 5
Treasure	"	Robert I. Kirkwood	8398	51.65	Aug. 14
Triune	"	"	8770	51.65	Aug. 14
Wilmer	"	George Boulter	8331	18.68	Dec. 3
Wilmer Frct	"	"	8330	13.68	Nov. 5
Amos	Slocan City	The Arlington Mines, Ltd., N. P. L.	5913	51.35	Nov. 5
Argo	"	" "	7612	33.50	Nov. 5
Bettina Frct	"	" "	5915	31.17	Nov. 5
Eastside No. 2	"	" "	5912	47.90	Nov. 5
Portia	"	" "	5914	44.78	Nov. 16
Day After Frct	Trail Creek	Le Roi Mining Co., Ltd	8722	.20	Feb. 27
Inland Empire	"	The Inland Empire Mining & Milling Co., Ltd	3880	51.39	Jan. 27
Le Roi Annie Frct	"	Le Roi Mining Co., Ltd	8723	.07	April 11
Nebu	"	Fred Kettner	4981	51.65	Aug. 10
Richard	"	"	4980	45.89	Aug. 10
Richmond	"	Samuel Forteath	1508	30.96	July 29
Ruby Frct	"	Le Roi Mining Co., Ltd	8721	27.00	Feb. 26
Saginaw Frct.	"	The Inland Empire Mining and Milling Co., Ltd	3881	13.11	Jan. 27
Stewart Frct	"	The Consolidated Mining and Smelting Co. of Canada, Ltd	1433	1.04	Nov. 10
Francis	Revelstoke	James I. Woodrow, Alexander W. McIntosh, George Johnson, and Elizabeth McMahon	7489	50.65	Feb. 27
Mascot	"	Alice Maud Clark	7494	49.86	Jan. 18
Peacock	"	Charles J. Rumens, Orville E. Robinson and Willam M. Saxton	7482	51.50	Feb. 19
Big Hope Frct	Trout Lake	Charles John Allen Newton Padley	8250	19.06	June 1
Bryan	"	Wilmer C. Wells	1699	30.68	Nov. 21
Evening	"	Harry Abbott	6039	26.40	Jan. 17
Hidden Treasure	"	James Dixon, C. Osborne Wickenden and C. Maude Wickenden	4718	30.36	Feb. 10
Index	"	" " "	3956	45.49	Feb. 10
Red Cliff	"	" " "	3957	51.65	Feb. 10
Reunion	"	Harry Abbott	6040	50.57	Jan. 17
Royal R	"	James Dixon, C. Osborne Wickenden and C. Maude Wickenden	3958	47.98	Feb. 10
Ishpeming Frct	Lardeau	The Consolidated Kingston Gold Mining Co., Ltd., N.P.L.	6557	28.96	Mar. 25
Houghton	"	" " "	6556	11.30	Mar. 25
Completer	Arrow Lake	Annie Kelleher, Administratrix of the Estate of Patrick Kelleher, deceased, intestate	7309	22.05	Sep. 17
Virginia	"	Samuel Walker	8514	46.51	May 8

BOUNDARY.

Addie	Grand Forks	George A. Paulson	1760	49.85	Jan. 23
Arsene	"	William Edward Caporn	8518	47.41	Dec. 19
Bank of England Frct.	"	The Granby Consolidated Mining, S. and P. Co., Ltd.	4628	1.68	May 30
Black Bear Frct	"	" " "	3556	7.33	May 30
Bonita Vista Frct	"	William E. Caporn	8508	38.41	Dec. 19

BOUNDARY.—*Continued.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Columbia	Grand Forks	William E. Caporn	849S.	41.82	Dec. 19
Cottage	"	Jacob Jaskulek and Irvin Ballew	585S.	34.75	Jan. 16
Florence Fret	"	George Warren Averill and Alexander Levie Rogers	935S.	8.86	April 29
Last Chance	"	Jacob Jaskulek and Irvin Ballew	586S.	47.28	Jan. 16
London No. 2 Fret	"	The B. C. Copper Co., Ltd	465S.	13.01	Feb. 1
Monitor Fret	"	George Warren Averill and Alexander Levie Rogers	934S.	11.70	April 29
Royal Banner	"	" " "	933S.	51.02	April 29
Saloon Fret	"	James F. Cunningham and William T. Smith	2457	8.75	May 29
Selene	"	William Edward Caporn	848S.	38.50	Dec. 18
Waverley	"	George Edward Massie	578S.	50.55	Jan. 17
Admiral Dewey	Greenwood	William Younkin, Charles E. Hamilton, William M. Law, William G. Gaunce, Neil M. Lamont & George O. Guise	1952	45.85	Jan. 20
Anchor	"	James Ernest Spankie	2866	51.64	Nov. 6
Balzac	"	Thomas Beaulieu, Henry J. Jolly and George H. Inkster.	876S.	36.03	Sept. 21
Battle Axe Fret	"	Eric E. Jackson and Francis W. Groves	2308	45.40	April 2
Billy Fret	"	Isaac Hoyt Hallett and Albert E. Ashcroft	999	40.90	Sept. 8
Blue Bird	"	Hugh Megraw	2815	48.93	Nov. 17
Boomerang	"	Thomas Beaulieu, Henry J Jolly and George H. Inkster	733S.	37.95	Sept. 21
Chaperonne	"	" " "	875S.	43.53	Sept. 21
Coin Fret	"	James Ernest Spankie	615S.	44.77	Nov. 6
Columbia	"	Elmore Collier	886S.	42.72	Nov. 6
Commander	"	Isaac Hoyt Hallett	1707	47.50	Feb. 28
Ella E.	"	"	2961	50.01	Oct. 19
Fanny Joe	"	Charles Herbert Tye	729S.	38.56	Dec. 21
Hartford	"	Robert Duncan Kerr and James Cass Dale	2358	51.65	Dec. 10
Iconoclast	"	Thomas Beaulieu, Henry J. Jolly and George H. Inkster.	734S.	50.61	Sept. 21
Ivanhoe	"	Samuel T. Larsen and Henry B. Thoen	574S.	49.53	Oct. 26
Lucky Shot Fret	"	Henry J. Clint, Edgar J. Smith, Christopher H. Reeves and James E. Thompson	3310	32.81	May 29
Mable Fret	"	John Mulligan	1103	9.29	Feb. 18
Myrtle No. 2	"	Henry J. Clint, Edgar J. Smith, Christopher H. Reeves and James E. Thompson	3553	25.33	May 29
Northern Bell	"	" " "	3552	45.71	May 29
No. 2 Fret	"	Robert Duncan Kerr and Philip B. S. Stanhope	483S.	2.52	Sept. 9
No. 6 Fret	"	" "	2356	42.00	Dec. 10
O. K	"	Samuel T. Larsen and Henry B. Thoen	573S.	51.65	Oct. 26
Smilax Fret	"	Isaac Hoyt Hallett and Albert E. Ashcroft	1064	38.50	Nov. 12
Surprise No. 3	"	Francis William Groves	1776	31.04	Aug. 15
Tiger	"	Daniel Brenahan	3548	45.35	May 27
Tuck	"	Thomas Beaulieu, Henry J. Jolly and George H. Inkster.	877S.	20.34	Sept. 21
Warwick Fret	"	Thomas Hemmerle and Hugh McKee	616S.	46.25	Dec. 22
Apex	Osoyoos	Chas. H. Cornell	659S.	48.60	Mar. 25
Bighorn	"	Francis H. French and George H. Cahill	3411	31.20	April 2
Blue Grouse Fret	"	Duncan Woods	639S.	20.20	Jan. 16
Bulton Beek	"	Thomas Bradshaw	652S.	17.71	April 30
California	"	Duncan Woods	638S.	43.63	Jan. 16
Centre Star Fret	"	Josiah Graham	2822	.18	Nov. 6
Copper Chief	"	Charles E. Oliver	199S.	36.90	Dec. 22
Draw	"	Josiah Graham	2823	40.97	Nov. 6
Ebbe Fret	"	James Fraser Campbell and Harry W. Yates	377S.	50.40	Sept. 10
Florence	"	Thomas Bradshaw and George M. Gilbert	650	51.65	April 28
Florence	"	Thomas Bradshaw	653S.	22.69	April 28
Jack Frost	"	Charles A. C. Steward and Arthur R. Barrow	2766	51.65	Sept. 1
King Edward	"	Richard Hacking Parkinson	542S.	50.89	Oct. 19
Kitty Fret	"	Thomas Bradshaw and George M. Gilbert	910S.	2.73	April 29
Leamington	"	Charles A. C. Steward and Walter E. Welby	558S.	43.15	July 17
Little Joe Fret	"	Henry A. Williams and William E. Burritt	391S.	40.00	Mar. 10
Little Pittsburg	"	Thomas Bradshaw	649S.	14.52	April 30
Long Shot	"	William J. Garbutt, Robert D. Mitchell and Nicholas J. Cavanaugh	224S.	33.66	Aug 14
Maid of the Mist	"	James Fraser Campbell and Henry W. Yates	625S.	51.65	Sept. 10
Maple Leaf	"	William J. Garbutt, Robert D. Mitchell and Nicholas J. Cavanaugh	225S.	45.91	Aug. 14
Mascot Fret	"	Duncan Woods	642S.	17.20	Jan. 16
Mollie	"	Charles A. C. Steward and Arthur R. Barrow	909S.	51.53	Sept. 1
Morning	"	Francis H. French and George H. Cahill	655S.	48.70	April 2
Nick of Time Fret	"	James Fraser Campbell and Henry W. Yates	657S.	34.42	Sept. 10
Night Hawk	"	Richard Hacking Parkinson	541S.	51.65	Oct. 19
Oro Plata	"	Lytton W. Shatford, Thomas D. Pickard and Isaac L. Deardorff	387S.	49.30	Aug. 10
Paris	"	William Arnott	656S.	26.60	Feb. 11
Phyllis	"	Charles A. C. Steward and Arthur R. Barrow	204S.	49.75	Sept. 1
Selkirk	"	William J. Garbutt and Richard D. Mitchell	226S.	48.59	Sept. 25
Skipper Fret	"	Duncan Woods	641S.	42.44	Jan. 16
Speculator	"	"	640S.	50.75	Jan. 16
Sunrise	"	Jerome L. Drumheller	18S.	37.54	Feb. 19
Whale	"	Thomas Bradshaw	651S.	15.13	April '30
White Grouse	"	William Darymple	551S.	31.04	Mar. 25
Winchester Fret	"	Francis H. French and George H. Cahill	3412	48.00	April 2
Windfall	"	" "	3410	36.00	April 2
Zeerust	"	George M. Gilbert and Thomas Bradshaw	654S.	8.40	April 28
Zero	"	Charles A. C. Steward and Arthur R. Barrow	276?	45.11	Sept. 1
Adelaide Fret	Similkameen	Jessie Renton Hunter	386S.	15.30	Dec. 3
Cork	"	The Mira Monte Mining Co., Ltd	370	19.93	April 30
Dividend	"	Charles Willarson and Peter Johnson	384S.	12.20	July 27
Hattie Fret	"	Mira Monte Mining Co., Ltd	369	14.83	April 30
Kate	"	" "	372	38.51	April 30
King Solomon	"	Claudius M. Snowden and Edgar E. Burr	809	46.90	Aug 10

BOUNDARY.—*Concluded.*

Claim.	Division.	Grantee.	Lot No.	Acres.	Date.
Lone Star Frct	Similkameen	Charles Willarson and Peter Johnson	385S.	17.00	July 27
Moonshine Frct	"	Mira Monte Mining Co., Ltd	371	15.70	April 30
Nero Frct	"	Charles Willarson and Peter Johnson	382S.	2.90	July 27
Townsend	"	Mira Monte Mining Co., Ltd	342	50 06	April 30
Big Horn	Nicola	John E. Bate	1551	41.76	Aug. 3
Boomerang	"	Robert Joseph Armstrong	1541	48.78	May 13
Copper Age	"	Price Ellison and Isaac Earlwood	1567	50.98	Sept. 3
Cornell	"	John E. Bate and Samuel J. Bate	1549	36.67	June 5
Gladiator	"	John E. Bate	1543	37.42	April 28
Gold Eagle	"	Julia A. Hinshaw	1544	37.82	May 8
Great Republic	"	Samuel J. Bate	1529	51.65	Sept. 9
Great Western	"	John E. Bate	1536	51.65	April 28
Golden Sovereign	"	Robert Joseph Armstrong	1528	51.65	Sept. 9
Medal Frct	"	John E. Bate	1540	18.90	Aug. 3
Oreaphemia	"	Samuel J. Bate	1542	37.93	April 28
Stand Bye	"	"	1554	35.20	Aug. 3
Vernon Frct	"	David H. Smith	1566	27.64	Sept. 3
Woodpecker	"	John E. Bate	1550	37.19	April 28
Yankee	"	Julia Anna Hinshaw	1530	22.58	Feb. 11
Fortuna	Kamloops	Fraser River Copper Mining Company	1591	51.65	Feb. 6
Fortuna No. 1	"	" "	1592	49.02	Feb. 6
May Frct	"	Adolphus Richard Thomas	1311	25.90	Feb. 21
Mint Frct	"	"	1342	49.00	Feb. 21

VANCOUVER ISLAND AND COAST.

Constance Frct	Alberni	The Southern Cross Copper Mine Co., Ltd., N. P. L	357	5.34	Sept. 4
Happy John No. 2	"	Alvin John Engvik	608	34.15	Sept. 26
Happy John No. 3 Frct	"	"	609	2.89	Sept. 26
Little Dipper Frct	"	The Southern Cross Copper Mine Co., N. P. L	356	4.59	Sept. 4
Brutus No. 2 Frct	Clayoquot	Edgar Dewdney	712	49.00	Feb. 12
Ironside	"	Thomas I. Dunn	487	35.16	Sept. 1
Mephistopheles	"	Edgar Dewdney	711	47.20	Feb. 12
Eastgate	Nanaimo	William Henry Lee	53	51.56	Nov. 30
Benjamin Frct	Victoria	The Bentley Iron Mining Co., Ltd., N. P. L	208	24.17	Sept. 25
Blue Bird	"	Henry B. Thomson	135	51.65	July 2
Donaldson	"	"	144	50.75	July 2
Elijah	"	The Bentley Iron Mining Co., Ltd., N. P. L	207	33.12	Sept. 25
Garden Thrush	"	Henry B. Thomson	141	47.48	July 24
Jack	"	"	145	51.25	July 30
Jennie Frct	"	Thomas Parsell and Lars Nicholas Anderson	174	11.13	Dec. 3
Koksilah	"	Lars Nicholas Anderson	19G.	49.40	May 27
Sidney	"	Henry B. Thomson	143	51.65	July 2
Wallace	"	Robert H. Whidden	16G.	46.34	Sept. 4
Willow Grouse	"	Henry B. Thomson	136	51.65	July 2
Willow Grouse Frct	"	"	142	7.23	July 2
Copper Duke	New Westminster	William H. Gallagher, John G. Hunt, William Hunt and Henry Mutsie	2467	51.65	April 2
Fritchley Frct	"	William M. Humphreys	2014	6.80	Sept. 1
Long Dan	"	Mason T. Adams	2402	24.95	Sept. 21

DEPARTMENT OF MINES.

VICTORIA, B. C.

Hon. Richard McBride,	*Minister of Mines.*
R. F. Tolmie,	*Deputy Minister of Mines.*
Wm. Fleet Robertson,	*Provincial Mineralogist.*
Herbert Carmichael,	*Provincial Assayer.*
D. E. Whittaker,	*Assistant Assayer.*
F. H. Shepherd,	*Chief Inspector of Mines, Nanaimo.*
Archibald Dick,	*District* " "
Thomas Morgan,	" " *Cranbrook.*
James McGregor,	" " *Nelson.*

GOLD COMMISSIONERS AND MINING RECORDERS.

Mining Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Atlin Mining Division	Atlin	J. A. Fraser	John Cartmel	
Sub-office	Discovery City			R. Webster
"	Telegraph Creek			Jas. Porter.
"	Wynnton			W. H. Simpson.
"	Haines (U. S.)		(Com. for taking Affidavits)	Risdon M. Odell.
Stikine Mining Division	Telegraph Creek	Jas. Porter	Jas. Porter	
Liard "	"	"	"	
Skeena Mining Division	Prince Rupert	William Manson	William Manson	Herbert Young.
Sub-office	Kitimat			Geo. L. Anderson.
"	Port Simpson			John Conway.
"	Essington			T. G. Wynn.
"	Stewart (Portland Canal)			Robt. M. Stewart.
"	Unuk River			Burt E. Daily.
"	Hartley Bay			Ed. McCoskrie.
Bella Coola Mining Div.	Prince Rupert	William Manson	William Manson	
Sub-office	Bella Coola			Chris. Carlson.
Queen Charlotte Mining D.	Prince Rupert	William Manson		
" "	Jedway		E. M. Sandilands	
Sub-office	Skidegate			W. Silversides.
"	Masset			C. Harrison.
"	Lockeport			H. L. Beresford.
Omineca Mining Division	Hazelton	William Allison	Jas. E. Kirby	
Sub-office	McConnell Creek			A. Skelhorne.
"	Fort Grahame			Wm. Fox.
"	Fort St. James			Alex. C. Murray.
"	Manson Creek			Ezra Evans.
"	Copper City			P. R. Skinner.
"	Aldermere			R. Gale.
"	Lorne Creek			F. E. Holt.
Peace River Mining Div.	Fort St. John	F. C. Campbell	F. C. Campbell	F. W. Beatton.
Cariboo Mining Division	Barkerville	Geo. J. Walker	R. C. S. Randell	
Sub-office	Quesnel			David H. Anderson.
Quesnel Mining Division	150-Mile House	Geo. J. Walker (at Barkerville)	C. W. Grain	
Sub-office	Quesnel			David H. Anderson.
"	Quesnel Forks			Geo. E. Stephenson.
Clinton Mining Division	Clinton	F. Soues	F. Soues	
Lillooet "	Lillooet	C. Phair A. M. Ego, Deputy	C. Phair A. M. Ego, Dep.	

GOLD COMMISSIONERS AND MINING RECORDERS.—*Concluded.*

Mining Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Kamloops Mining Division	Kamloops	G. C. Tunstall	E. T. W. Pearse	
Ashcroft "	Ashcroft	" (at Kamloops)	H. P. Christie	
Nicola "	Nicola	" "	Geo. Murray	
Yale "	Yale	" "	Wm. Dodd	
Similkameen "	Princeton	Hugh Hunter "	Hugh Hunter	
Sub-office	Hedley	" "		Carl Hairsine.
Vernon Mining Division	Vernon	L. Norris	H. F. Wilmot	
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 Min. Div	Grand Forks	S. R. Almond	S. R. Almond	
Osoyoos Mining Division	Fairview	J. R. Brown	Howard A. Turner	
Sub-office	Olalla			John McDonald.
"	Hedley			Carl Hairsine.
Golden Mining Division	Golden	J. E. Griffith	F. H. Bacon	Colin Cameron.
Windermere "	Wilmer	" (at Golden)	E. J. Scovil	
Fort Steele Mining Div.	Cranbrook	J. F. Armstrong	J. F. Armstrong	
Sub-office	Steele			Joseph Walsh.
"	Fernie			J. S. T. Alexander.
"	Moyie			Fred. J. Smyth.
"	Marysville			Louis E. Herchmer.
Ainsworth Mining Div	Kaslo	E. E. Chipman	R. J. Stenson	Wm. J. Green.
Sub-office	Howser			W. Simpson.
"	Trout Lake			J. C. Murray (acti'g)
Slocan Mining Division	New Denver	E. E. Chipman (at	Angus McInnes	
Sub-office	Sandon	Kaslo)		W. J. Parham.
Slocan City Mining Div.	Slocan City	" "	Howard Parker	
Trout Lake Mining Div.	Trout Lake	" "	J. C. Murray (acti'g)	
Nelson Mining Division	Nelson	Harry Wright	P. J. Gleazer	
Sub-office	Creston			J. Wilson.
"	Ymir			J. A. Fraser.
Arrow Lake Min. Division	Nakusp	Harry Wright (at	W. Scott	
Sub-office	Vernon	Nelson)		H. F. Wilmot.
Revelstoke Mining Div.	Revelstoke	Robt. Gordon	W. E. McLauchlin	Edward Edwards.
Lardeau Mining Division	Camborne	" (at Revelstoke)	B. E. Drew	
Trail Creek Mining Div.	Rossland	John Kirkup	J. E. Hooson	
Nanaimo Mining Division	Nanaimo	George Thomson	George Thomson	
Sub-office	Ladysmith			J. Stewart.
"	Alert Bay			W. Woollacott.
"	Van Anda			Geo. McK. McLeod
"	Rock Bay			A. C. Minty.
Alberni Mining Division	Alberni	H. C. Rayson	H. C. Rayson	
Clayoquot "	Clayoquot	" (at Alberni)	W. T. Dawley	
Quatsino "	Yreka	" "	O. A. Sherberg	
Victoria Mining Division	Victoria	R. A. Renwick	G. V. Cuppage	
New Westminster Min. D.	New Westminster	S. A. Fletcher	John Mahony	
Sub-office	Vancouver			R. J. Skinner.
"	Harrison Lake			L. A. Agassiz.
"	Chilliwhack			J. Pelly.

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ERRATUM.

Page 84, the third to last line should read:— ....."forming the drainage areas of the Stikine river and of the Turnagain river, a tributary of the Liard."

LIST OF ILLUSTRATIONS.

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, I.S.O., V.D., Printer to the King's Most Excellent Majesty.
1909.

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Series.

British Columbia. *Bureau of Mines.*

Annual Report of the Minister of Mines for the year ending 31st December, 1908, being an account of mining operations for gold, coal, etc., in the Province. William Fleet Robertson, Provincial Mineralogist. 271 p., plates, maps, 1908.

Victoria, Government Printing Office, 1909.

Author.

Robertson, William Fleet. *(Provincial Mineralogist.)*

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