ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31st DECEMBER,

1898,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, ETC.,

IN THE

PROVINCE OF BRITISH COLUMBIA.

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, Printer to the Queen's Most Excellent Majesty.
1899.

REPORT

OF THE

MINISTER OF MINES,

1898.

To His Honour THOMAS R. MCINNES,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1898 is herewith respectfully submitted.

J. FRED HUME,
Minister of Mines.

Minister of Mines' Office,
23rd February, 1899.

REPORTS

—BY—

WILLIAM FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

—o—

To the Hon. J. Fred Hume,
Minister of Mines.

SIR,—I have the honour to submit herewith the following statistical tables showing the mineral production of British Columbia for the year ending December 31st, 1898, and illustrating, by comparisons with past years, the progress in mining during the year.

I also submit detailed Reports upon the various Mining Divisions of the Province. In gathering the material for the statistics I have been met by a ready compliance with the requirements of the "Inspection of Metalliferous Mines Act, 1897," and have received, in every instance, the detailed statement as to production therein provided for—based on smelter or mill returns.

I believe the returns to be correct, and I think they will be found to be practically complete.

In the compilation of this, my first report as Provincial Mineralogist, I have adhered, as closely as possible, to the general form established by my predecessor, Mr. Carlyle, making only such slight changes as may have been found necessary.

I have the honour to be,

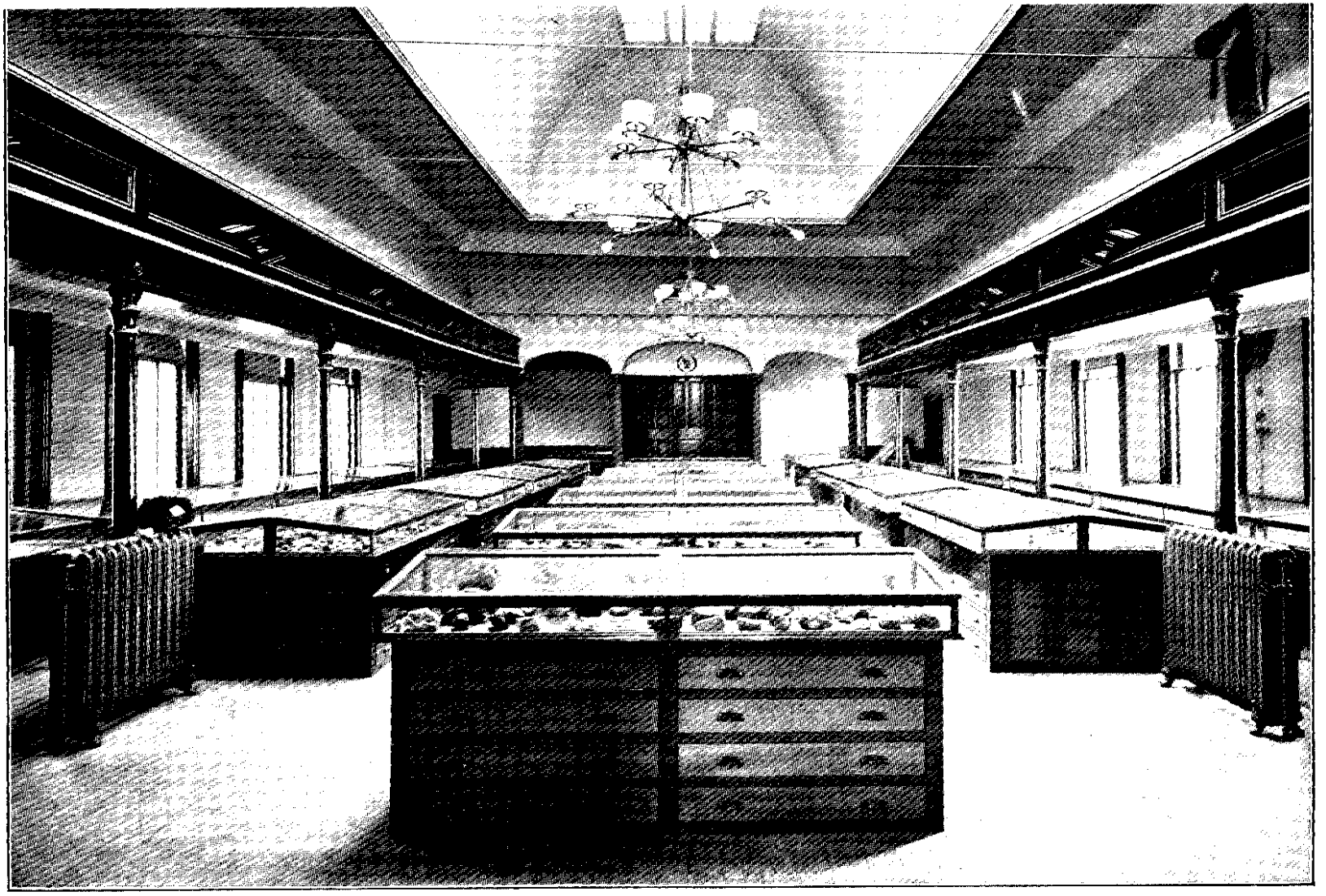
Sir,

Your obedient Servant,

WILLIAM FLEET ROBERTSON,

Provincial Mineralogist.

Victoria, B. C. February 7th, 1899.



ORE EXHIBIT, MAIN HALL, DEPARTMENT OF MINES MUSEUM.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

METHOD OF COMPUTING PRODUCTION.

In assembling the out-put of the lode mines in the following tables, the established custom of this Department has been adhered to, viz.: The out-put of a mine for the year has been 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 output of the mine, but rather the amounts credited to the mine on the company's books during the year.

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

In the lode mines tables the amount of the shipments are 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 of the New York Metal Market has been used as a basis in all cases. 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 1898.

Gold, placer	$ 59,960,819
Gold, lode	6,501,906
Silver	9,676,901
Lead	4,049,199
Copper	1,395,841
Coal and Coke	40,226,160
Building stone, bricks, etc	1,500,000
Other metals	26,500
Total	$123,337,326

TABLE II.

PRODUCTION FOR EACH YEAR FROM 1890 TO 1898 (INCLUSIVE).

Year.	Amount.
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	10,826,861

Table III. gives a statement in detail of the amount and value of the different mineral products for the years 1896, 1897, and 1898. As it has yet been impossible to collect the statistics regarding building stone, lime, bricks, tiles, etc., these are estimated for 1897 and 1898, but not estimated for or included in the output for 1896.

TABLE III.

AMOUNT AND VALUE OF MINERAL PRODUCTS FOR 1896, 1897, AND 1898.

	Customary Measure.	1896.		1897.		1898.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer	Ounces	27,201	$ 544,026	25,676	$ 513,520	32,167	$ 643,346
" lode	"	62,259	1,244,180	106,141	2,122,820	110,061	2,201,217
Silver	"	3,135,343	2,100,689	5,472,971	3,272,836	4,292,401	2,375,841
Copper	Pounds	3,818,556	190,926	5,325,180	266,258	7,271,678	874,781
Lead	"	24,199,977	721,384	38,841,135	1,390,517	31,693,559	1,077,581
Coal	Tons, 2,240 lbs	894,832	2,688,666	882,854	2,648,562	1,135,865	3,407,595
Coke	" "	615	3,075	17,832	89,155	35,000	175,000
Other materials			15,000		151,600		151,500
			$7,507,946		$10,455,268		$10,906,861

TABLE IV.

PRODUCTION OF METALS BY DISTRICTS AND DIVISIONS.

NAME.	DIVISIONS.			DISTRICTS.		
	1896.	1897.	1898.	1896.	1897.	1898.
CARIBOO				$ 384,050	$ 325,000	$ 389,360
Barkerville Division	$ 82,900	$ 65,000	$ 94,500			
Lightning Creek "	53,000	25,000	37,000			
Quesnellemouth "	51,100	35,000	28,000			
Keithley Creek "	197,050	200,000	214,860			
CASSIAR				21,000	37,060	107,300
KOOTENAY, EAST				154,427	163,796	133,368
KOOTENAY, WEST				4,002,735	6,765,703	6,042,975
Ainsworth Division	345,626	440,545	159,801			
Nelson "	545,529	789,215	694,880			
Slocan "	1,854,011	3,280,686	2,619,852			
Trail Creek "	1,243,360	2,097,280	2,470,811			
Other parts	14,209	157,977	97,631			
LILLOOET				33,665	39,840	47,814
YALE				206,078	226,762	432,512
Osoyoos	131,220	142,982	364,112			
Similkameen	9,000	25,100	7,560			
Yale	65,108	58,680	60,840			
OTHER DISTRICTS				15,000	9,390	19,437
				$4,816,955	$7,567,551	$7,172,766

PLACER GOLD.

Table V. continues 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 for 1898, 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 V.

YIELD OF PLACER GOLD PER YEAR TO DATE.

1858	$ 705,000	1879	$1,290,058
1859	1,615,070	1880	1,013,827
1860	2,228,543	1881	1,046,737
1861	2,666,118	1882	954,085
1862	2,656,903	1883	794,252
1863	3,913,563	1884	736,165
1864	3,735,850	1885	713,738
1865	3,491,205	1886	903,651
1866	2,662,106	1887	693,709
1867	2,480,868	1888	616,731
1868	3,372,972	1889	588,923
1869	1,774,978	1890	490,435
1870	1,336,956	1891	429,811
1871	1,799,440	1892	399,526
1872	1,610,972	1893	356,131
1873	1,305,749	1894	405,516
1874	1,844,618	1895	481,683
1875	2,474,004	1896	544,026
1876	1,786,648	1897	513,520
1877	1,608,182	1898	643,346
1878	1,275,204		
		Total	$59,960,819

TABLE VI.

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

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
	325,147	$6,501,906	15,673,365	$9,676,901	120,860,501	$4,049,199	17,692,934	$1,395,841	$21,623,847

TABLE VII.

PRODUCTION IN DETAIL OF THE METALLIFEROUS

DISTRICT.	YEAR.	TONS.	GOLD—PLACER.		GOLD—LODE.		SILVER.	
			Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
				$		$		$
CARIBOO								
Barkerville Division	1896		4,145	82,900				
	1897		3,250	65,000				
	1898		4,725	94,500				
Lightning Creek "	1896		2,650	53,000				
	1897		1,250	25,000				
	1898		1,350	27,000				
Quesnellemouth "	1896		2,555	51,100				
	1897		1,750	35,000				
	1898		1,400	28,000				
Quesnelle Forks, Keithley Ck. Division.	1896		9,853	197,050				
	1897		10,000	200,000				
	1898		10,743	214,860				
Omineca (Land Record'g Div.)	1896							
	1897							
	1898		750	15,000				
CASSIAR								
Atlin Lake Division	1896							
	1897							
	1898		3,750	75,000				
All other Divisions	1896		1,050	21,000				
	1897		1,853	37,060				
	1898		1,615	32,300				
KOOTENAY, EAST								
Fort Steele Division	1896		1,054	21,076			73,796	49,443
	1897	2,497	600	12,000			116,657	69,760
	1898	1,971	850	* 17,000			69,780	33,623
KOOTENAY, WEST								
Ainsworth Division	1896						374,097	250,665
	1897	5,556					524,578	313,697
	1898	1,738					167,147	92,515
Nelson "	1896	30,160	275	5,500	236	4,720	631,960	423,413
	1897	50,014			2,076	41,520	961,124	574,752
	1898	52,762			3,823	76,459	692,867	383,225
Slocan "	1896	16,560			152	3,040	1,954,258	1,309,353
	1897	33,567			193	3,860	3,641,287	2,177,490
	1898	30,691			60	1,194	3,063,643	1,698,496
Trail Creek "	1896	38,075			55,275	1,104,500	89,285	59,830
	1897	68,804			97,024	1,940,480	110,068	65,821
	1898	111,282			87,343	1,746,861	170,804	94,539
Others (Trout Lake, Revelstoke).	1896	58	231	4,627	35	700	11,917	7,985
	1897	1,781	300	6,000	9	180	116,657	69,761
	1898	621	552	11,040	346	6,923	121,510	67,256
LILLOOET	1896		1,683	33,665				
	1897	755	1,874	37,480	118	2,360		
	1898	900	2,130	42,614	260	5,200		
YALE								
Osoyoos, Kettle River, Grand Forks.	1896				6,561	131,220		
	1897	6,098	440	8,800	6,674	133,480	1,174	702
	1898	14,320	382	7,632	17,824	356,480		
† Similkameen "	1896		450	9,000				
	1897		1,175	23,500				
	1898		378	7,560				
Yale "	1896		3,255	65,108				
	1897		2,934	58,680				
	1898		3,042	60,840				
OTHER DISTRICTS	1897	290	250	5,000	47	940	1,426	853
	1898	1,159			405	8,100	2,145	1,187
Building stone, bricks, etc	1897							
	1898							
TOTALS	1896		27,201	$544,026	62,259	$1,244,180	3,135,343	$2,100,689
	1897	169,362	25,676	$513,520	106,141	$2,122,820	5,472,971	$3,272,836
	1898	215,944	32,167	$643,346	110,061	$2,201,217	4,292,401	$2,375,841

* Estimated. † 100 ounces Platinum in 1898 = $1,500.

MINES FOR 1896, 1897, AND 1898.

COPPER.		LEAD.		TOTALS FOR DIVISIONS.			TOTALS FOR DISTRICTS.		
Pounds.	Value.	Pounds.	Value.	1896.	1897.	1898.	1896.	1897.	1898.
	$		$	$	$	$	$	$	$
							384,050	325,000	389,360
				82,900					
					65,000				
						94,500			
				53,000					
					25,000				
						57,000			
				51,100					
					35,000				
						28,000			
				197,050					
					200,000				
						214,360			
						15,000			
							21,000	37,060	107,500
						75,000			
				21,000					
					37,060				
						32,300			
							154,427	163,796	133,368
		2,806,411	88,908	154,427					
		2,291,451	82,036		163,796				
		2,286,603	77,745			133,368			
							4,002,735	6,765,703	6,042,975
		3,186,592	94,961	345,626					
		3,543,237	126,848		440,545				
203	24	1,978,297	67,262			159,801			
2,237,921	111,896			548,529					
3,453,644	172,682	7,291	261		789,215				
1,955,033	235,196					694,880			
		18,175,074	541,618	1,854,011					
		30,707,705	1,099,336		3,280,686				
		27,063,595	920,162			2,619,852			
1,580,635	79,030			1,243,360					
1,819,586	90,979				2,097,220				
5,232,011	629,411					2,470,811			
		29,900	897	14,209					
		2,291,451	82,036		157,977				
		365,064	12,412			97,631			
				33,665			33,665	39,840	
					39,840				
						47,814			47,814
							206,078	226,762	432,512
				131,220					
					142,982				
						364,112			
				9,000					
					25,100				
						7,560			
				65,108					
					58,680				
						60,840			
51,950	2,597				9,390			9,390	
84,381	10,150					19,437			19,437
								150,000	
									150,000
3,816,556	$190,926	24,199,977	$721,384				$4,801,965		
5,325,180	$266,258	33,841,135	$1,390,517					$7,717,551	
7,271,676	$874,781	31,693,559	$1,077,581			$7,322,766			$7,322,766

TABLE VIII.

COAL AND COKE PRODUCTION PER YEAR TO DATE.

Coal.

YEARS.	TONS (2,240 lbs.)	VALUE.
1836-52	10,000	$ 40,000
1852-59	25,396	101,592
1859 (2 months)	1,989	7,956
1860	14,246	56,988
1861	13,774	55,096
1862	18,118	72,472
1863	21,345	85,380
1864	28,632	115,528
1865	32,819	131,276
1866	25,115	100,460
1867	31,239	124,956
1868	44,005	176,020
1869	35,802	143,208
1870	29,843	119,372
1871-2-3	148,549	493,836
1874	81,547	244,641
1875	110,145	330,435
1876	139,192	417,576
1877	154,052	462,156
1878	170,846	512,538
1879	241,301	723,903
1880	267,595	802,785
1881	228,357	685,071
1882	282,139	846,417
1883	213,299	639,897
1884	394,070	1,182,210
1885	265,596	796,788
1886	326,636	979,908
1887	413,360	1,240,080
1888	489,301	1,467,903
1889	579,830	1,739,490
1890	678,140	2,034,420
1891	1,029,097	3,087,291
1892	826,335	2,479,005
1893	978,294	2,934,882
1894	1,012,953	3,038,859
1895	939,654	2,818,962
1896	896,222	2,688,666
1897	882,854	2,648,562
1898	1,135,865	3,407,595
Total	13,217,552 tons.	$40,034,180

Coke.

1895-6	1,565	$ 7,825
1897	17,831	89,155
1898 (estimated)	35,000	175,000
Total	54,396 tons.	$ 271,980

PROGRESS OF MINING.

The Province of British Columbia, although as yet only in its early stages of mineral development, has entered into the company of the great mineral producing countries of the world, with no uncertain step. Confidence in her future is based upon the rich promises of the many partly developed mines, which as yet predominate; promises that to a large extent are guaranteed by the results now being obtained from the comparatively few mines, which have as yet been sufficiently developed to become producers; and the foregoing statistical tables show what has been and is being actually accomplished, figures being the only measure we have for commercial success. Attention is directed to the comparatively recent growth of lode mining, and to the greatly increased production of recent years, such production being now eight or nine times what it was in 1894, or over twenty times as great as in 1893.

From these figures it will be seen how young our lode mining industry is, and how rapidly it has increased; and it will then be understood that, almost of necessity, but a small proportion of our known mines have had time to enter the lists as producers.

Increased production during the last year is to be noted in gold—both placer and lode; also in copper; while the output of coal, from the Vancouver Island Collieries alone, has broken all previous records, to which must still be added the output of the Crow's Nest Pass Colliery, which only commenced shipping in November.

While the total Mineral Production of the Province shows an increase, even over last year, the increase is not as marked as it would have been but for the serious dropping off in the output of silver-lead ores.

The reason for this decrease seems to be the unusually low price of silver during the latter part of 1897 and the beginning of 1898, together with the uncertainty as to the future price of the metal. For the time being this paralyzed many existing ventures and prevented new ones being started to work properties of this nature. The drop in price coming, as it did, shortly after a rise in the duty on lead imported into the United States, then our only market, deterred many of our mines from starting work this season. When the price of silver increased again, in the latter half of the year, it was then too late to begin operations for this season.

Again, the certainty of the completion this year of the Canadian Pacific Railway's branch through the Crow's Nest Pass, bringing with it cheaper fuel and transportation, and so enabling our native smelters to compete for ores, has induced many large producers to confine their attention to development and blocking out of their ore bodies, holding back shipments until such time as the new conditions should have taken effect, and higher net values might be obtained for the products of the mines.

Decrease from this cause is a healthy sign, and next year should show a very materially increased output of this class of ore.

The increased production of copper during the past year has been marked, while the present market price of the metal, should it be maintained, will have the effect of bringing into the list of producers a number of new properties, and next year may be looked forward to for a greatly increased production.

While it is unlikely that 18-cent copper has come to stay any length of time, still we have it from an acknowledged authority on the American Copper market that 16 cents will probably be the average price for 1899.

The very greatly increased tonnage of the year from the lode mines is to be noted, and coming as it does from mines of low grade, means that a considerable amount of attention is being attracted to the large low grade propositions which until recently have been untouched.

CAPITAL.

The importance, and often the absolute necessity of capital, to bring a prospect through the development to the producing stage is well recognized by our prospecting class, but at the same time they fail to recognize the risk capital runs in putting money into a prospect on which little or no conclusive development has been done. In consequence, the prices asked for properties of this description have been so high that the holders of money were not justified in so risking it.

That there is in the country ample capital, ready and more than willing to invest in any property showing values from definite development, is beyond question, but the money necessary to bring a property up to the requisite point has often been found hard to obtain.

The moneyed men or their agents are usually willing, working on a bond, to guarantee to spend in development work definite amounts within a fixed time and so develop the property in question.

The great trouble seems to be in the demand for cash payments, to be made so soon that it is impossible that sufficient development should be done in the time.

Thus the terms, rather than the amount of the bond, are what have prevented the development hoped for, and the country is tied up, inactive, through what appears to be the unreasonableness of the prospector.

There is, however, another side to the question, which I think it might be well to bring before the capitalist.

The prospector, enduring privations and hardships and running dangers innumerable, spends his whole time scouring the most remote parts of the mountains for prospects; he has no other means of livelihood and must have money enough to buy food and supplies, so that when he comes to tie up a prospect in a bond, though perfectly willing to "stand in with the capitalist on the gamble," still he must have enough cash to enable him to get out into the mountains again to discover new properties. The demand for a small cash payment is thus not as unreasonable as it at first seems.

I am glad to say, however, that there seems to be a decidedly better mutual understanding coming about, the effect of which should be shortly felt.

ATLIN GOLD FIELDS.

Public attention has recently been so much drawn to the placer discoveries in Northern Cassiar, in the neighbourhood of Atlin Lake, that the best available information has been collected with reference to this little-known District, which will be found in detail in the body of this Report.

A sketch map has been prepared by the Lands and Works Department from data thus collected, showing that portion of the country.

The information as to the actual amount of gold brought out in 1898 is somewhat uncertain, but, by collecting data regarding amounts of which actual figures have been obtained, it is estimated that the output was about $75,000.

The placer discoveries at Atlin, while in themselves important, have still greater importance, in drawing public attention to the existence—well known locally—of the great placer gold belt, extending the whole length of the Province from Wild Horse Creek, in East Kootenay, near the United States boundary (which is credited with a total output of some $20,000,000), in a north-westerly direction along the western slope of the Rockies, through the famous Cariboo and adjoining gold fields, and still further on through Atlin to the Yukon gold fields in the North-West Territories.

Between Atlin and Cariboo there is still a great extent of country which has as yet been little prospected, and which may eventually prove as rich as its neighbours on either side.

As already foreshadowed in last year's Report, there is strong evidence to show that the gold of Atlin is not confined to placer workings. Samples of very rich gold-bearing quartz from prospects there have already been brought down, and upon these prospects some development will be made this coming year. Whether this District will eventually prove rich in lode mines, it is too early to predict, as little attention has as yet been given to anything but placer gold. Samples of cinnabar have been received from there for assay by this Department and found to contain 26% mercury.

GOLD.

Placer Gold.

While the output of placer gold has not regained the importance it held 20 years ago, still there is a material increase over last year—and, as a matter of fact, over any of the last ten years—showing that the gold is still unexhausted, though occurring under conditions rendering it only available by large operations. The placer miner has largely given way to the hydraulic plant.

The increase this year seems to be pretty well all along the line, each District showing a decided gain.

Free Milling Gold.

The production of free milling gold is surprisingly small, when one takes into consideration the amount of rich placer found in the country. Attention is being gradually drawn to this class of mining, and stamp mills are going up in several localities. The increased production of Camp McKinney and Fairview, in Yale District, and the returns from the Fern mine, in Nelson Division of West Kootenay, indicate probabilities for the future. Something less than 200 tons of such ore has been milled at Alberni, on Vancouver Island, and fair results are reported as having been obtained.

So far, all the free milling properties have found it necessary to use some form of concentration, for the collection of gold not existing in a free state, which concentrates have usually been sent to the smelters for treatment.

Cyanide Plant.

The first working Cyanide plant in British Columbia has been erected, and is situated on Philipps' Arm, 120 miles up the Coast from Vancouver, in connection with the "Doratha Morton" mine—a full description of which appears in this Report.

The plant has only been in operation for a couple of months, but has already produced satisfactory results, which, it is hoped, may continue, as the continued success of this, the pioneer of its class in the Province, will be looked forward to with much interest, as indicating what may be expected from the large low grade gold-bearing quartz veins occurring along the Coast line.

Smelting Gold Ores.

The ores of the Rossland Camp may be more appropriately classed as gold ores than as copper ores, inasmuch as the values of the former metal are proportionately much greater. The output of Trail Creek Division (see tables) is almost entirely from ores of this character—sulphides of copper and iron carrying gold and silver.

These ores are being treated by smelting at Northport, Wash., the Trail Smelter, or at the Hall Mines Smelter, Nelson. The copper acts as a collector for the gold and silver, a matte being produced—the greater part of which is brought forward to refined copper, cast into anodes, and sent to some electrolitic refinery, for the separation of the gold and silver.

PLATINUM.

Platinum has been found in the black sands obtained in placer washing, both in the Similkameen and Omineca Divisions. From the former some 100 ounces have been sold this year. It is only recently that attention has been drawn to the existence of platinum in these sands, quantities for years having been thrown away, prospectors not being aware of its value.

To facilitate the detection of platinum, this Department is prepared to test qualitatively, free of charge, samples of such sands sent in from any part of the Province.

SILVER-LEAD.

Here these two metals go together, their source being chiefly argentiferous galena, and mined principally in Ainsworth and Slocan Divisions of West Kootenay. While they still hold the place of premier importance in our year's production, the output has this year considerably diminished, for the reasons previously given.

For the two Divisions mentioned, the grade of shipping ores seems to have been maintained, as may be calculated from the statistics, and averaged, on over 32,000 tons of ore, 97 ounces of silver to the ton and 47% lead.

The galenas of East Kootenay are not so high grade in silver, the North Star holding its own this year with about 50 ounces of silver and 50% lead.

Developments of galena properties in East Kootenay, lead to the expectation of shipments next year from the Moyie Mines and from the Sullivan, fully described elsewhere.

Discoveries of galena in quantity have also been made in Windermere Division of East Kootenay, but remain to be proven by further development.

Few "dry ores" of silver have as yet been developed, though a few such exist in West Kootenay.

The Hall Mines, of Nelson, a silver-copper proposition, carrying about 15 to 20 ounces of silver to the ton and 2 to 2½% copper, have smelted over 45,000 tons of ore of this class this past year.

GOVERNMENT LABORATORY—DEPARTMENT OF MINES.

COPPER.

Classing the ores of Rossland as gold, and of Nelson as silver-copper ores rather than as copper ores, has removed from the list of copper mines the properties which are really our greatest copper producers, a very unfashionable thing to do in these days when anything branded "copper stock" is so eagerly sought for.

Except as noted above, we have no large copper producers in the country as yet. A few hundred tons of fair copper ore have been shipped from Van Anda, on Texada Island, and a smaller quantity from mines of Vancouver Island, but more as trial than regular shipments.

There are, however, a large number of promising copper prospects in the Fort Steele, and also in the Windermere and Donald Divisions of East Kootenay, many of which are reported on elsewhere. Vancouver Island has also shown up a few prospects which may soon become producers, notably the "Lenora," on Mount Sicker, and certain properties on the West Coast.

With copper anywhere near its present market value, a large number of copper producers will probably spring up this coming year.

COAL.

This past year has been the banner year in our Collieries, the yearly out-put of the Vancouver Island Collieries alone being 1,126,531 tons—about 100,000 tons more than was produced in any one year heretofore, and to this must be added some 9,334 tons from Crow's Nest—which has only just entered the field as a producer—bringing the grand total for the year up to 1,135,865 tons.

A detailed description of the Collieries will be found in the Report.

COKE.

Vancouver Island has produced in the neighbourhood of 35,000 tons of coke, the exact figures not being available, and of this amount some 3,167 tons have been exported, the remainder going chiefly to the Kootenays.

The Crow's Nest Collieries have just begun shipping, having before the close of the year shipped some 361 tons of a very superior quality of coke.

ANTHRACITE COAL.

Anthracite coal has been found on Queen Charlotte Island and on other islands off the coast, but has not been worked as yet, although the prospects are promising.

Gypsum. Large deposits of gypsum, said to be good quality, are reported in the immediate neighbourhood of Kamloops, but no attempt has, so far, been made to work them.

Asbestos Is also reported from several localities, but the Department has been unable to get any authentic information as to values.

Plumbago. Several finds of plumbago have been made, samples from which indicate good quality.

Mica Occurs in various parts of the Province. From the neighbourhood of Tete Jeune Cache large blocks have been obtained, some as large as 16 x 28 inches, but as yet the transportation facilities are lacking to make it of commercial value.

DEPARTMENT OF MINES.

WORK OF THE YEAR.

Early in the year, and directly after preparing the report for 1897, Mr. Carlyle resigned his position as Provincial Mineralogist, to accept the management of one of the largest producing mines in the Province.

The vacancy thus caused was filled on June 1st by the appointment of Wm. F. Robertson, B.A.Sc., as Provincial Mineralogist.

Mr. Robertson began his work on the above date, meeting the Minister of Mines at Golden, and, under instructions, began a detailed examination of East Kootenay.

The snow was still heavy on the mountains in the northern portions of the district, and it was found necessary to begin at the southern end, where many of the claims are at a lower elevation; work being pushed northward until the beginning of October, when snow on the higher elevations, near Golden, put a stop to field work in that section.

An attempt was then made to visit the Big Bend country north of Revelstoke, but this was found impracticable on account of unusually early snow, and the Provincial Mineralogist returned to headquarters at Victoria.

The Old Legislative Buildings, mentioned more in detail later, were then arranged and fitted as a mineral museum, and the collections removed from the store-room and displayed in the cases.

In the first part of November, a hurried trip was made to Texada Island, from whence the steamer was taken to Philipp's Arm, an examination being made of a few of the more important properties in these districts, while later in the month a visit was made to certain properties on Mount Sicker, V. I. The remainder of the year was spent in preparing for publication the notes collected and looking after the routine work of the office.

Owing to the great area of the Province, the difficulties of travel, and in some parts the shortness of the season in which field work can be carried on, it is impossible that the Provincial Mineralogist should be able to personally examine more than a small portion of the field each year.

It is consequently the intention of the Department that he should make a detailed report of the various Districts in rotation, following the line of greatest mining development.

The Gold Commissioners and Mining Recorders have supplied information as to the progress of mining in their respective districts, while from those portions of the Province which have reached the producing stage, the tabulated returns of output speak more convincingly of the increasing importance of our mining industries than could any worded description.

This Report gives a very full account of the mining industries of the Province, and every care has been exercised to make it impartial and trustworthy.

THE OLD LEGISLATIVE BUILDINGS.

The Old Legislative Buildings, having been handed over to this Department for its use, were, during the first half of the year, renovated and so altered as to render them available for the purposes intended.

The buildings have been utilized as follows:—

Ore exhibit. The old main Legislative Hall, a room 32 by 76 feet, surrounded by a gallery, and lighted from the sides and from the top, has been fitted with some thirty specially constructed mineral specimen cases, made from the yellow cedar of the country, and provided with sloping glass tops, the interior being a dull black colour, found to be the best back-ground for the display of specimens.

The lower portions of each case is provided with drawers, in which will be kept duplicate specimens, from which collections will be made to send away, and access to which will be allowed students and others studying more minutely the ores of the Province.

This main hall will be reserved exclusively for the exhibition of ores, etc., of commercial value, from the mines of British Columbia, and will in no wise be a general collection of minerals, provision for which has been made in the room to the left of the main entrance.

Mineral collection. Here it is intended to have a general mineral collection, irrespective of whence obtained or their value, commercially. A collection of specimens of the typical rocks will also be here displayed, the classification corresponding to that of the Dominion Geological Survey. This collection should prove of great value to students and prospectors as familiarizing them with the more uncommon minerals and which may afterwards be met with in the field.

These collections are made up of specimens collected by the Provincial Mineralogist in the field or received through the courtesy of private individuals who have contributed samples of ores or minerals. It might not be out of place here to appeal to the mine owners of the Province, requesting that they send in specimens, such as are suitable for exhibit, due credit for which will be given on the name card attached to each specimen.

Geological Maps. As fast as they can be obtained, geological maps and sections of the Province and elsewhere will be hung on the walls.

Laboratory. What was known as the old "lunch room" has been moved back and fitted up as a laboratory, and is provided with gas and water, suitable work benches and shelves, with balances, bullion rolls, etc.

Off the laboratory there is provided a dark room for chemical and photograph work.

Furnace room. Back of the laboratory there has been built this last year a brick furnace room, which is fitted with a large two-muffle coal furnace, also suitable furnace and appliances for the melting into bars of such gold dust as may be presented for melting and assay.

Sampling room. Underneath the furnace room is a sampling room, provided with hand crushers, bucking board, etc.

Students' Laboratory. Back of the main hall is a room thirty-two feet long, fitted up as a laboratory for students in assaying and blowpiping, and is provided with gas, water, etc.

ILLUSTRATIONS.

The illustrations in this report are made from photographs, most of which have been taken by the Provincial Mineralogist with a No. 4 Cartridge Kodak.

Those from Nelson are from flashlight photographs for which the Department is indebted to Mr. Norman Carmichael, of the Hall Mines Smelter, while those of the Bonnington Falls Electric Plant, are to be credited to the courtesy of one of the officers of that Company.

The illustrations of the Crow's Nest Pass Colliery are from cuts kindly loaned by the "B. C. Mining Record" and represent the conditions existing late in the fall, long after the visit of the Mineralogist to these properties.

The excellent press-work in their reproduction, and also of the Index Map accompanying this report, is due to the special care of W. H. Clark, Chief Pressman for the Queen's Printer.

ACKNOWLEDGMENTS.

The Provincial Mineralogist takes this opportunity of acknowledging the invariable courtesy with which he has been received, and the assistance given him in his field work, not only by the various Government officers, but by every one with whom he came in contact in the Districts visited, newspaper men, business men, generally, and especially by the prospectors

WORK OF THE LABORATORY.

REPORT OF HERBERT CARMICHAEL, PROVINCIAL ASSAYER.

The proper work of the laboratory was seriously interfered with during the first half of the year by the moving of the laboratory into the present quarters in the old Legislative Buildings, and in getting the same fitted up and ready for use, this work not being completed until August.

Since then some 915 assays have been reported, and a large number of qualitative determinations made.

It has been the custom of the Department to determine, qualitatively, free of charge, any mineral sample sent in, returning to the sender any available information as to its value. This privilege has been largely taken advantage of, and is believed to have been of great help to prospectors throughout the Province.

The usual number of assays and determinations have been made for the Provincial Mineralogist, in connection with his field work of the summer, and this year included a number of coal analyses.

A series of investigations has been carried on with a view of determining the presence in the black sands of the Province of metals of the platinum group.

Sands have been examined from widely separated locations but, as yet, platinum and the allied metals have only been found in appreciable quantities in sands from Similkameen and Quesnelle Rivers, in the former sometimes in very appreciable quantities.

Examinations in Assaying. In April an examination for "efficiency in the practice of assaying" was held in compliance with section 12 of the "Bureau of Mines Act," two candidates presenting themselves for examination. Of these two, only one passed and was granted a certificate to that effect. Three students have been availing themselves this year of the instructions in assaying, mineralogy and blow-piping.

Gold Melting. During the year a number of lots of gold dust were presented for melting and assay, which dust has been melted and sampled while the owner waited for the bar, on which was stamped its weight and fineness.

Photographic Work. A large amount of photographic work has been done during the year. The Provincial Mineralogist took a number of photos, illustrating his field work, all of which were developed and printed in the laboratory, a selection being made from them to illustrate his report.

A number of photographic enlargements, 18 x 22 inches, were made and sent to the Trans-Mississippi Exhibition, where they received very favourable notice.

A number of similar enlargements were donated to the Westminster Exhibition, and also to the Dominion Geological Survey.

A large number of lantern slides were also prepared and sent to the larger Eastern Universities, to be used as illustrations in lectures on British Columbian mining.

Much of such work had previously been done by outside assistance, and doing it in the laboratory has saved the Department considerable expense.

Fees Collected.

The Laboratory has been at least partially self-sustaining, the fees collected for the year ending June 30th, 1898, amounting to $569.50 as against $1,483.00 for the previous year, but this decrease is accounted for largely by the fact, already mentioned, that the moving of the laboratory practically stopped all assaying work for nearly half the year.

CARIBOO DISTRICT.

REPORT OF JOHN BOWRON, GOLD COMMISSIONER.

In submitting this, my twenty-fourth annual report on the mining industry of the Cariboo District, I am unable to announce any great increase in the yearly gold output; at the same time the actual condition of affairs gives the greatest encouragement that the District is on the eve of a prosperous term that has not been equalled for many years. In former seasons there have been indications of prosperity, but the present year has given evidence of such positive and substantial character that it is safe to predict a greatly increased activity. Many of the smaller properties, hitherto held and worked by individual miners, have been purchased by strong companies and amalgamated into large enterprises, calling for the construction of extensive ditches, flumes, reservoirs and other works of a most substantial nature. This fact has conduced to the curtailment of this year's output of gold, but when the extensive preparations already underway are fully completed, there will certainly be a large increase in the gold yield of the District. While the number of men employed in mining has not materially differed from that of previous years, probably not more than one in four has been actually engaged in the work of gold production.

It is understood that the following well-known placer mines have been either purchased or are held under option by reputed capitalists, who have already begun development work on them on a more comprehensive scale than hitherto undertaken, or purpose so doing as soon as spring opens:

The Alabama and adjoining claims, on Mosquito Creek.

The Meadows, on Williams Creek.

The Bench Claims along Slough Creek.

The Eleven of England and adjoining claims, on Lightning Creek.

The Pinkerton Claim, on Lowhee Creek.

The San Juan Claim, on Williams Creek.

The claims on Conklin's Gulch and French Creek.

The Maud Claim, on Four-Mile Creek, and several others in the vicinity of Quesnelle Forks.

The Discovery Claim, on Shepherd's Creek.

The Boursin and Fry lease, on Cornish Creek.

The Birrell and Polleys dredging leases, on Quesnelle River, and many others.

Though, for reasons already given, the actual gold output for the year shows slight increase, I am happy to be able to report that in no case where development work has been started within the past few years have operations ceased through failure to find gold in paying quantities. Several large enterprises have been steadily carried on for several years and are still being pushed, notably, the Deep Diggings on Slough Creek, and Willow River, and the Hydraulic Elevator proposition on Williams Creek. I append a detailed report on these works, and on others of more recent origin, equally promising.

After the exhaustive review of the late Mineralogist, Mr. Carlyle, in the annual report of the Minister of Mines for 1897, of the physical features and geological nature of the district, I feel that it would be presumptuous for me to attempt any divergence into these fields. I shall therefore confine myself to a description of the work of the different camps.

THE SLOUGH CREEK ENTERPRISE,

Operated by The Incorporated Exploration Company of British Columbia, Limited, London, England.

At the date of the last report, the property of the Slough Creek Mining Company had just been acquired by the above Company, who will develop it and other properties adjoining. During the year the development work has been carried on under the direction of Mr. William Thompson, M.E., F.R.G.S., of London, Managing Director and Consulting Engineer of the Company, with Mr. John Hopp as local manager at the mines.

In order to determine, with all possible accuracy, the depth and location of the old channel of Slough Creek, before sinking shafts and running tunnels to it, additional boring was done with hydraulic jetting machines and the depth as determined by former borings verified.

The management has decided to sink a three-compartment working shaft through the rim-rock upon the Island Mountain side of the property, opposite the mouth of Nelson Creek, and when it has reached the required depth, a bed-rock tunnel will be run from the shaft to intercept the old channel. Lumber, for timbering the shaft, is now being prepared and delivered by the Clarke & McIntyre Mill, upon Jack of Clubs Lake. A large quantity of cord wood, 1,000 cords, has been contracted for, and is being delivered at the shaft site. The necessary machinery for sinking the shaft and running the tunnel, consisting of air compressors, drilling machines, pumps, hoisting-engines, additional boilers, etc., has been provided for and will be installed as soon as required.

During the year several new buildings have been added to the Company's plant at the mouth of Nelson Creek, and a new shaft-house will be built upon the site of the proposed bed-rock shaft.

WILLOW RIVER.

On a recent visit to Willow River Camp, I obtained the following definite information regarding this important undertaking:

Work on this deep ground proposition was begun by Mr. Fred. C. Laird, on July 1st, 1894, and has continued without intermission, except such as was caused by the necessary addition of more powerful machinery. The workings now consist of a drain tunnel to the rim-rock, 620 feet in length; a three-compartment shaft, 200 feet deep, 100 feet of which is in rock, and a bed-rock tunnel to intercept the channel, 650 feet in length. Three openings have been made into the channel wash, but operations were suspended early in the year in order to provide more powerful machinery to cope with the large volume of water encountered.

The new auxiliary plant is now on the ground, and is being installed. The entire plant consists of the following:—

Two boilers, developing 115 horse-power; two engines, each 50 horse-power; one 8 x 10 double cylinder Fraser & Chalmer's hoist; one 9-inch exhaust fan, with 1,000 feet of 6-inch galvanized iron pipe; one 18-inch Cornish pump, with a 10-foot stroke, which will be actuated by one of the engines; 1 pair geared plunger pumps; 1 duplex steam pump; one 7-inch Nye steam pump.

When the new machinery is installed, which it is expected will be not later than January 15th, 1899, the total normal pumping capacity will be 3,000 gallons a minute. With the water under thorough control, it should be a matter of but a few weeks to cross-cut the channel. I am credibly informed that operations on this property have already entailed an expenditure of $100,000.

Should this enterprise prove successful, it will prove a great incentive to the development of the vast deep-ground deposits of the District heretofore untouched.

WILLIAMS CREEK.

Operations of the Cariboo Gold Fields, Limited.

During the past four years, this company has most persistently and perseveringly prosecuted the work on their extensive system of ditches, flumes and reservoirs, and on the installation of the immense steel pipe line conducting water to their hydraulic elevators. During the past season they made a start in raising gravel. Their plant is the most extensive and powerful of its kind in the world, raising gravel as it does by hydraulic pressure, ninety feet vertically, in one lift. While the trial proved this method of handling the gravel to be entirely feasible and satisfactory, the troubles and set-backs incident to the starting of such an enormous work were experienced, and the opening of the pit from the surface to bed-rock was necessarily slow. Owing to the short season, the capabilities of the plant were not shown under a steady working test. Enough ground was handled, however, to prove the value of the gravel, which was entirely satisfactory.

When the water supply became too small to further work the elevators, a large force of men were busily engaged until winter set in, improving and increasing the water supply, by widening the old and constructing new ditches, building dams to augment their storage system, and, in the light of their working experience, placing the whole plant in perfect working order for the season of 1899.

A complete description of the huge plant operated by this company, and their immense system of water supply, was given in the Report of the Minister of Mines for 1897.

HYDRAULIC MINING UPON SLOUGH CREEK BENCHES.

English capital, represented by Mr. Sam. Medlicott has, during the summer and fall of 1898, built two ditches from Jack of Clubs Creek and New Creek, respectively, to provide water for hydraulicing a series of bench claims upon the south side of Slough Creek, which adjoin the property of the Incorporated Exploration Company of British Columbia, Limited. The Jack of Clubs ditch, carrying 1,500 miner's inches, is over four miles in length, and will furnish water for working the leases acquired between Jack of Clubs and Burns Creeks. The New Creek ditch, carrying 600 miner's inches, is one mile and a half in length, and will furnish water for working the leases acquired between New and Nelson Creeks. The construction work has been under the personal supervision of Mr. Melbourne Bailey, M. E., who has used the latest methods in building the dams, ditches and flumes, and has given them a permanent character. The giants to be used will have ball-bearings, and the equipment of both properties will be modern in every particular. The New Creek ditch has been completed, and the plant fully installed ready for operation at the opening of the season of 1899. The Jack of Clubs ditch has been completed, and the lumber for fluming is being distributed along the ditch. The plant to operate the leases between Jack of Clubs and Burns Creeks is on the ground ready for installation in the spring of 1899. Camp buildings of a substantial and convenient character have been built at the mouths of Burns and Nelson Creeks, and will be occupied by the manager and employees of the company.

HARDSCRABBLE CREEK.

The Menominee and Marianette Hydraulic Gold Mining Company purchased the Garibaldi claim from Shaw & Son about two years ago. The company began operations by running a drain tunnel from Willow River, 1,200 feet in length, to tap the deep channel of Hardscrabble Creek. Work has been carried on continuously, except when the water supply gave out in the winter seasons; and from the time the workings reached bed-rock in the channel, gold has been taken out. Operations have recently been suspended again, on account of a failure of the water supply, but will be resumed early in the spring. The last ground worked was paying, and was improving as the drive advanced.

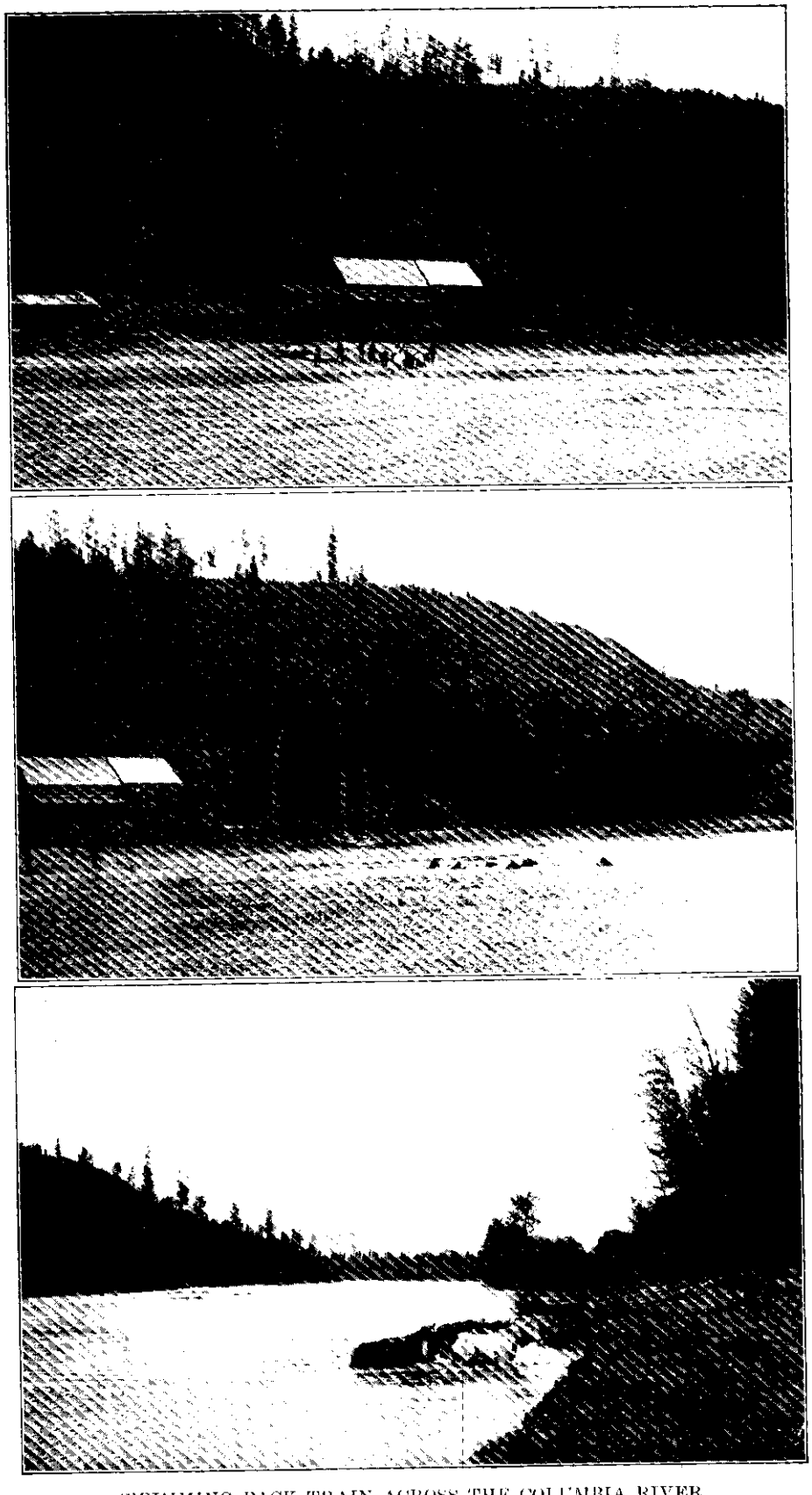
ANTLER CREEK.

Prospecting work on the property of the "Bradford, Cariboo and Yukon Gold Fields, Limited" was continued during the past season. A tunnel 150 feet in length was run on Antler Creek, above Saw-Mill Flat, at right angles to the present water-course. Twenty feet from the mouth of the tunnel a blind shaft was sunk to bed-rock, a distance of four feet. Ninety-seven feet further in, another shaft was sunk forty-seven feet to bed-rock, the last seventeen feet of which was in gravel, in which a prospect of gold was secured. At the face of the tunnel the depth to bed-rock was found to be twenty-seven feet. A shaft has been started further down stream, and will tap the bed-rock in the channel near the deepest blind shaft in the tunnel.

DEVIL'S CANYON.

Along Devil's Canyon Creek are a number of benches which have been worked out, chiefly by Chinese. These benches carried coarse gold, and are supposed to have paid well. Although the gold was followed from the foot of the benches down towards the deep ground, as far as water would permit, the old channel of this creek has never been reached.

A partnership of miners, known as the Devil's Lake Mining Company, Limited, is now endeavouring to exploit the deep ground above the canyon. A rock tunnel has been driven more than three hundred feet; this will be extended through rock about sixty feet (estimated) where it is expected to break into gravel.



SWIMMING PACK TRAIN ACROSS THE COLUMBIA RIVER.

FRASER RIVER.

The Cottonwood Alluvial Gold Mining Company, holding hydraulic mining leases on the Fraser River, near the mouth of the Cottonwood River, suffered, some time ago, a severe set-back, by a slide which destroyed several hundred feet of their tunnel, which was run in connection with their seventeen-mile ditch. In September last a large force of men was set to work repairing the damage, and operations were pushed until frost set in. Work will be resumed in the spring, and it is expected that everything will be in ship-shape to take advantage, of at least part, of next season's water.

LIGHTNING CREEK DRAINAGE TUNNEL.

The British-American Gold Mining and Trading Company, of Baltimore, are engaged on Lightning Creek on a very extensive drainage tunnel. This company acquired the property of the Lightning Creek Gold Gravels and Drainage Company. Operations were commenced during the past season on a tunnel through which it is proposed to drain the old channel of Lightning Creek. The tunnel was started near the foot of what is known as Wing Dam Hill. Twelve hundred feet have been so far completed, most of which is an open cut. Three shifts, of eight hours each, are kept going continuously, and it is proposed to push the work in like manner until the tunnel is completed. It is estimated that the total length of the tunnel and open cut to the bed-rock in the old channel will be 8,000 feet. Major Moore, of Baltimore, Md., is in charge of the work.

THE WAVERLY COMPANY, OF GROUSE CREEK.

The Waverly Company, of Grouse Creek, prosecuted their work during the water season, and made good progress in steadily improving ground. Just before they began the yearly wash-up a large slide occurred, permitting a clean-up of only a portion of the season's piping.

THE BLACK JACK COMPANY, OF WILLIAMS CREEK.

The Black Jack Hydraulic Company has been steadily working during every season since 1861. In 1897 their work uncovered a back channel, and this season, with only half a dozen men employed, a clean-up of $10,000 was made.

THE ALABAMA AND DISCOVERY COMPANIES, OF MOSQUITO CREEK.

The Alabama and Discovery Claims, on Mosquito Creek, have, this season, maintained their reputation as dividend payers. It is understood that these properties are under option to a strong English Company; and if the option is taken up work will be carried on on a much larger scale than heretofore.

THE GOLDEN PROVINCE MINES COMPANY, LIMITED.

This Company is engaged near Quesnelle, about three miles west of the Fraser River, on a large undertaking of a somewhat novel but very interesting nature. Briefly stated, the Company is running a rock tunnel, some 1,500 feet in length, to intercept the old channel of the Quesnelle River which, it is believed, passes through the high bluff of basaltic rock situated on Baker Creek at this point. Work has progressed steadily since its inception, and I understand that the work of exploration is nearly completed. I have been unable to secure a detailed account of the work that has been done, but am assured that everything in connection with the proposition is in a most satisfactory condition.

QUESNELLE FORKS SECTION.

The extensive works of the Cariboo, the Golden River Quesnelle, and the Montreal and B. C. Mining Companies, situated about the Forks of Quesnelle, and the Horsefly Hydraulic, the Miocene and the Horsefly Gold Mining Companies, on the Horsefly River, and other works of importance in the southern part of the District are described in the detailed report of Mr. Stephenson, Mining Recorder for that part of the District, which follows this report.

SUMMIT CREEK.

Considerable attention has been attracted during the past season to the prospecting work on this Creek of the Klondike Gold Mining and Development Company. Many previous attempts have been made to prospect this channel, but, owing to lack of facilities to handle the water encountered, they were unsuccessful. The above Company, under the management of Mr. F. T. Hamshaw, has been more successful, in that a shaft 80 feet in depth was sunk; and, while it was found that it was impossible to continue it to bed-rock without machinery to pump the water met with at that depth, yet sufficient data was had to promise encouraging results. Mr. Hamshaw is at present, I understand, in the East, arranging for a plant of sufficient power to thoroughly prospect the ground.

Summit Creek is about fourteen miles in length; and all of it is held under leasehold or record. A good deal of work has in past years been done upon it, in a small way; and encouraging prospects have been secured. Should the development work of the above Company and of the others who are exploiting the Creek prove satisfactory, a camp of importance will doubtless be found there.

MINERAL CLAIMS.

Another year has passed without adding anything to our knowledge of the capabilities of our District as a quartz mining section. Many promising lodes have been discovered, but little more than assessment work has been done on them, and they are still in embryo.

It appears only reasonable that the wealth of the historic placers of Williams, Lightning, Mosquito and other creeks, must have had its parent source not far from where it was found. The evidence of this is even more convincing when the fragile nature of much of the gold, in nugget form, is considered. Very many nuggets have been found of so friable a nature that they could be compressed in the hand, this proving conclusively that they could not have been carried far from their source, and moreover, in many cases, the gold is found with quartz still adhering to it.

Prospecting for gold-bearing quartz in this section, however, is rather difficult, owing to the deep alluvial deposit, which covers the rock almost everywhere.

If it is a fact that the gold in our creeks and rivers had its origin in the quartz ledges, the discovery of one lode, of a permanent character and of sufficient richness to pay for development and milling, will doubtless lead to the search for and discovery of others.

One fact which strongly militates against us as a quartz mining district, especially in the upper portion, is our remoteness from a railroad. If one of the projected railways becomes an assured fact, I feel sure that this branch of the mining industry will claim due attention in these parts.

RIVER DREDGING.

Considerable attention is being attracted to this method of winning the precious metals from the sands of our rivers; and latterly from the bars formed in the small lakes at the outlet of auriferous streams. So far the work which has been carried on has been almost

entirely experimental. Some 275 miles on the Fraser, Quesnelle, Cottonwood and Willow Rivers; and on the Cariboo, Jack of Clubs and Eight Mile Lakes, are now held under dredging leases. There is probably as much more ground available for dredging purposes, and should the work now being prosecuted in this line demonstrate that the gravels of our rivers and lakes can be handled advantageously and cheaply, it will certainly open up an immense field.

I feel safe in saying that in this District the suction dredges have proved a failure. Some of the companies have adopted the dipper type, but so far have not made a working test sufficient to prove that this is the more advisable method. The Olson dredge, which was worked on the Quesnelle River, some fifteen miles above its mouth, has given evidence of being probably the nearest approach to the dredge suitable for our rapid rivers. This is a machine of the elevator type, and although of less power than either the Pittsburg or McCorkle plants, has been working during the entire season in a very satisfactory way. A second dredge on the same lines is now under construction by the Company.

So far the greatest difficulty that all of the dredging enterprises have encountered is in inventing proper appliances to save the fine gold, which is in very large preponderance in our swift streams. All of the machines are capable of raising large quantities of gravel, but the form or construction best adapted to raising gravel in large quantities and for saving the fine gold does not yet appear to have been hit upon.

The Companies which have been working for several years with very indifferent success are worthy of all praise for their persistent efforts. I feel satisfied that proper methods will yet be discovered for handling the gravel of our rivers, and, as they have already been proved to be auriferous, there will then be added a very important branch to our mining industry.

The Pittsburg and Cariboo Dredging Company, who have concessions near Cottonwood Canyon on the Fraser River, about twenty miles above Quesnelle, met with a serious misfortune this season in having their huge dredge cast high and dry on a bar in the river. Owing to the rapid fall of the water, they were unable to float the dredge without removing the machinery. This unfortunate accident entailed the loss of the season's work, and was the more disheartening as the Company had just completed the installation of a dipper type in place of the suction form hitherto used.

The McCorkle dredge, operating on the Quesnelle River, which was first worked on the suction system and later changed to the dipper type, has passed into new hands, and is, I understand, to be again refitted, this time with a bucket elevator appliance.

Several new dredging companies have recently been formed, giving further assurance that the at least partial failure of the attempts so far made are no deterrent to further efforts.

The number of men engaged in mining will not materially differ from that of previous years. I estimate the number at 350 whites and 400 Chinese and Japanese.

Summary of mining transactions of the District, ending November 30th, 1898:

No. of individual Free Miners' Certificates issued			1373
" Company Miners' Certificates issued			9
" Creek leases issued	28		
" Hydraulic "	58	138	
" Dredging "	52		
" Placer claims recorded	117		
" Mineral "	147	264	
" Water Records for mining purposes			22
" Certificates of work issued on mineral claims			23
" Applications for leases not yet issued			43

QUESNELLE DIVISION.—KEITHLEY CREEK DISTRICT.

By W. STEPHENSON, MINING RECORDER.

A good supply of water for the greater part of the season enabled hydraulic mining to be carried on to good advantage in this section of the District.

Development work has not been carried on to the extent anticipated, only a few companies doing work to any great amount. On the main Quesnelle River, the Maud (Four-Mile Creek), and the two companies owning the dredging leases for the first twenty miles from Quesnelle Forks down, have done a considerable amount of prospecting, and they claim with good results.

On the South Fork of Quesnelle River, the Golden River Quesnelle Company have completed their dam at the outlet of Quesnelle Lake, and were able to work for a short time during the latter part of the season in the bed of the river, obtaining, I believe, very good prospects for their further operations.

The Victoria Consolidated Hydraulic Mining Company carried on prospecting with a good force of men for nearly the whole season on Rose's Gulch, South Fork River, but I have not learned with what results. The Consolidated Cariboo, also on the South Fork, worked as usual with a large force of men for the whole season; in fact, it may be said, for the whole year, as there are at present over thirty men who will continue working for the Company during the winter.

On the North Fork of Quesnelle River very little work was done during the season, three men working on the Moore Company claim, Spanish Creek, and some prospecting work done on the Mather's lease, being about all, except some desultory work by Chinese.

Keithley, Snowshoe, Martin and Harvey Creeks have made no new developments for the season, the small companies working with about the usual results.

On the Horsefly River there has been considerable work done for the season. The Miocene Company got their shaft down to a depth of over 400 feet, and although not positive that they are in the deepest ground yet, they have obtained prospects that the manager—Senator R. H. Campbell—says will pay very well to work, and he (the manager) is preparing to sink a new and much larger shaft than the one from which he has obtained his prospects, and there is very little doubt but that within another year this old channel will be thoroughly tested as to its value.

The Horsefly Gold Mining Company has been running two hydraulic elevators for a good part of the season, and, according to report, with very good success. The Horsefly Hydraulic Mine only worked part of the season. I have not yet learned why they suspended operations. The other companies prospecting on the Horsefly and vicinity have no developments to report for the season.

Re quartz mining, there is nothing to report, although in August and September, 1897, there were quite a number of locations made near Clearwater Lake and recorded in this office. I do not know of any work having been done upon the locations.

OMINECA LAND RECORDING DISTRICT

Lies chiefly in the Electoral District of Cariboo and described in the "Gazette" in 1874 as follows:

"The Land Recording District of Omineca shall be bounded on the south by the 54th parallel of north latitude; on the east by the 124th meridian of west longitude; on the north by the 56th parallel, and on the west by the 127th meridian of west longitude."

To this district a Gold Commissioner and Mining Recorder, Mr. Fred. W. Valleau, has been appointed for the purpose of transacting all such mining business in this district as appertains to these offices. His report on the district follows:

REPORT OF F. W. VALLEAU, GOLD COMMISSIONER.

SIR,—I have the honour to submit the following report upon the progress of mining in the Omineca Land Recording District for the season of 1898.

I left Victoria on the 15th March last, as per instructions, and Vancouver a couple of days later, after getting my outfit ready. The spring being so far advanced I was too late to be able to take advantage of the Naas River route, so had to go in by way of Ashcroft, Quesnelle and over the old Telegraph trail to Stuart Lake. This route, while being the best to travel in summer, is by far the most expensive in winter, and especially so at the time I had to go through. I found great difficulty in persuading any men to come in with me, as they were afraid the rivers would be running with ice and the snow too soft for snowshoeing. However, I managed to secure four men at Quesnelle who took me as far as Fort St. James on Stuart Lake, and from there to Manson I got two siwash to accompany me and haul the loads. I arrived at Manson Creek on the 20th April, having been just about a month on the trip in. There are a few old log cabins at Manson, built by the miners in the 70's. One of these I secured and fixed up as an office. There were quite a few men already there when I arrived, the greater number having come in by the Naas River route. Mr. Cotton, engineer in charge of the 43rd Mining and Milling Company's hydraulic works at Manson, was in with his men, and the saw-mill was at work. This season there was a large number of men in the district. The portions which received the most attention were the Nation, the Stranger or Meslinca Rivers, the Omineca River, Oslinca, Driftwood, Findlay, and that part of the district lying to the north of the Omineca River and west of the Findlay. A large number of hydraulic leases have been applied for in these sections. The following is a short account of what has been done upon the different creeks:

TOM CREEK

Has been worked for a number of years and is now held by a small company of miners, who have expended quite a sum of money and labour upon a bed-rock flume. This property is at the present time about to be sold to an English syndicate, who propose working it upon a large scale.

VITAL CREEK

Is being worked by a company of Chinamen. Leases have also been applied for by a company of Nanaimo gentlemen, who have been prospecting their ground all the past season.

The 43rd Mining and Milling Company have just about completed their work of development, and now have a line of ditch and flume about completed to their ground upon Kildare,

Slate and Manson creeks. They have had a very complete saw-mill working for the past two years. All the steel piping, monitors and elevators are now on the ground, ready to be placed in position. Their flume is 6 feet in width, 3½ feet deep; the ditch is 11 feet on top, 4 feet on bottom, and 3 feet deep.

THE OMINECA CONSOLIDATED CO.

Have not done any work in the division this past season, having secured a lay-over from the Government, although some development work has been done on this Company's claims. A sale of this ground to an American Company is pending at the present time, which I trust will go through, as this large extent of ground, if worked, would advance the interests of the district very much. The greatest drawback to the district is the great expense of getting in supplies, freights being 15 cents per pound from Ashcroft, a distance of about 620 miles.

While there have been no creeks discovered this past season which would warrant men going in there to work them by pick, shovel and sluice boxes, there have been found large areas of gravel which carry gold in quantities that will pay very well when worked by hydraulics, and the following list of applications for leases will show that the men who have been in that district this past season have faith in the future of the Omineca district:

Manson Creek	25	applications.
Germansen "	32	"
Lost "	10	"
Quartz "	2	"
Meslinca River	15	"
Oslinca "	14	"
Omineca "	18	"
Vital Creek	3	"
Total	119	"

I hope to see a great deal of development under way next season.

I beg leave to append below a statement of receipts for the past season.

Free Miner's Certificates	$ 540 00
Revenue Tax	186 00
Mining Receipts	2,200 00
Total	$2,926 00

CASSIAR DISTRICT.

ATLIN LAKE MINING DIVISION.

The discovery of promising areas of gold-bearing gravels in the extreme northern portion of the Cassiar District—as yet confined to the western slopes of the Atlin-Teslin divide—has again drawn the attention of the world to the constancy and uniform character and richness of the placer belt of the Province.

Public information concerning the new "strike" reached Lynn Canal ports on August 5th, Victoria, August 13th, a few weeks before the close of the mining season, since which time upwards of 3,000 people, it is estimated, have visited the new fields. Considerable prospect work has been done in the district, together with a fair amount of actual mining; both attended with satisfactory results, the total wash-up being estimated at about $75,000.

The greater number of those concerned in the summer rush, having secured claims, abandoned the field at the close of the season, being totally unprepared to withstand the rigours of the northern winter, and food supplies being comparatively scarce. Not to exceed 400 miners are now wintering in the vicinity of Atlin Lake. The indications are, however, that the ensuing spring will witness a repetition of the earlier excitement and, in anticipation of immediate development, steps have been taken to thoroughly organize the new Division.

TOPOGRAPHY.

Of the great northern reaches of British Columbia, comprising the districts of Cassiar and Cariboo, very little is known, save of isolated portions. Great areas have never been explored for the precious metals. The region under review has heretofore been included under this general category, and has ever been a terra incognita, even to the topographer, appearing on all maps as a featureless portion of the Province. Within the past six months, however, the entire field has been over-run by prospectors encouraged by the gold discoveries of Fritz Miller and his companions in the drainage basins of Atlin and Teslin Lakes, and much has been learned of the topographical and geological features peculiar to the region.

Confining attention to the former of these basins, now officially organized as the Atlin Lake Mining Division of Cassiar District, the information at hand, although more or less general in character, permits me to detail its main features. For the information herein conveyed I am indebted to Mr. Frank Weir, of Atlin City, who has placed at my disposal notes and observations made during an extended survey of the new fields in the interest of eastern capital.

Atlin Lake. Atlin Lake, the central feature of the district, has an estimated length of from 70 to 80 miles, and a direction nearly north and south for the greater part of its length, expanding east and west along the flanks of its southern boundary, the granites of the Coast Range. Its width is said to average six miles. North of the lake proper, well within the North-West Territories, a smaller body of water 16 miles long empties into the main body through a river of equal length flowing through a low, meadow-like country, but little elevated above the present water level, indicating the identity of the two lakes at no very distant period of time. Signs, indeed, are everywhere apparent of a comparatively recent subsidence of the lake and of its isolation from the Bennett-Tagish sys-

tem, of which it formerly must have formed the integral part. Its enclosing mountains flank or approach its shores for the most part in long, easy slopes often terminating in marsh, and where valleys descend its shores are prominently terraced at uniform levels, and are timbered if at all, with spruce of comparatively recent growth.

The "Golden Gate," a deep indentation in the eastern shore of the Taku Arm of Tagish Lake, 12 miles or more in length, occupies a wide valley running at right angles to the main direction of the two lakes—Tagish and Atlin—a comparatively low moraine, two to four miles in width, alone separating their present waters. Through this moraine the Atlintoo River has cut its way, and discharges the drainage of Lake Atlin into the Taku Arm, the only known connecting link between these two important bodies. It is worthy of note in thus tracing a former union of the two systems, that the Indians of the district still apply the term Taku Lake to the Atlin Lake of the miners, and only know as Lake Atlin the smaller lake to the north, previously described.

Pine Creek.

About midway of its length and, approximately, twenty miles south of the Provincial boundary, Lake Atlin receives the waters of Pine Creek, a more or less rapid stream flowing in from the north-east, and unwatering through its main source Surprise Lake and tributary streams, the greater part of the western slope of the Atlin-Teslin divide. Its estimated length is 16 miles; that of Surprise Lake from 18 to 20, the two bodies running from within a mile or two of the 60th parallel almost due south for the first ten miles, then south-westerly into Atlin Lake. It was on this stream, midway of its course, that gold was first discovered in the district.

Not exceeding fifty feet in average width, save when in flood, Pine Creek occupies a valley from two to three miles wide, flanked by mountain ranges 2,000 feet high, and converging as the lake is approached, terminating somewhat boldly from three to four miles from its present shore. This valley is filled with an immense deposit of gravel—comparatively coarse in kind, well-worn and carrying a fair amount of boulders—through which the creek has deeply cut its way, bearing first to the right, then to the left with many long sweeps and sharper curves on its way into Atlin Lake. For the main part the resultant benches form long stretches of perfectly level ground, fairly timbered, topped in the immediate vicinity of Discovery claim for a short distance by an extensive deposit of clay, the remnant of a stratum that at one time stretched across and along the valley.

Geology.

At various points in the valley, more especially at what is termed the Canyon, the underlying rock formations are in evidence, and seem to have been identified as typical Cariboo schists, varying from black to bluish shale to a more or less foliated grey or greenish chloritic or talcose schist. The detrital matter is said to be characteristically a "blue gravel." Quartz veins carrying gold have been discovered on this creek and in various other sections of the district; but values have yet to be authentically reported on.

Tributary Streams.

The chief tributary of Pine Creek occupies the valley immediately to the south, its waters discharging into the larger stream about three and a half miles above its mouth. It is called Spruce Creek by the miners, and is a considerable stream twenty miles or more in length, with an average width of thirty feet. The valley is wide, and its gravels, similar in character to those already described, are also gold-bearing, as are those of its main feeders, Rose, Placer and Little Spruce Creeks. Discovery claim is situated about three miles from its mouth, and so far as this creek has been prospected its richest ground lies below the discovery. Excellent prospects, however, have been also found some miles nearer its source, low, marshy flats extending

FALLS ON BUGABOO CREEK, GOLDEN DIVISION, EAST KOOTENAY.

HEAD OF BUGABOO CREEK, GOLDEN DIVISION, EAST KOOTENAY.

between for several miles, not permitting the prospector to reach bed-rock on the intervening stretches. Winter prospects have been determined on to establish the value of these flats.

In addition to receiving the waters of Spruce Creek, Pine Creek drains a considerable tract of country to the north through a second tributary which joins it a mile or two below Surprise Lake. This has been mapped as Birch Creek, and has its rise close to, if not beyond, the 60th parallel. Important quartz veins are reported to cross this stream at various points along its course.

Willow Creek, the third most important feeder of Pine Creek, enters it from the north-east, a short distance above Discovery, and runs in the same general direction as the main stream for the greater part of its course.

McKee Creek. **O'Donnell River.**

The topography of Pine and Spruce Creeks above described is that of all streams entering Atlin Lake from the north-east, of which McKee Creek, O'Donnell River and Pike River are the most important. These are all gold-bearing, and are from 25 to 30 miles in length, with interlocking feeders draining the divide in every direction towards their sources. O'Donnell River is also known locally as Moose or Cariboo Creek, and is, perhaps, the largest of all the known tributaries of Atlin Lake, averaging sixty feet in width, and discharging a volume of water equal to any two combined of its fellows. Both McKee Creek and O'Donnell River give promise of equalling the discovery creek in the richness of their gravels. The former enters Atlin Lake ten miles below the mouth of Pine Creek, the latter an equal distance further to the south, six miles above the mouth of Pike River.

The Divide.

An area of 1,500 square miles is comprised within that portion of the drainage basin of Lake Atlin extending from the Provincial boundary south to Pike River, and from the eastern shore line of the lake to the height of land separating its waters from those discharging into Lake Teslin. The divide occupying the eastern boundary of the district has a distinctly north-westerly trend and is pierced by an extension of the granitic axis, whose alternating and more or less irregularly shaped masses, preserving a general alignment, appear as a subordinate mountain series extending from the International Boundary north-westward to the Alaskan line in the vicinity of the Yukon gold fields.

Surprise Lake.

The entire district occupied by and immediately adjoining the divide is a lake country, every stream or tributary seeming to have its origin in crater-like depressions or swampy hollows in the higher mountain valleys. Of these the most interesting is occupied by Lake Surprise, the main source of Pine Creek, a body of water 18 to 20 miles long and three miles in average width, which receives the waters of several tributary streams, similar in general character to those previously described as emptying into Lake Atlin. Its counterpart on the eastern slope of the divide is Gladys or Sucker Lake, a body of somewhat greater dimensions discharging into Lake Teslin through the North River of the miners—a succession of connecting lakes, 32 miles in estimated length, and running in a northerly direction. A strip of low-lying "moose pasture," ten miles or so in breadth, forms the water-shed separating the heads of the two lakes. Thence southerly the divide is very irregular, both in direction and altitude, but is in every way pronounced, being characterised by granite outbursts on every hand.

Boulder Creek.

The two main affluents of Surprise Lake, entering it from the north, are Boulder (or Musket) and Ruby Creeks, both skirting the flanks of granite hills, and rich in promise as regards their value as gold-producing

Ruby Creek. streams. Boulder Creek seems especially rich for a mile of its length, from 20 above to 30 below discovery, and authentic reports regarding this area are very encouraging. Ruby Creek has been less developed, but is known to contain satisfactory prospects. The gravels of Boulder Creek are coarser in size than those elsewhere observed, the presence of large boulders in the valley bottom being especially noticeable, whence its name.

Otter Creek. Wright Creek. On the south side of Lake Surprise, Otter and Wright Creeks discharge into the lake, where skirted by a flat and more or less marshy shore for some miles. Their points of entrance, a mile or more apart, correspond with the narrowing of the lake to discharge itself into Pine Creek; and their general direction is very similar, a little south of west, then north-westerly into the lake. Both creeks skirt granite hills for part of their courses, and are rich in coarse gold wherever bed-rock has been reached, the characteristic shaly bed-rock of all streams in the district, easily broken and with pronounced cleavage. Hemlock, Union, Quartz, and Horse Creeks are additional tributaries of the lake, draining the divide to the south and south-east, and vieing with Wright and Otter Creeks in promise.

The principal tributaries of Otter Creek have been named Topaz, Quartz, Left and Centre creeks, and have prospected favourably. Bonanza and Eagle Creeks enter Wright Creek from the east during the last four or five miles of its length, and likewise carry gold in promising quantities.

Dixie Creek. Crossing a low divide at the head of Wright and Otter Creeks, the miners, late in the season, discovered the head waters of a stream they would have known as Dixie Creek, with its main feeders, Bear, Feather, Cariboo, Goose, Slate and McKinley, all within a radius of a few miles. Dixie Creek was not followed to its mouth and bore away to the southward. Its identity with O'Donnell River has been suggested, and there are some who aver that it returns on its course and discharges into Surprise Lake. It is more than likely, however, that, rising as it does on the other side of the divide, it discharges either into one of the tributaries of Gladys Lake or forms an important northern feeder of the Taku River.

Gold. The gold in the Atlin Lake gravels is more or less uniform in its nature, being essentially a fine "coarse gold," well-worn and flattened, and varying in size from small colours to that of flax and melon seeds. Larger pieces, worth from $2 to $35, are, however, frequently found, some more or less worn, attached to pieces of milk-white quartz. Little or no "flour" gold is found in the district.

Depth to bed-rock varies, being from four to ten feet in the creek bottoms and from two to thirty feet and over where prospect holes have been sunk on the higher benches. In the shallower diggings there is pay dirt almost from the grass roots down. "Spotting" is not characteristic of the district, the more or less uniform distribution of the gold over large areas being a marked feature of the new field.

With appliances of the crudest kind, $20 per diem to the man has been the average return on the principal creeks, but as high as an ounce an hour has been taken from bed-rock in many authentic instances. No attempt has been anywhere made to reach the creek bed, but facilities for damming and ditching are everywhere pronounced. The constant annual wash from the rich benches adjoining and occasional "slides" of large masses of gravel have, however, undoubtedly enriched the shallow bottom gravels to an appreciable extent, and many claim owners, favorably located, are only awaiting the re-opening of the season to divert the streams. Bars are infrequent in any of the waters of the district.

Timber.

The altitude of Lake Surprise coincides approximately with the timber line of the region. Below this line the stream bottoms and the shores of Lake Atlin are more or less plentifully wooded with spruce, chiefly of small size, but with isolated groves of good merchantable timber occurring in favourable localities. The whole lower region has a park-like appearance, there being an entire absence of undergrowth. Wild hay and luxuriant grasses covering the marshes afford an abundance of feed for stock, and the agricultural possibilities of the district are by no means uninviting. Wild fruits grow in abundance, and the region teems with grouse, ptarmigan and wild fowl. Game is also plentiful.

Trails.

Excellent trails traverse the district in every direction, and waggon roads are being opened up between the near-by creeks and Atlin City, the chief distributing point of the region, situated on the shore of Lake Atlin near the mouth of Pine Creek.

ROUTES.

Summer travel.

But little difficulty was experienced by prospectors in reaching the vicinity of the new district during the past season, lying as it does within easy access of recently established routes of Yukon travel. Steamers plying between the head of Lake Bennett—the common terminus of the Chilkoot and White Pass trails—and the lower river, made alternate trips during the summer from Bennett to the mouth of the Atlintoo River, a distance of about 120 miles, landing passengers and freight within a mile or two of the western shore of Lake Atlin. The construction of the Bennett branch of the White Pass and Yukon Railway, now rapidly approaching completion, together with contemplated improvements in the navigation of the Atlintoo River, will give direct rail and steamer connection between tide water and Atlin City, thus bringing the new mining centre within a week's travel of lower West Coast ports. Lake navigation lasts throughout the entire mining season, opening during the latter part of May and closing early in November.

Fantail Cut-Off.

With the close of navigation for 1898 steps were taken by the officials of the White Pass Railway to open up a winter overland trail from Log Cabin to Atlin City, preference being given to an existing trail locally known as the "Fantail Cut-Off." This route follows the valley of Otter Lake, and is practically level for the greater part of its length, rising slightly during the first 20 miles of its course. Stopping places have been provided at convenient intervals where board and lodging can be obtained at moderate prices. For the information of those travelling this trail, the following has been published by the authorities at Atlin as a matter of expediency: "Coming this way from Log Cabin the first stopping place is a hotel tent, 12 miles. This one can reach either for dinner or to stay over night. Next is the Tepee—20 miles—where Mr. Brooks is putting up a log hotel. Four miles farther is Otter Lake; at its foot—31 miles from Log Cabin—is another stopping place where meals are served and travellers taken in. From there it is three miles to the Ferry house on Taku Arm. From the Ferry house it is four miles or more to the Golden Gate, and 12 miles farther to Taku City. This is the longest stretch of all, as there is no stopping place en route. It is best to arrange for an early start and to allow a whole day from the foot of Otter Lake, or the Ferry house to Taku City. From Taku to Atlin City is a distance of 9 miles, and travellers are warned against attempting to cross either Taku Arm or Atlin Lake after nightfall or during stormy weather, unless they are in possession of compasses enabling them to take correct bearings."

Too-Chi Trail.

At this writing (February 10) it has been found necessary to abandon the Fantail route for double-sledding, owing to the uncertain strength of the ice on Otter Lake. While safe for pedestrians and light loads, single sleds or dog teams, all heavy loads of freight requiring double-teams are now being forwarded over the Too-Chi trail, which lies a few miles further to the north and offers a more favourable grade. The elevation of Log Cabin above sea level is 2,750 feet, that of Too-Chi Lake 2,320, the intervening distance of 9 miles being a gradual fall. The lake is 22 miles long, and steady northern winds sweep the solid ice free of snow during the greater part of the winter season. From the foot of Too-Chi Lake to Taku Arm the distance is 4 miles and the difference in elevation 190 feet. From this station the trail runs for 34 miles over the frozen surface of Taku Arm as far as Taku City, thence over the two-mile portage, and across Lake Atlin to the common destination. The difference in elevation between the two lake systems being but 70 feet, this forms the only rise in a distance of 51 miles. The total distance from Log Cabin to Atlin City by the Too-Chi trail is given at 85½ miles, as against 65 or 70 by the earlier route.

Juneau Trail.

In addition to the above-mentioned routes by way of Dyea and Skagway, a third trail is now being opened up from the town of Juneau, entering the district from the south by way of the Taku, Silver Salmon and Pike rivers. From the head of tide-water on the Taku Inlet—33 miles by steamer from Juneau—the trail follows the bed of the Taku River to its junction with the Kateena or Silver Salmon, a distance of 50 miles. From the mouth of the Kateena to its source, thence across a narrow divide to Pike Lake and down Pike River to its mouth, is a further estimated distance of 40 miles. The latter stream, as already stated, empties into Atlin Lake some 25 miles south of Atlin City, giving a total mileage by this route of approximately 115 miles from tide-water.

BENNETT LAKE DIVISION.

The following is gathered from the report of Mr. W. J. Rant, Gold Commissioner at Lake Bennett, the headquarters during 1898 of both Atlin and Bennett Lake Divisions, then one:—

Since the news of the discovery of the Atlin Lake gold fields reached Lake Bennett on July 31st, 1898, these mines have expanded at an extraordinary rate, owing to their ease of access from the Coast and their proximity to the Dawson trail.

The country is flat and open, has a fair supply of timber, and a delightful climate during the summer months.

The route to Atlin City from Skagway is over the White Pass and Yukon Railway to its terminus, thence by road to Log Cabin, where the Custom house is located, from which point, following the water-ways, on the ice in winter and by boat, viâ Bennett, in summer, Taku City is reached, distant from the Coast approximately 120 miles.

A short portage, over a good trail, leads to the west shore of Atlin Lake, across which, on the east shore, Atlin City is located.

Atlin City was surveyed during the summer of 1898, and laid out in lots, and has five stores and certain hotel facilities.

Gold has been discovered on the Dalton trail, and discoveries have been reported about twelve miles east of the Meade Glacier, in this Province, but to what extent is not known.

The mining receipts for the season, up to October 31st, 1898, are reported as follows:—

From Free Miners' Certificates issued	$8,020 00
" General Mining receipts	3,289 50
Total	$11,309 50

NORTHERN PORTION OF CASSIAR DISTRICT.

The following is gathered from the report of Mr. James Porter, Gold Commissioner for that portion of the District, dated at Telegraph Creek, Nov. 15th, 1898, but not received here in the ordinary course of the mail until January 14th, 1899.

The scattered settlements of the District, and the inadequate means of communication, render impossible any complete report of progress.

A good many placer and quartz locations have been recorded in outlying localities, but no confirmation of their value has been obtainable.

The District last year saw a large influx of prospectors, but, being unprepared, no proper amount of supplies was available, and could not be received until too late in the season to be of any use to prospectors in 1898, but will be consequently ready for the expected rush of 1899.

During 1898 the rush to the Klondike and Atlin drew off many of the mining community, and at the same time raised the prices of provisions and of packing to such an extent as to be prohibitory to the prospector. These conditions are not expected to prevail next season.

Some little excitement was caused late in the summer by a gold discovery on Glacier Creek, which flows into the Stickine from the south at a point six miles from Glenora. The find was made too late in the season to show what may be expected from it later.

So far nothing more than bare assessment work has been done on any of the quartz claims in the District, but in many instances very promising results have been so far obtained, and it is expected that development work will be commenced in earnest in the coming spring.

At the time of writing, the only returns as to placer gold that have been received were from Amos Everson, acting Mining Recorder at McDame's Creek, who places the known output of that Division at $10,250—an increase over last year.

The revenue from Mr. Porter's district from January 1st to October 31st—but not including receipts at McDame's Creek for October—amounted to as follows :—

From Free Miners' Certificates issued	$3,991 00
" Mining receipts general	1,588 00
Total	$5,579 00

EAST KOOTENAY DISTRICT.

FORT STEELE DIVISION.

Location.

This Division comprises the drainage area of the Kootenay River and its tributaries south of Findlay Creek, and occupies the extreme south-eastern portion of the Province. On the east it is bounded along the watershed of the Rockies by the North-West Territory of Alberta; on the south by the United States boundary line; to the west by West Kootenay, and northward by the height of land forming the watershed of the streams flowing into the Kootenay River, south of Findlay Creek. Approximately 80 miles in width and the same in length, it has a total area of between 6,000 and 7,000 square miles.

Physical Features.

The valley of the Kootenay is enclosed on either side by high peaked mountain ranges—to the east the Rockies and the Selkirks to the west. Down from these flow the tributary streams in still narrower valleys, winding along the bases of the high peaks; each valley completely walled in from its neighbour and necessitating the following of one to its junction with the main valley, thence up the next, if the traveller seeks to pass from one to the other. This is true not only of the main streams but of all the smaller creeks, it being usually impracticable to drive even a pack-horse over the dividing summit.

The valley of the Kootenay north of Fort Steele has a width between hills of from 4 to 12 miles, part bottom and part bench land. The soil, as a rule, is excellent, although the bottoms often require draining and the benches irrigating. South of Fort Steele the bench land becomes much wider and the country more rolling, forming, in places, prairies of considerable area.

The valleys of the smaller tributary streams have practically no bottom lands, the mountains sloping up from the very edges of the streams.

When traced to their sources all of these streams are found to head in basins, at an elevation of from 5,000 to 8,000 feet, nestling in the mountain peaks and usually surrounded by glaciers, from which snow slides are of constant occurrence. Here the snow lies until June, at times later, but its passing away is succeeded by the appearance of luxuriant herbage and the most brilliant of flowers. This follows so closely that it would seem as if the snowy mantle needed to be but lifted to disclose their presence beneath.

The benches of the Kootenay may be best described as park lands, great stretches of grass covered prairie, dotted here and there with straight and tall trees, chiefly Douglas fir and "Bull" pine; the total absence of underbrush being a notable feature.

Towns.

Fort Steele, the Divisional centre, is a thriving town on the banks of the Kootenay, near the mouth of St. Mary's River. Here are situated the offices of the Government Agent and of the Mining Recorder for the Division. To the miners of the district it is an important outfitting point, its many stores, good hotels, etc., making it a desirable basis of supply.

Cranbrook, a new and vigorous town which has sprung into existence since the advent of the railway, is a Divisional point on the Crow's Nest Pass branch of the Canadian Pacific Railway. Hotels, stores, bank agencies and all that go to make up a thriving town are already in running order.

The other centres of the Division have not as yet attained any important growth, but under the stimulating influence of railroad communication and the increasing development of the surrounding mining properties several townsites will undoubtedly become more or less important towns within the next few years.

Transportation.

The southern portion of the Division has this summer been crossed by the Crow's Nest branch of the Canadian Pacific Railway, giving a direct railway connection with the East through Fort McLeod in Alberta, and with the West through West Kootenay, whence other lines of communication run north and west through Revelstoke and south from Nelson and Rossland. The line followed by the railway is shown on the map accompanying this report.

A line of steamers on the Kootenay River runs regularly in summer from Fort Steele to Jennings, Mont. The period of navigation will be considerably extended when improvements in the river channel, now in progress at the instance of the Dominion Government, are completed.

Communication by stage is maintained twice weekly between Fort Steele and Windermere, thence north to Golden on the main line of the Canadian Pacific Railway; by steamer on the Columbia in summer, and by stage in winter.

Waggon Roads and Trails.

The Provincial Government has built and maintains good waggon roads along all the main valleys in the district, and from these has provided and keeps in order excellent trails. These latter follow up all the larger creeks and many of the smaller ones where the amount of mining development has justified the necessary expenditure. I found all roads and trails in excellent condition, and it would be difficult to find any part of the Division not accessible by their use.

Mineral Development.

The mineral development of the District can scarcely be said to have reached the mining stage, with the exception of the Coal Creek Collieries and the North Star and St. Eugene mines, yet it is gradually passing from the prospecting to the development stage. For some years past prospecting has been successfully carried on, and a large number of promising prospects have been recorded, more particularly in the St. Mary's River and Wild Horse districts. Some serious development work has been done on the more important of these claims, but the holders of the majority of them have been content—perhaps from necessity—to limit improvement to the amount of work prescribed by law for annual assessment work.

The advent of the railway has been looked forward to with great anticipation on the part of those interested. By some it has been the excuse for deferring development work until cheaper transportation became an accomplished fact. Now that the railway is into the District the prices asked for prospects have been advanced, often to figures which are prohibitory to capital actually seeking investment and willing to risk it on a prospect only slightly developed. Latterly, however, better counsel has prevailed, many prospects have been bonded on fair terms, and the past summer has seen a large amount of work done by the bondholders, the results of which will soon become apparent.

The following is a somewhat detailed account of the various claims visited by me between June 10th and August 15th. While the list is more or less complete, and embraces most of the claims in the Division upon which important work has been done, or which have been currently reported as promising, there remain unreported on some claims, perhaps as important, of which I did not hear till after my visit to their part of the Division. Comparatively few claims in the Division are Crown granted, and my only means of obtaining information as to the claims in a given section was by personal interview with prospectors and others.

I gladly take this opportunity to acknowledge my indebtedness to the prospectors, business men and journalists of the Division for their uniform courtesy in supplying me with all the information possible. In many instances, prospectors have left their work for a day or more to show me short cut trails, or point out where development work had been done, giving their time freely, and always offering the hospitality of their cabins with that cordiality bred of their independent life.

My travelling was entirely done on horseback, with a small pack train; the distance covered in the Division being between 800 and 900 miles.

COALS OF THE CROW'S NEST PASS.

The most important mining development in East Kootenay, if not, indeed, in the whole Province, during the past year, has been the opening up of the magnificent coal deposits of the Crow's Nest Pass; a development rendered possible by the completion of a railway giving an outlet, not only to British Columbia markets, but to those as well of the North-West Territories, and eventually to the North-Western States.

The importance of this development will be felt throughout the Province, but more particularly in the Kootenays, for on or near the Coast the Vancouver Island mines have fully supplied the demand for fuel, and can continue to do so at reasonable prices, its carriage not being subject to very heavy freight rates. The coal and coke supplies for the Kootenays, until now derived from this source also, have, however, necessarily been subject to excessive carriage charges, consequent upon a long up-grade haul and one or more inconvenient transfers. Hereafter coal from the Crow's Nest Pass can be delivered into the heart of the mining districts of East and West Kootenay without breaking bulk, delivered in cars loaded at the mine and hauled down an easy grade to all points of consumption. The ideal situation and mode of occurrence of the Crow's Nest coal further admits of its being mined and delivered on the cars at a minimum of cost.

These considerations seem to guarantee to the mines and smelters of these districts a steady supply of first-class fuel at a price very materially lower than has before been possible. Combined cheaper transportation and cheaper fuel will have the effect of so reducing the cost of treatment of ores that it will, to a large extent, necessitate a reconsideration of many of the mining propositions which have had to be temporarily abandoned on account of the present cost of treatment. In like manner, direct rail communication with the Eastern metal markets will enable products to be marketed at a considerably increased figure.

While much may be expected from these increased facilities, they will not do everything seemingly expected of them; they will not make a mine where none existed; they will only lower the line dividing loss from profit, and enable many of our low grade propositions to step over this line and become profitable producers.

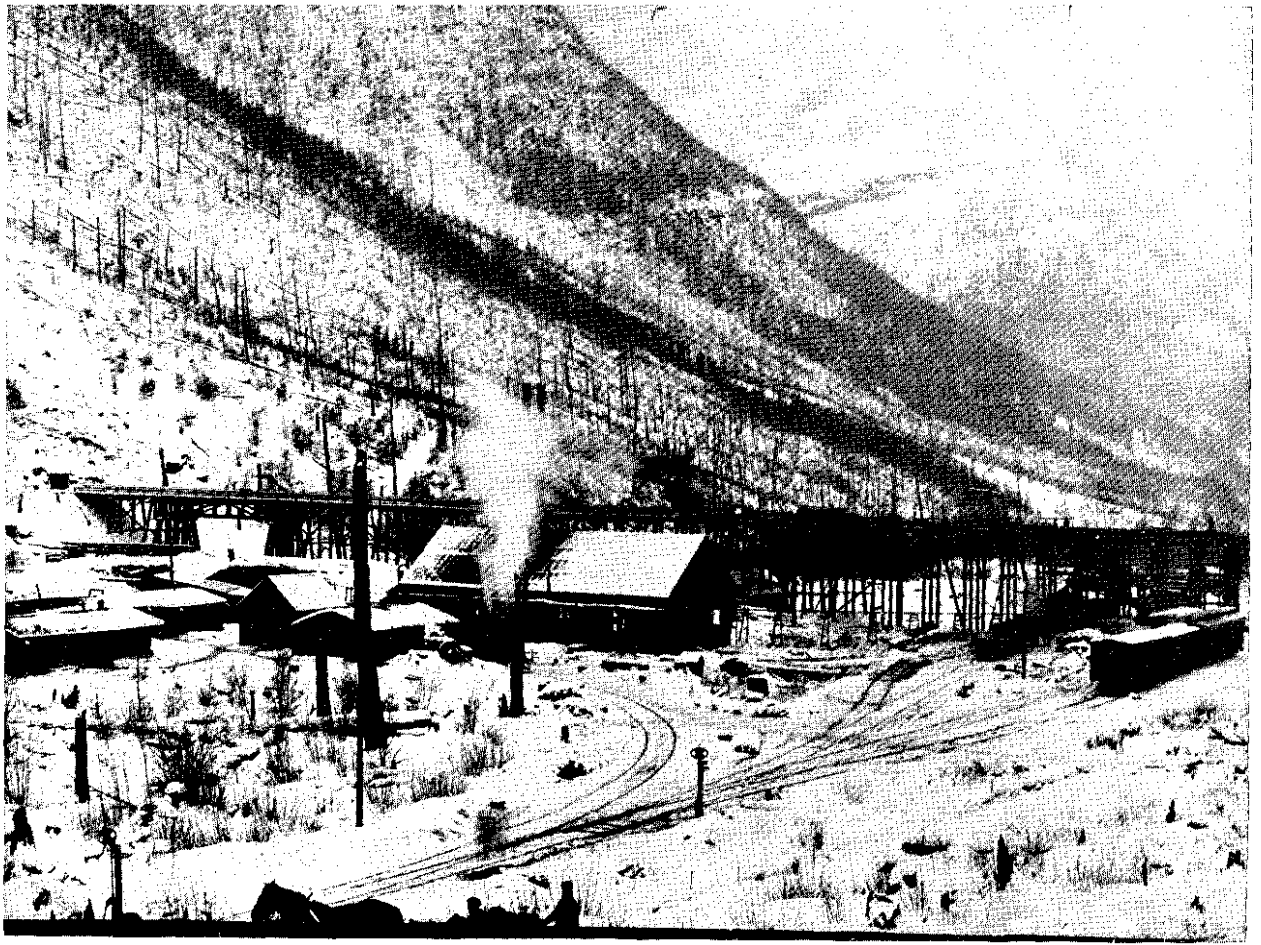
To afford some insight into the difference that will be made in this connection, I quote figures which have been given me as to cost of fuel and transportation in the past, and rates that may be expected in the future. I am indebted to Mr. F. Peters, the C. P. R. district freight agent at Nelson, for the following figures, which I understand to be retail prices:—

Freight rate, coal and coke from Coast to Nelson				$ 5 25	per ton.
" " "	Crow's Nest to Nelson			2 25	"
Price of screened coal at Nelson from Coast				10 00	"
" " "	"	Crow's Nest		5 75	"
" coke "	"	Coast		11 00	"
" " "	"	Crow's Nest		7 00	"

One of the conditions on which the grants were made to the Crow's Nest Pass Coal Co. was that "run of mine coal" should be sold at the mine for a price not to exceed $2.00 per ton, a guarantee for cheap fuel for all time.

Coal Deposits.

The coal deposits of the Crow's Nest Pass have been known to the public for some years, having been the subject of a report in 1891 by Dr. Selwyn, C. M. G., of the Dominion Geological Survey, which report was in part reproduced in the Report of this Department for 1896. Latterly, and since the railway was an assured fact, the coal area has received careful study from those interested, and careful



BRIDGE CONNECTING TUNNELS—CROW'S NEST COLLIERIES—S. E. K.

measurements made of the seams. I am indebted to Mr. Frank Smith, resident engineer and mine manager of the Crow's Nest Pass Coal Co., for information as to explorations made for his Company.

The coal seams so far known have, for practical purposes, been divided, in ascending series, into :—

1st. The Elk River Basin, bituminous..... 12 seams
2nd. Michel Creek, " ..... 7 "
3rd. " cannel coal..... 15 "

Actual work has been confined to the Elk River Basin seams, and these are the only ones I personally inspected.

Elk River Series.

This series outcrops along the mountains on the east side of Elk River, from Morrisey Creek to above Coal Creek, at a height of from 1,600 to 2,500 feet above the valley of Elk River. The beds dip to the east into the mountain at a flat angle. The other edge of the basin is said to outcrop some ten miles to the eastward and near the summit of the mountains. The measurements, etc., of this series of beds, as given to me by Mr. Smith, are as follows :—

ELK RIVER SERIES OF COAL SEAMS.

Designation of seam.	Thickness in feet.	Work done on seam.	Elevation above Elk River.	
12	4		2,500 feet.	
11	7			
10	5			
9	6			
8	4			
7	7	No. 2 tunnel, south side of valley, also exposed in gulch and face-stripped.		900 ft. sandstones, conglomerates and shales.
6	30	No. 1 tunnel, north side of valley.		
5	6			
4	3			
3	15			
2	30			
1	30		1,600 feet.	
12 seams.	147 feet—Total thickness of coal in		900 ft. vertical coal measure.	

The outcrop of this series of beds has been traced and found to cut both banks of Coal Creek, some four or five miles up from Elk River.

THE CROW'S NEST PASS COAL COMPANY.

Head office, Montreal.

President.....Col. Jas. Baker, Victoria.
Vice-President .....Senator Cox, Toronto.
Managing Director.....Wm. Hanson, Montreal.
Secretary.....J. A. Gemmill, Ottawa.
Treasurer.....E. Hanson, Montreal.
General Manager .....W. Blakemore, Fernie.
Mine Manager (certificated) .....Frank Smith, Fernie.

This company has control of and is working the Elk River seams where they outcrop on Coal Creek. A branch line of the railway has been run up from Fernie, at the C. P. R. crossing of Coal Creek, some five miles to the mines. I visited the property on June 20th, and at that time the construction was only starting, and the mines only beginning to be opened up. Work has been continued all summer, and the mines are now reported to be capable of turning out 500 tons of coal daily.

No. 1 Tunnel. No. 1 tunnel is on the north side of the valley, and has been run into the hill from the outcrop on the strike of seam No. 5. On June 20th the tunnel was in 150 feet, of which the first 130 feet was through surface wash, the last 20 only being in solid coal. Work was progressing at the rate of 12 feet per diem, and the tunnel is now reported to be in almost 1,000 feet. The coal at the distance reached at the date of my visit was clean and of good quality, though somewhat broken, being so near the surface. The seam was 6 feet thick, and practically free from shale, although there appeared to be a band of from 2 to 6 inches containing "iron-stone," which came in in the mining. This iron, however, was considered to be local as it did not show where the seam had been exposed in other places. The roof of the seam was firm and good, necessitating comparatively little timbering and giving no trouble. The tunnel was permanently timbered for a main driveway.

No. 2 Tunnel. No. 2 tunnel was driven on the south side of Coal Creek on the strike of No. 7 seam, with a slight rise as it went in, and had then been driven about 1,000 feet, but is now reported in 500 feet farther. Parallel with the main driveway, and 20 feet below it, is the drainage tunnel. Ventilation was supplied by a furnace connecting with a short shaft. The seam is 7 feet thick, free from shale of any importance, and all solid coal. Both roof and pavement are good and solid.

From this seam a winze had been sunk to the No. 6 seam, a 30-foot bed laying below, for the purpose of testing the quality of that seam at a depth. The winze had just reached the coal, on June 20th, which proved to be good, and a level driveway will be run to the west, through which the 30-foot coal will be mined.

The coal, even from the inner face of the present tunnel, was more or less fractured, as though crushed by some movement in the earth, which crushing may disappear as the levels get deeper into the hills. The effect of this fracturing is that a large percentage of screenings will be made, and that the lump coal shipped will be very friable. On this account it will not make as good an appearance on the market, or for use in open grates, as it will scarcely stand the handling, breaking into smaller lumps, although not into dust. The large percentage of screenings produced, however, will not be injurious. They can all be used for coke-making, while the fact that the coal is not in large lumps will not take from its value for steam or metallurgical purposes. The seams so far tested are of "coking coal," producing a strong, hard, bright coke.

Analyses. Analyses of both the coal and coke have been given in the Reports of this Department for 1896 and 1897, and I shall only add a couple more given me by one of the officers of the Company, as representing the product of No. 2 tunnel:

Coal.			Coke.	
Water	0.78		Water	0.45
Volatile matter	20.24	"Total fuel," 96.49.	Volatile matter	0.90
Fixed carbon	76.25		Fixed carbon	94.55
Ash	2.73	Ratio of fixed carbon to vol. comb. matter, 3.77 to 1.	Ash	4.10
	100.00			100.00
Sulphur	0.79		Sulphur	0.72

A further analysis from the same authority:—

Water	0.58		
Volatile matter	24.42	"Total fuel" = 96.92.	
Fixed carbon	72.50	Ratio of fixed carbon to vol. comb. matter	2.96 to 1.
Ash	2.50		
	100.00		

Sulphur—Not determined.

I have obtained a strictly commercial sample, taken by an expert sampler, of one of the first of the regular "run of mine" coal shipments, on which sample the Provincial Assayer makes me the following return:—

Water	1.80		
Volatile matter	18.70	"Total fuel" = 90.78.	
Fixed carbon	72.08	Ratio of fixed carbon to vol. comb. matter	3.85 to 1.
Ash	6.70		
Sulphur	0.72		
	100.00		

The above analysis, on a commercial sample, representing as it does coal taken from comparatively near the surface and from a shipment made before the colliery was in regular working order, must certainly be considered as very good. It cannot but be so considered by practical men, who know what the difference is between a commercial sample and those usually taken for analyses.

In reply to an inquiry addressed to the Superintendent of one of our largest smelters as to the working quality of the Crow's Nest coke, I have a reply in which he states: "With the Crow's Nest coke I find I can accomplish as much with 135 lbs. as I could with 150 lbs. of the other cokes I have used."

From the analyses given it will be seen that the percentage of ash is remarkably low, and the "total fuel" correspondingly high. In the Elk River Series the ratio of fixed carbon to volatile combustible matter is very high, indicating a coal which, in composition, as compared with the usual bituminous coals, approaches nearer to the semi-bituminous and semi-anthracite, although it must still be classed as a "bituminous coal." Compared with the ordinary bituminous coals, for example, the coal from the Coal Creek Collieries does not have as great a quantity of "volatile combustible matter," viz.: constituents which can be distilled

over as gas, but the carbon is there in an increased proportion as "fixed carbon," which might be otherwise described as coke, and which cannot be drawn off as gas under the ordinary conditions of use. A coal of this description will not be so "smoky" as ordinary bituminous coal, but will burn with a brighter and more local flame. It will also produce a greater percentage of coke and a smaller percentage of gas, and consequently will be more valuable for the former and less valuable for the latter purpose, while for domestic use there will be less "soot" sent over and the fire will burn hotter in the fire-box, making less flame.

The following table of laboratory analyses, taken from an article read before the American Institute of Mining Engineers in 1885 by Mr. W. Routledge, manager of the Reserve Colliery, Cape Breton, and used by him as a table of comparison of the various well known bituminous coal districts of the world, will be found interesting, and it will be seen that "Crow's Nest Coal" stands very favourably in the light of comparison. The last column "Total Fuel" or "Total Combustible Matter," I have added to Mr. Routledge's table, and, as will be seen, it is simply the addition of the vol. comb. matter and fixed carbon. It will be noted that Mr. Routledge includes hygroscopic water under the head of "Volatile Matter":

Locality.	Country.	Volatile Matter.	Fixed Carbon.	Ash.	Total Fuel.
Pennsylvania	U. S. A.	29.50	64.40	6.10	93.90
Virginia	"	33.68	57.76	8.56	91.44
Indiana	"	39.00	52.00	9.00	91.00
Illinois	"	36.59	59.47	3.94	96.06
Iowa	"	44.00	48.50	7.50	92.50
Missouri	"	34.06	50.81	15.13	84.87
Newcastle	England	37.60	57.00	5.40	94.60
Staffordshire	"	37.86	59.64	2.50	97.50
Derbyshire	"	35.10	61.65	3.25	96.75
Yorkshire	"	35.67	62.08	2.25	97.75
North Wales	Wales	36.56	57.49	6.25	93.75
Pictou	Nova Scotia	29.63	56.98	13.39	86.61
Sydney	Cape Breton	34.07	61.43	4 50	95.50

Crow's Nest Coal, taken on same basis as above.

No. 2 Tunnel—Coal Creek	21.02	76.25	2.73	97.27
"	25.00	72.50	2.50	97.50
Peter Seam—Martin's Creek	34.70	58.30	7.00	93 00
Jubilee Seam, "	31.70	68.30	4.20	95.80

Cannel Coals. The cannel coals, mentioned as occurring on Michel Creek, as their characterization would imply, contain a much larger proportion of volatile combustible matter, and a smaller proportion of fixed carbon. These will have their use principally for gas manufacture and for the somewhat ornamental open grate fires, as they light easily and burn with much flame. The "volatile matter" is said to be about 57 per cent. in these coals.

These beds have not, as yet, been rendered available, as they are not within reach of railway connection and, consequently, have been opened up only by prospecting workings.

Later Development. From the Government Inspector of Mines, who visited the collieries in November, I learn that since my visit in June the company have connected the No. 1 and No. 2 tunnels, on the opposite sides of the valley, by a 1,000-foot bridge, near the centre of which very complete shaking screens have

been placed, while underneath is ample track accommodation for a large output. Large and handsomely finished offices were built at the mines which, unfortunately, were destroyed by fire later, but they will be replaced promptly. The company's buildings at Fernie were destroyed by fire on the same night.

The mine is equipped with end dumping cars, each having a capacity of 2,240 pounds of coal, and it is the intention of the company to institute a system of electric haulage and electric lighting. Some 15 drop-bottom, 30-ton railway cars were on the sidings for use in transporting coal to the coke ovens at Fernie. Two Murphy fans have been ordered and will be erected as soon as received. Gas has shown itself in the workings, but not in any quantity as yet, and ample provision has been made for ventilation.

Fernie.

At Fernie 30 Beehive coke ovens have been built and are now in operation, with bricks on hand for as many more. It is the intention of the company to erect, in the immediate future, some 200 ovens in all.

It is expected that all the employees will live at or near Fernie, as there is no room for houses at the mines, the valley being deep and narrow, and bounded by steep hills, so steep that in winter the sun seldom strikes down into the valley. Trains on the branch line will carry the workmen to and from work.

It is hard to conceive that any coal deposits could be located more advantageously for cheap and economical working than are the Coal Creek seams.

The working driveways, entering from either side of a narrow valley, at an elevation of some 400 to 500 feet above the level of Elk River, run in practically level, and can be so continued for miles. Above the drainage level of these tunnels the coal extends to the rise, at an angle of almost 20°, for a vertical height of 1,200 feet or more. Each of the driveways will probably be used as an outlet for two or more seams. Timber is plentiful in the immediate neighbourhood for all mine purposes, and Coal Creek is capable of supplying any water power which might be needed for the colliery's use. The estimated cost of production, as appears in the company's prospectus, of $1.25 per ton, for "run of mine" coal on cars at the mine can certainly be realized.

The amount of coal available in the Coal Creek mines is so great that it will be more than sufficient for a long time to come. I have made no personal estimate of the quantity, but quote from Mr. Smith's report, in which he estimates that the Elk River basin alone has an available tonnage of 16,443,900,000 tons in the twelve seams.

KIKOMUN CREEK.

Burton Mineral Claim.

Title, location. Owner, George Watson, Fort Steele. This claim is situated on the western slope of the Rockies, near the B. C. outlet of the Crow's Nest Pass, and about two miles from the town of Elko, at the Elk River crossing of the railway. The trail from Elko passes along the comparatively level valley of the Kootenay to the mine cabin, situated at the base of the mountain, which here rises at an angle of about 30°. The present workings are from 800 to 1,000 feet above the level of the valley.

The rock formation consists of light grey shales, dipping into the hill to the N.E. at an angle of about 43°, the outcrop being nearly horizontal, and the strike S. 60° E. These shales form the principal part of this face of the mountain. Overlaying them, conformably, is an

"iron band" of some 18 inches, chiefly iron oxides, and above this and forming the top of the mountain are the dolomitic limestones of the Rockies.

The vein appears to be a true fissure quartz vein, of from 5 to 6 feet in width, dipping 78° to N.W. with strike about N. 30° E., and having free walls with marked gouge. The ledge is very porous, and near the mouth of the tunnel is heavily charged with lime. The lead is traceable up the hill, from the tunnel, some 200 feet vertically to the contact with the limestone, when it seems to "dip under." The ore consists of copper carbonates and oxides with rich copper sulphides in places, and occurs in stringers and pockets through the quartz.

Development.

At an elevation of 4,025 feet (about 800 feet above the valley) a tunnel of some 100 feet has been driven in on the vein, from which has been taken some very good ore, chiefly copper carbonates and oxides. Sample from ore pile on dump gave 28.8% copper and traces of silver and gold. At the face of the tunnel there was a very fair sized pocket of ore making into the hanging wall, which had not been sounded as to depth. An average across the face of tunnel gave me an assay of 3% copper, traces of silver and gold. Further up the hill and, on the outcrop of the vein, are two open cuts, respectively 75 and 85 feet above the tunnel and some 5 to 8 feet deep. In these cuts a good exposure of ore has been made, chiefly copper carbonates. In the upper cut there is also a pay streak some 6 to 8 inches wide of rich copper sulphides, apparently extending across the ledge and dipping in the vein with the strata. A sample of this richer portion, taken right across, gave me an assay 33.12% copper, no gold or silver.

The property is a straight copper proposition, with little or no silver or gold values. At the time of my visit, June 18, the property was not being worked, but was under bonds to parties in Spokane who, I have since heard, have been developing it seriously this summer, but with what result I have been unable to learn.

SHEEP MOUNTAIN.

Sheep Mountain is situated at the fork between Elk and Kootenay rivers, about a mile south of the town of Elko. It is a low, rounded mountain, almost entirely covered with wash and earth, sparsely wooded with large trees and covered with luxuriant herbage, which provides splendid feed for cattle and horses, but renders prospecting slow and expensive owing to the few exposures. Quite a number of locations have here been made, however, but few of which have had much more than one or two years' assessment work done on them as yet.

The whole hill seems to be more or less mineralized, with small stringers of quartz carrying copper and silver; quite enough to induce prospecting, but not enough, so far as developed, to guarantee working. The facilities for cheap work are here great,—proximity to the railway, ease of access, easy grades, good timber, and a water-power at Elko, on the Elk River, more than sufficient for any demand for power for either mining or industrial purposes. The Elk River, which in the spring is a wild and uncontrollable torrent, keeps up a good flow of water through the whole summer, being fed from the snow-capped Rockies, which part with their snow very gradually. At Elko the river plunges through a gorge with perpendicular walls of hard quartzsite, dropping, by a succession of small falls, a height of about 200 feet in a distance of about half a mile, and offering unexcelled opportunity for the cheap installation of a large power plant.

The country rocks, where exposed, seem to be quartzites, calcareous sandstones, and mica shales, with occasional outcropping of gneiss, the whole cut here and there by igneous dykes.

Ramshorn Mineral Claim. Title, location. Owned in Fort Steele. Elevation, 3,200 feet. There are several small cuts on the surface, not attaining any depth, however. In one of these there is shown up a fairly well-defined quartz vein some 20 inches wide; strike S. 35° W., and dip nearly vertical. The quartz proper shows very slight mineralization, principally blue carbonate copper and some copper pyrites. There is a gouge to S.E. side of vein of some 2 inches of soft talcose matter, which is, in places, heavily charged with carbonates and oxides of copper and traces of rich sulphides of copper. Development is slight and superficial, and the amount of mineral shown up by it is not important.

Jennie Mineral Claim. Title, location. Owner, Thos. Flowers or C. Stephenson, Elko P.O. Elevation, 3,300 feet. This claim is situated one-half mile from the mouth of the South Fork of Elk River. Development consists of a tunnel 8 feet into the hillside, with, 25 feet further up the hill, a pit of some 10 feet in depth; both in what appears to be the bedding plane in the country rock, into which a small quantity of quartz has infiltrated. It carries small quantities of copper pyrites in little stringers.

Sweet May Mineral Claim. Owner, Frank Sheriff. Lies next to the above claim, further down hill and to the south. Development here is also very superficial, consisting of little more than surface cuts. In one is exposed a fair-sized quartz vein, with small quantities of grey copper, cutting a bed of quartzite some 30 feet, but seeming to end where it meets a mass of gneiss. In another cut there is exposed a 30-inch lead of grey and white quartz, lying, apparently, between quartzite and gneiss, with about a 2-inch cropping of copper pyrites, said to assay: copper, 26%; silver, trace; gold, $2.

SAND CREEK.

Bishop Group. Owners, Bishop Bros., Wardner P. O. Elevation, 3,000 feet. Situated about half-a-mile up Sand Creek from the C. P. R. crossing and the town of Cranston. The claims in this group are the *Jessie*, *Margaret*, *Little Roy*, *Dottie* and *Rob Roy*. Development has all been confined to the two first mentioned claims. The country rock consists of hard stratified shales and slates, with a dip S. 20° W. < 33°.

At the time of my visit, June 23rd, the development consisted of:

1. A lower tunnel started near the creek bottom, cutting into the steep hillside, N. 80° E. for 50 feet, where a turn was made to the right (S. 65° E.) and continued for 20 feet, with work still continuing. This tunnel was being run with the intention of cutting two or three quartz veins, which had been exposed in the upper tunnel, some 200 feet vertically higher up the hill and further to the south. The owners calculated from the dip and strike of these veins that the lower tunnel would cut them, but so far the attempt had been unsuccessful and the work only showed slight mineralization, chiefly iron pyrites.

2. An upper tunnel driven in near discovery point, N. 85° E., for 55 feet, then S. 55° E. for 25 feet. Near the mouth of this tunnel a quartz vein of some 15 to 18 inches was cut at an angle having a strike about S. 45° E. Again, at about 50 feet in a similar vein was cut, and in the face of the tunnel, to the left hand side, another seemingly similar vein was exposed, all three being nearly parallel as to strike and dip.

These quartz leads cut the formation and are fairly strong, but seem to be frozen to the country rock. They might be expected to continue to the level of the lower tunnel, but from

what rough calculations I was able to make at the time, I was of the opinion that the lower tunnel had been driven too far up stream to catch them, even if they did continue. There is little chance of following the leads on the surface, as it is covered with heavy rockslide and earth. The driving of the lower tunnel was attempted on very insufficient data obtained in the upper tunnel. As exposed in the upper tunnel these quartz leads contained copper carbonates and sulphides, with some iron sulphides, and occasionally galena; but not in any appreciable quantities.

Empire Mineral Claim.

Title, location. Owners on record, A. R. Macdonell, F. A. Godsall *et al.* Locally known as *Major Steele's* claim. Full claim, 1,500 by 1,500 feet, not yet surveyed. Situated near the summit of the mountain, about 6 miles N. W. from Cranston Station, and about 1,600 to 1,700 feet above the level of the railway.

This claim is reached from Cranston by a good pack trail, fairly level for the first four miles and rising rapidly for the last two miles, approaching the claim from the north on the easy slope of the mountain. To reach the actual workings, however, one has to go around the very steep south face of the mountain for some 100 yards on a trail existing more in name than in reality, with nothing but a very insecure foothold on the upturned edges of outcropping shales to save one from a rather sudden drop of some hundreds of feet.

The country rock seems to be chiefly shales of a dark gray colour, locally much altered and distorted, and in the immediate vicinity of the vein much crushed. The general strike of the rocks would seem to be about S. 45° E., and the dip about 45° into the hill to N.W. The claim extends down the very steep hillside from No. 1 stake, situated near the summit of the mountain at an elevation of about 4,800 feet, to No. 2 stake, at an elevation some 500 feet lower.

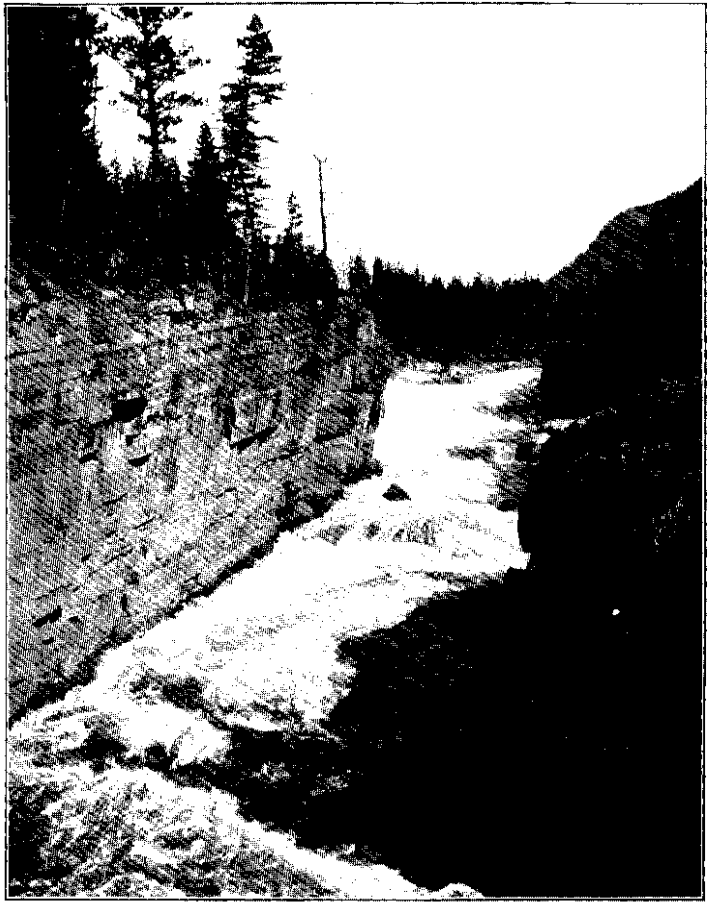
The most important development work has been done at an elevation of about 4,650 feet, and consists of an open 8-foot cut, leading to a tunnel which has been driven in 10 feet; both on the lead. This has cut through a so-called "iron capping," which occurs on the surface at this point, having a depth of some 2 to 3 feet, and a width of about 30 to 40 feet, laying conformable to slope of hill. Underlaying this capping and cutting the formation a quartz vein has been exposed in the tunnel, about 24 inches in width, dipping nearly vertical and running into the hill. The quartz carries copper pyrites, occurring in small stringers and pockets, but so far as exposed, not in very great quantity. A very rough sample across the face of the tunnel gave me, copper, 4.60 %, and silver, 2.25 oz. The iron capping, from samples taken by me, contains no values.

About 150 feet vertically below, or at an elevation of 4,500 feet, there is an "open cut," and a certain amount of work done exposing iron capping—here about 25 to 30 feet wide, and about 3 feet thick—showing underneath it the quartz vein similar, though somewhat narrower than in the tunnel above. Still further down the hill some 150 feet vertically, and near the No. 2 stake, the capping has again been exposed but not cut through.

Although at least five yearly assessments have been recorded on this property, the work has been so done as to show very little, and the property must be classed as unproven.

Blue Grouse Mineral Claim.

Owners, Langley Bros., Fort Steele. Elevation, 4,300 feet. This location is an extension of the *Empire*, extending from No. 2 stake down the hill and to the westward, and is a full claim, 1,500 by 1,500 feet. The conditions which prevail in the *Empire* probably continue through this claim. The "iron capping" before mentioned, the general trend of which seems to be about N. 85° W., mag., has been exposed in three or four open cuts, and is practically the same in



ELK RIVER—NEAR TOWN OF ELKO—S. E. KOOTENAY.

SAND CREEK—S. E. KOOTENAY.

character as higher up the hill, although not showing up quite as wide, being probably here not over 15 feet. The quartz vein is again exposed, and is almost the same as above, carrying copper and iron pyrites in stringers.

The development work done has been so spread out that little beyond proving the existence of the vein has been accomplished, and no positive knowledge of value, even in prospective, could be obtained.

Other Claims Have been located in extension of the Blue Grouse, but from the best information obtainable have little or no development to show. As the travelling was extremely difficult and somewhat dangerous, I did not visit them.

Mountain Mineral Claim and West Extension of same. Title, location. Owner, Alex. McBean *et al*, Wardner P.O. Elevation, 2,950 feet. These claims are situated on a small hill rising out of the plain and separated from the main range of mountains, and are about 3 or 4 miles to the westward of Sand Creek and about 5 miles S. 60° W. from the *Empire* mineral claim. A fair waggon road from the property connects with the main government road which runs from Fort Steele to Elko.

The country rock is composed of slates and shales, laying comparatively regular and little disturbed, dipping S. 15° W. at angle 15°. Somewhat above the present workings there is what appears to be an igneous dyke, some 14 feet wide, across the measures and running N. 20° E. So far as I could see, however, this had no connection with the mineralization as exposed in the workings, nor had it caused any mineralization in its neighbourhood. There does not appear to be any regularly defined vein on these claims, but there are lines of fissure filled with alternating bands of quartz and slate, the bands being a few inches wide, amounting in the aggregate to some 5 or 6 feet. The lower tunnel follows one of the banded leads for some 50 feet in direction N. 65° E. In it was obtained some very fair ore, copper pyrites, with some carbonates; and the amount found seems to have been fully as great near the surface as farther in. The ore is in stringers, which, taken together, across the exposure in the tunnel, would aggregate somewhere about 4 or 5 inches of solid ore. There are on this same lead two pits showing up almost the same condition of affairs. In three additional open cuts two other leads of a similar nature are exposed, not so heavily mineralized; but all leads more or less parallel.

There was quite a fair "surface showing," but, so far, it does not seem to have improved with such depth as has been reached in the tunnel, some 20 feet vertically.

Waterfall Mineral Claim. Title, Location. Owners on record, Langley Bros. *et al*, Fort Steele. Reported to be now held by Robert Dempsey and John Grassick. Situated on the main mountain range, some five miles west of Sand Creek, at an elevation of 3,900 feet, or about 1,000 feet above level of plain. Trail leading to it, from the waggon road at *Mountain* mineral claim, is fairly good until it reaches the foot of the hill, after which it is practically impassable for horses, being a zig-zag over a shifting rock slide.

The country rock is composed of greyish shales and slates, dipping N. 30° E. at angle from 28° to 38°. There is an open cut of some 5 to 10 feet leading to a tunnel of almost the same length, following a quartz vein of from 12 to 15 inches wide, which runs N. 25° W., cutting the formation. The dip of the strata on right of tunnel is 38°, on left 28°, the change in dip causing a fissure, which dips nearly vertical as it cuts each layer of shale, shifting a few inches to the right on each bedding plane. This produces the effect of a stepped fissure

with a general dip of about 80°. It stops and is cut off at the roof of the tunnel by a "slate capping," which does not appear to have been broken.

The fissure is filled with white quartz containing pockets of copper pyrites and galena, with some iron pyrites, giving samples of 6 and even 12 inches in diameter of clean ore, but not as yet in quantity. The vein is exposed in the floor and face of tunnel, but I could not trace it on the hillside below.

BULL RIVER.

Bull River flows in a southerly direction from the Rockies, and empties into the Kootenay River, near Wardner. Quite an amount of work has been done in this section within the last few years, and numbers of claims recorded, chiefly in the vicinity of the bridge on the old pack trail, where the latter crosses the river at the canyon, a few miles above its mouth.

Placers.

The "Old Pack Bridge" was a centre of activity on Bull River in the "early sixties," when the discovery of gold placers, a mile above and below the bridge, made the river famous, and returned small fortunes to many prospectors. The records as to the amount of gold taken out are rather meagre and incomplete, but old timers' estimates place the figures quite high. There is, indeed, no doubt but that a large amount of gold was washed from the river bed; that it was very coarse and of good quality, and that pay-dirt was confined to a very limited stretch of the river on either side of the bridge, that is to say, just above and just below the canyon.

Bull River is at all times a good-sized stream, swift and broad, until it enters the canyon, where it is confined to a width of not exceeding thirty feet by perpendicular walls of quartzites and slates. Through this gorge, in a distance of a mile, the river drops two or three hundred feet in a succession of falls and rapids. Above the bridge the rocky banks are only a few feet above the level of the water. Here the river rushes along, lashed into foam, as two sharp right angled turns obstruct its passage. Straightening itself on its course it makes a wild dash at the bridge as though to sweep it away, but when within a distance of twenty feet it drops suddenly out of sight over a sheer fall of some 80 feet, sending up a cloud of spray in which is hung a most brilliant rainbow, seeming to act as an arch for the narrow bridge spanning the canyon. Below, the river plunges on for some three-quarters of a mile between walls of ever-increasing height till, finally, the gorge is 200 feet in depth, yet scarcely one-half that distance in its upper width. Suddenly the canyon widens into a valley with sloping sides wooded to the water's edge, through which the river now peacefully winds, scarcely recognizable as the mad torrent met with but a few yards further up. The canyon of Bull River, with the unbroken forest to the very edge of its perpendicular cliffs, forms one of the most beautiful bits of scenery in East Kootenay, and it is appropriate that nature should have set it in its golden frame.

Where the gold came from that lay immediately above and below, is a still unsolved mystery. "Pay" extended but a short distance above the canyon and stopped abruptly. The hills on either side have been prospected most thoroughly, yet no gold quartz has as yet been found. Two large igneous dykes, to be later referred to, cut across the river and valley, but there appears to be nothing in them to account for the gold found in the river, particularly in such a coarse state, for but little fine gold was in evidence.

The life of the Bull River placers was a merry one and proportionately short, lasting but a few years. Various attempts have been made in later years to find further placer ground on the river, but without any decided success. Almost every year a small quantity of gold is

taken out by miners who still have faith that the river has not been washed out, and it would seem reasonable to hope that their efforts may be rewarded by new finds.

Geology. The country rock is composed hereabouts of alternating beds of hard dark slates and quartzites. Near the head of the canyon the slates are much distorted and folded, although not much broken; while in the canyon and above it the formation is more or less regular. There appear to be few, if any, quartz veins cutting the slates, and certainly none have been found carrying free gold. About a mile above the canyon, cutting across the river, are two large igneous dykes, parallel and some few hundred feet apart, running N. 65° E. Where exposed in a tunnel they have a dip of 65° to N. 25° W., the country rock dipping 17° to N. 25° E. These dykes have been traced from the summit of the mountain to the east of Bull River, across the river and continuing, seemingly without interruption, to Burnt Bridge Creek. On the most southerly of these dykes there have been quite a number of claims recorded, and on them more or less work has been done.

MINERAL CLAIMS.

Bull River Group. Consisting of the following claims, *Twilight*, *Cuckoo* and *Molly Bawn*, owned by Geo. Watson, Fort Steele; Geo. Huggarth, Elko; and Jay Usher, Fort Steele. Situated on the east side of Bull River, about one mile above the old pack bridge, and reached by the old placer pack trail.

The country rock is composed of shales and quartzites dipping N. 25° E. at an angle of 17 degrees. The measures are cut by the two large igneous dykes, probably porphery, some 400 or 500 feet apart, parallel and in a general east and west direction, dipping nearly vertical.

Twilight mineral claim has been located on the line of the south dyke where it crosses the river, and the claim lies about half on each side of the stream, extending up the slopes. Development is confined to the eastern slope. In addition to certain surface exposures, there have been two tunnels started—the first or lower tunnel near the river level (elevation, 2,600 feet) driven some 30 feet, and the second a little farther up the hill driven about 20 feet. Both tunnels were on the dyke, nearly in its centre, and ran with it. In each there were observable signs of slight mineralization, chiefly galena, but, so far as I could see, not showing up in any quantity.

The *Cuckoo* mineral claim is an extension of the former claim to the north-east, and higher up the hill on the same dyke. Here a 50-foot tunnel has been run in on the dyke N. 65° E., started on a surface showing of apparently some 12 to 15 inches of mixed sulphides—galena with copper and iron pyrites, which I am told assayed 6% copper, 64 oz. silver, and $12.00 in gold. Such mineralization as may have been near the surface, however, does not appear to have lasted, for the face of the tunnel is now in solid dyke matter with little, if any, showing of mineral.

The *Molly Bawn* mineral claim lies still further to the north-east and up the hill from the last named claim, and is located on the same dyke. Here a cross-cut tunnel of some ten feet in length has been driven into the dyke from a surface exposure, but so far has shown up nothing of value.

At no point on these claims has any attempt been made to determine whether the line of contact between dyke and country rock is mineralized.

To the westward of the river there has been a succession of locations made on the line of the dyke, which is distinctly marked, and forms the crest of a line of foothills running nearly parallel to the main range. These claims extend over the height of land into the water-shed of Burnt Bridge Creek and, as far as I was able to trace them over the wooded hillside, they are on the same dyke as noted on the eastern side of the river. None of the claims were being worked at the time of my visit, June 27th, and it is quite possible I may have missed some of the developments.

Lying directly to the south-west of the *Twilight* mineral claim are a couple of claims, the names of which I could not obtain, the notices on the stakes being indistinct.

To the south-west of these again we have in succession the *Mabel* and *Chickamon Stone*, and over the ridge on Burnt Bridge Creek are the *Daisy Fraction*, *Silver Chief*, *Silver Reef*, *Silver Buckeye* and a number more which, as yet, are nothing more than locations with little or no work done on them that I could find.

Mabel Mineral Claim.

Owners, Johnson and Roberson, of Fort Steele; situated on west side of Bull River. The dyke at this point seems to be nearly vertical, and to have swung around somewhat to the right, A quartz ledge crosses it, but does not seem to have cut the country rock. There is a small open cut on the dyke in which there is a small quantity of copper pyrites showing, but not in quantity as yet. The dyke matter is said to carry gold in places, but not to any high values, and development is such as to really show up nothing as regards the property.

Chickamon Stone Mineral Claim.

A south-west extension of the *Mabel*, and belonging to the same owners. At an elevation of some 3,600 feet there is an open cut of some 10 feet cross-cutting the dyke. At the end of this cut, in the sidehill, a shaft has been sunk about 10 feet deep, which was filled with water at the time of my visit. In a second open cut, some few feet above the shaft, there is a 10-inch quartz vein which, from the surface, would appear to be dipping right into the shaft, but such examination as I was able to make of the shaft failed to show that the vein continued. This small vein contained copper ore, as carbonates and sulphides, of good quality as far as they went, but the vein did not appear to continue. Some 400 feet south-west from the shaft and 100 feet higher up a small amount of work has also been done stripping the surface. This has exposed a larger and more permanent quartz lead, running with and in the dyke, and also another lead of some 12 inches cutting across the dyke. In both of these the quartz shows patches of galena, but nothing permanent. Still further to the south-west, and near the discovery post, there is another small shaft, about 6 feet deep, sunk on the dyke, and showing small quantities of galena in iron oxides.

BURNT BRIDGE CREEK.

The claims located on this creek, so far as I could find, seem to be all on the extension of the dyke which crosses over from the Bull River Valley, and are practically a continuation of the claims of that District.

Daisy Fraction.

Held by Thos. Bevans, of Little Bull River. Elevation, 3,700 feet. There are on this property some half-dozen small pits and cuts from 4 to 6 feet deep, exposing what appears to be a fairly well-defined quartz vein, some 8 to 12 inches wide, carrying small quantities of galena. The development is unsatisfactory, and proves nothing.

Silver Chief Group.

Still to the south-west, on the line of the dyke, there is a group of three claims, *Silver Reef*, *Silver Chief* and *Silver Buckeye*, held by Dave Griffith, of Wild Horse Creek, Fort Steele. They are at an elevation of about 3,600 feet, and the assessment work has been done on these claims as a group.

No work has been done on the first named claim, which lies in between the Daisy and the next mentioned. Towards the north-east end of the Silver Chief the dyke has been exposed by a shallow open cut, in which a pit, some 6 feet deep, has been sunk. The cut shows a deposit of iron, some 2 feet thick, which has the appearance of being an "iron capping," and which lies over an exposed quartz vein very similar to that in the other claims, except that it carries a greater proportion of iron. On the Silver Buckeye, an extension of the Silver Chief, a cross-cut tunnel has been driven 100 feet into the dyke. About ten feet from its mouth there is a layer of iron oxide, perhaps 2 feet thick, apparently laying on the face of the dyke. From this point the tunnel penetrates solid dyke matter, not mineralized, until just at the face a quartz vein was cut 10 inches wide, which carries some iron sulphides. About 150 feet to the south-west of the tunnel there is a shaft 15 feet deep, which was filled with water, and which I could not consequently examine. The dump, however, showed indications that an iron oxide capping had been cut, but I could not find anything in sight of value.

DIBBLE BASIN.

Dibble Group.

Made up of the following claims: *Richmond Hill*, *Last Chance*, *Last Chance Extension* and *Beaver*, *General* and *Foster Fractions*. Owners, Geo. E. Foster, of Ottawa, and C. M. Keep, of Fort Steele. Superintendent, B. Hodge, Fort Steele.

These claims are situated in the Dibble Basin, at the head of Lost Creek, a small creek flowing S.W. from the Rockies down into the valley of the Kootenay River, where it disappears underground at a point 5 or 6 miles below Fort Steele, near "Norbray's Ranch." The property is reached from Fort Steele by a good Government waggon road to Johnson's Cabin, some six miles; thence, a good but very steep trail, some four miles in length, runs up the narrow canyon of Lost Creek; rising from an elevation of 2,700 feet at the waggon road to 6,200 at the mine.

Considerable work has been done on this property, consisting of one tunnel, 500 feet, a second tunnel of 175 feet, an open cut 150 feet long and 5 feet deep on the lead, and a shaft 44 feet deep, with a drift of 14 feet, in addition to other short tunnels and open cuts. There does not seem to be any "true" vein on the claims, but for a considerable distance on the surface an irregular quartz lead has been exposed, carrying copper, with gold and silver, in stringers and pockets.

This lead has been opened at the end by a tunnel and the lead stoped to surface, a height of some 30 feet. From these workings a considerable quantity of ore was taken, which was sacked and part of it "rawhided" down the trail to the waggon road, where it was stored. The remainder was piled up near the mine. Of too low a grade to admit of shipping, the Superintendent, at the time of my visit, was engaged in re-sorting it, and was apparently rejecting a large proportion of the pile. This is the main lead showing on the property and on which the most work had been done. The strike, in general direction, would appear at the surface to be S. 65° W., while the dip at the same point is nearly vertical. Whether this

strike and dip continue is uncertain; the 500 feet tunnel was run to cut the lead at a lower depth, but failed to do so.

In the shaft, which is east of the main workings, a body of high grade copper ore, gray copper with silver and gold, was found, from which a small amount of ore was taken. I am told a trial shipment was made of ore from this point which yielded a fair profit. At the time of my visit the shaft was full of water and I could not make a personal examination. The development which has been made on this part of the property has not, however, been sufficient to prove any continuous ore body.

The property was being worked by a Superintendent and six men, who were principally engaged in development work. Wages paid miners were $3.50 a day, less $1.00 for board. There are a couple of suitable log cabins on the property in good condition.

MAUS CREEK.

Nickel Crown Mineral Claim.

Owners, Robert Duer and Charles Chapman, Fort Steele. Situated about 8 miles east of Fort Steele, at an elevation of some 4,700 feet, and reached by a trail, at present not very good but capable of improvement should development warrant.

The country rock is composed of shales and slates, with quartzites, all considerably distorted and dipping approximately N. 30° W. I could not see that there was any regular vein on the property, but there was in evidence a zone or band of quartz, mixed with slate, which was all more or less charged with iron sulphides. The lead is said to have assayed about $4.00 in gold. I took a rough sample across the face as then exposed, but my assay did not show any such gold values, and gave only a small amount in silver. The development work is slight, and consists in an open cut of some 10 feet on the exposed lead.

PALMER BAR.

Eva Mineral Claim.

A location, situate between Palmer Bar Creek and Cranbrook. Owners, Watt and Campbell. Elevation, 3,300 feet.

The country rock is a very dark igneous rock, very much broken and distorted. The formation is as if the whole hillside was one great slide from the mountain and not in place. Yet through these rocks there are several quartz veins which were probably true fissures. Two such veins are exposed for a short distance, the first 12 to 15 inches wide and the second from 8 to 10 inches, with strike N. 24° W. and dip 80° to W. Quite a quantity of blue copper stain appears on the quartz, but little more, so far as I could see. The only work I could find done consisted in an open cut of some 4 or 5 feet on the first vein. As near as I could make out this claim is a re-location of the *Time Check* mineral claim, and the same posts have been used.

Paymaster Mineral Claim.

Situated about 400 feet west of the *Eva*, on the same range of hills. In an open cut a quartz vein has been exposed, 30 inches wide, running north and south and dipping vertically. It appears to cut off some 10 feet above the present cut. The vein carries copper pyrites, but not in quantity.

Daisy Mineral Claim.

Location. Owners, Ben Pugh and Wm. Ross, Fort Steele. Elevation, 3,500 feet. Situated near Palmer Bar, half a mile from the C. P. Railway tote road.

There is here exposed in an open cut some 6 or 8 feet deep, a small quartz lead 3 inches in width, cutting irregularly through syenite in a general S. 60° E. direction. Just in the cut there are signs of a local disturbance which has increased the size of a fissure and 10 inches of calcite has been deposited on the side of the quartz. This, however, is very local. I could find, in place, only a few patches of copper pyrites, while on the dump I saw a couple of pieces of rock, probably from the lead, carrying a little galena.

LITTLE NIGGER CREEK.

Pay-Roll Group.

Made up of *Pay-Roll* and *Paymaster* mineral claims, both locations, and owned by Vandecar, Lattin, Quain and Smith, of Fort Steele. Reached by a fair trail from Palmer Bar, a distance of some 6 miles. Development has been practically confined to *Pay-Roll*. The general country rock is quartzite, but cutting this near the creek is a syenite dyke, running about S. 30° E. This dyke is cut at right angles by a quartz vein some 5 inches wide, dipping S. 30° E. at angle 65°, and showing in an exposure on the hillside. I could not discover that it cut into the country rock after crossing the dyke. This small vein carries some copper pyrites, and a certain amount of "telluride" appears to have been taken out. Assays given me by various disinterested parties who have had samples assayed gave values of from $200 to $400 to the ton in gold on picked samples. Free gold can be found in the quartz, often visible to the naked eye. As nothing more than surface exposure has been made and the permanence of the vein has not been established, it is an open question whether the lead can be profitably worked.

The quartzites, forming the country rock, at an elevation of 3,500 feet, dip N. 23° W. at angle of 45°. At the upper tunnel here there is a large pocket of galena showing on the surface, seemingly embedded in quartz. I could not find any true walls to indicate a vein, but the country rock was considerably disturbed and broken in the vicinity of the deposit, probably accounting for this. A tunnel about 20 feet long and of rather irregular shape had been run under this surface exposure, leaving the quartz as a hanging wall and consequently not exposing much of the lead. From data gained in this tunnel, the owners started a second tunnel some 22 feet lower down the hill, with the intention of cross-cutting the lead at that depth, but although in some 34 feet they had failed to do so. I was of the opinion that the tunnel was being driven too far to the left and advised a turn of some 45° to the right, where the lead ought to be met if it continued to that depth.

There has, practically, been no mineral found except on the surface, as noted. There the showing gave good grounds for the hope that an extension might be found when development work had further progressed.

PALMER MOUNTAIN.

Great Bear Mineral Claim.

A location owned by C. H. Austin *et al*, situated a mile or so from the "Old Reservoir" on Palmer Mountain, at an elevation of 3,700 feet. The country rock is composed of rather soft shales and shaley sandstones. A tunnel has been run some 30 feet, entirely in slide save for the last few feet, gaining a depth of about 15 feet. A broken quartz ledge is here exposed, 12 to 24 inches wide. Both ledge and containing rock are part of a large slide and the quartz was practically barren.

Baby-Lon Mineral Claim.

Situated on the same mountain at an elevation of 3,900 feet. The country rock is a dark, coarse-grained igneous rock. The tunnel on the claim is in 45 to 50 feet, of which three-quarters is through broken slide rock of which the crevices are filled with surface wash. The remaining 15 feet is in country rock, hard and black, and showing absolutely nothing. There is a small quartz vein wandering through the masses of the slide rock, but it appears to be quite valueless. I was quite unable to make out what had induced so much work either on the property itself or on the good trail leading to it.

MOYIE LAKES.

The Moyie Lakes are a widening of the Moyie River, some 18 miles south of Cranbrook, lying between two lines of low mountains sloping up at an angle of about 25° from the water's edge. The Crow's Nest Pass Branch Railway skirts the eastern shore of the lakes, and is now in operation.

The town of Moyie is situated on the eastern shore of the most southerly of the two lakes, and is already a flourishing little town with three or four hotels, as many stores, and a number of private houses.

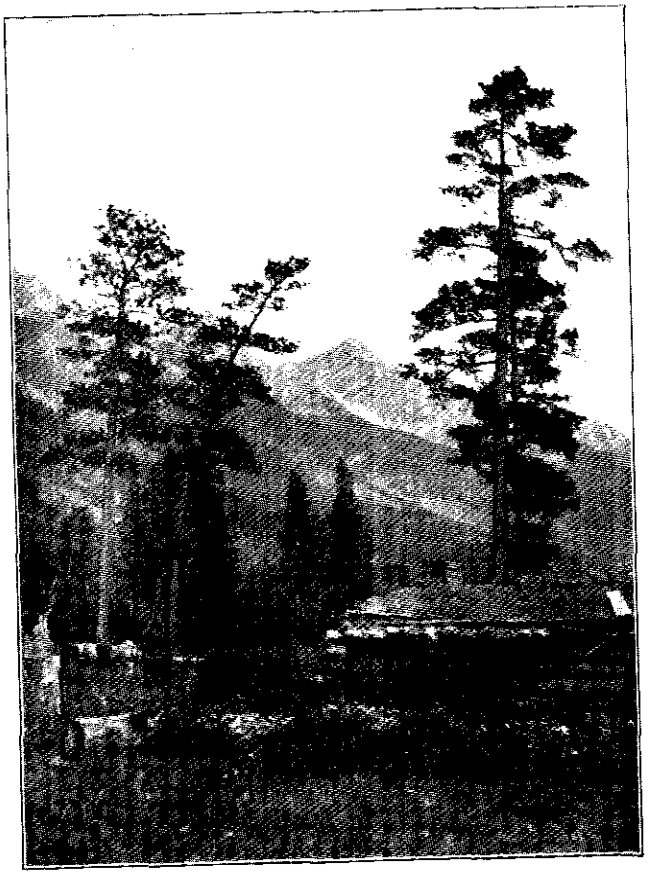
The country rock is composed of greyish slates and shales, with beds of quartzite dipping at an angle of about 15° to the east into the hill. On the mountain, just above the town of Moyie, a number of locations have been made, and here is situated the *St. Eugene* mine, while across the lake the *Aurora Group* has been located.

Starting at a point on the lake shore near Moyie City, one or more ledges or dykes, heavily mineralized in places with galena, cut the slates of the hill in an E. and W. (mag.) direction, with a dip to the S. of some 70°, and are traceable from the shore of the lake over the summit of the mountain to the east. Upon the main lead are located the *Lake Shore*, *Moyie*, *Queen of the Hills*, *Loretta Fraction*, *Peter*, *Rose Fraction* and *St. Eugene*, reaching to the summit. Over the summit a number of other locations have been made, but little has been done on them beyond proving the continuation of the same mineralized lead.

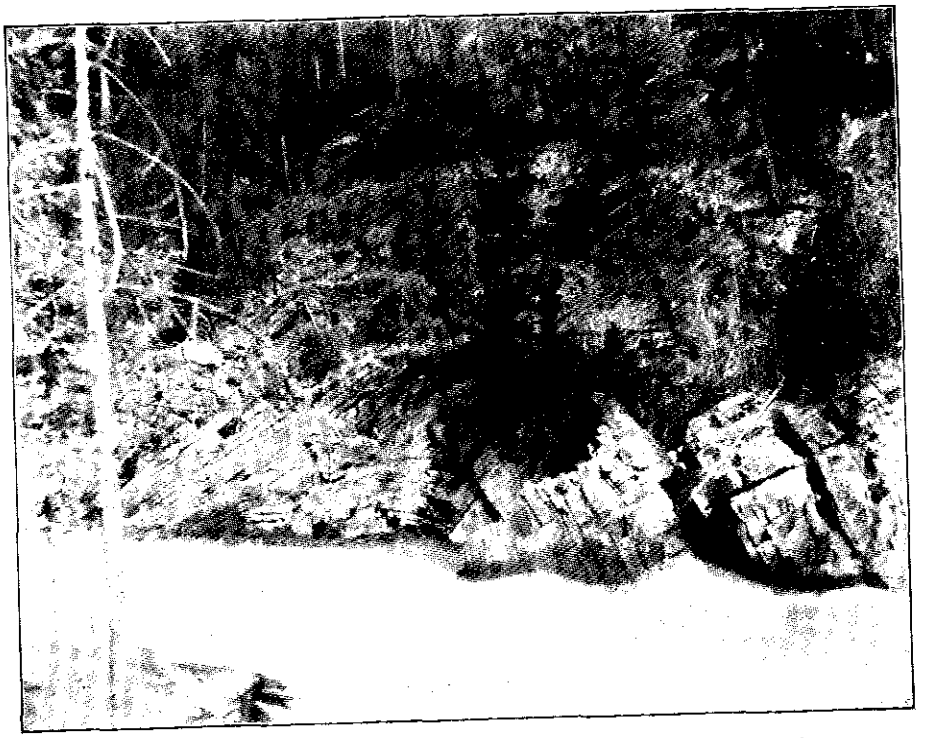
On the west side of the lake and almost in a line with the claims mentioned, a number of locations have likewise been made on what is supposed to be a continuation of this lead. The identity has yet to be proven, although there is considerable evidence in support of the theory.

St. Eugene Group.

Consisting of the *St. Eugene* and *Peter* mineral claims, and the *Rose* and *Loretto* fractions, all Crown granted (1897) in the names of J. Cronin and J. A. Finch, who have also a mill site on the lake front, close to the railway. The property is under the management of J. Cronin, who, at the time of my visit in the early part of June, was employing about 12 or 14 men in development



"THE STEEPLES" FROM JOHNSON'S CABIN, S. E. K.
(PHOTOGRAPH TAKEN AFTER 8 P. M.)



BULL RIVER, S. E. K.—HEAD OF CANYON—SHOWING STRATA.

work. On the surface, the lead had been traced by various openings for pretty well the entire length of the properties, proving its continuity. The underground development has, however, been so extensive and successful that the surface indications are not of such relative importance. I shall not notice them further than to say that at various points above the present upper tunnel, for a distance of 600 feet, the lead has been exposed, and galena ore, almost solid, has been uncovered of a width at the surface of from 2 to 5 feet.

Development. No. 1 shaft was sunk on the vein to a depth of 57 feet, in ore of the width of the shaft all the way, to the level of No. 1 tunnel. No. 1 tunnel, 5 by 7 feet, was run in on the lead for a distance of from 175 to 200 feet, gaining a depth at the face of about 150 feet, and seems to have been in pretty nearly solid ore of the width of the tunnel for the whole distance, the walls being fairly well defined.

No. 2 Shaft was sunk about 30 feet to the west from the mouth of No. 1 tunnel, starting from that level and sunk on the lead, and is said to have been in solid ore for a depth of 50 feet, at which depth the solid ore ceased and the vein was only partially mineralized. This shaft has now been connected through to No. 2 tunnel, a vertical depth of 120 feet.

No. 2 Tunnel. A cross-cut was driven about 100 feet, and cut the vein at a vertical depth of 120 feet below the No. 1 tunnel. The lead was found to be only slightly mineralized here, and not such as was in the upper tunnel. From this point the tunnel was driven on or on the side of the vein, which continued to show only slight values till a point, some distance to the east of No. 2 shaft, and about 400 feet in, was reached, where the solid ore was again struck. After striking the ore the work had been continued some 250 feet, at the time I saw it in June, and had carried ore for the width of the tunnel all the way in to its face. In this tunnel a couple of small igneous dykes have cut across the lead, but do not appear to have been accompanied by faulting to any extent. At the time of my visit there was a dyke cutting across the face which had not yet been cut through, but from past experiences and surface indications was not creating any anxiety in the minds of the management.

From the development made it would appear that there is an ore chute outcropping on the surface from No. 2 shaft for a distance of 600 feet to the east, so far as yet known; and that such ore chute has a dip of about 45° to the east—*i.e.*, into the hill. This ore chute has a width of from 3 to 6 feet, safely averaged at 4 feet, and while it contains a considerable percentage of absolutely solid galena, it is partly made up of ore that should be concentrated. The best class of ore is stated by the management to assay 70 % lead and about 50 oz. of silver to the ton.

The surface openings show up two other leads of similar character, with from 6 to 24 inches of galena, which may be parallel leads or only spurs from the main lead; sufficient development not having been done on them to determine which.

Since my visit I am informed that a waggon road has been built from the mine to Moyie, and that shipments of first class ore will be made this year. Should the development continue satisfactory, a concentrator will be erected on the lake shore and connected with the mine by tramway.

Queen of the Hills and Moyie Mineral Claims.

The *Queen of the Hills* and the *Moyie* are full sized Crown-granted claims lying directly below and adjoining the *St. Eugene Group*, and are owned by F. Houghton, E. P. Davis and others. The *St. Eugene* lead runs through both properties, and in places it carries considerable galena; but no ore shute such as exists in the *St. Eugene* has as yet been discovered. On

the *Queen of the Hills* there are three small open cuts showing galena of about the same grade as in *St. Eugene*. On the *Moyie* there is a 75-foot tunnel run in to E. on the lead, with a cross-cut of 15 feet to N., and another of 30 feet to S., showing some galena. In an open cut, at a point where the lead seems to be somewhat distorted, some 18 inches of fairly solid galena shows on the surface, but the showing has not been developed.

Lake Shore Mineral Claim.

A full-sized, Crown-granted claim, owned by Charles Farrell *et al*, and situated below and adjoining the *Moyie* and on the *St. Eugene* lead. Here the vein carries galena in pockets, but has not as yet developed an ore chute. There is a tunnel on the lead now in about 100 feet. A short distance to the south of the main lead there has been encountered a secondary lead, also carrying galena, but little work has been done on this as yet.

The three claims last mentioned derive much of their prospective value, and quite properly, from the success of the development in the *St. Eugene;* and the fact that they are on the same lead as is that mine. It is to be hoped that a similar ore chute may be found to exist further down the hill. As before stated, the *St. Eugene* ore chute dips away from these properties and to the east.

Aurora Group.

This group consists of the *Horseshoe*, *Portland*, *Etna*, *Durango* and *Aurora* locations, held by Johnson, Sanburn and Neitzel, and is situated on the west side of Moyie Lake. They are supposed to be on an extension, across the lake, of the *St. Eugene* lead, or of the lead appearing to the south of it on the *Lake Shore* claim. The measures here are composed of slates and quartzites, dipping N. 65° W. at angle of 25°. Cutting these is a quartz vein with strike S. 75° W. and dip 70° to S. On the *Aurora* claim, the nearest to the lake, there is a 40-foot tunnel showing up a little galena, but not enough as yet to be profitably worked.

WEAVER CREEK.

Weaver Creek is a small stream flowing from the north into the Moyie River, on which, at various points, placer gold has been found. It appears to have been deserted as a placer field, however, of late years, and I found no one at work on the creek at the time of my visit.

Where the trail crosses the stream, two or three miles up from the Moyie, a shaft was sunk a few years back to reach bed-rock on the creek, and from this shaft certain drifts were run. Just how much work was here done I was unable to determine as the shaft was full of water and was no longer being worked. Although the shaft itself is now of little interest, the surface workings are well worthy of brief notice.

The water power present had been utilized to hoist the gravel and water from the deeper workings, the same flume carrying water to sluice-work the gravel. A large over-shot wheel, 20 feet in diameter, was hung on a horizontal shaft of 12x12 timber, on which was a wooden friction wheel, 6 feet in diameter with an 18-inch face. Under this was a second shaft carrying a friction pulley and hoisting drum, so arranged that the friction wheels could be brought together by a long lever, worked from the mouth of the mine shaft. When hoisted the gravel was dumped onto a screen, the coarser material going into a car to be run on to the dump and the screenings into the sluice boxes. The whole apparatus was covered by a log building and the work was carried on in winter under shelter.

The entire plant was constructed on the ground from material at hand, and gives a very good example of what can be made in the way of a hoisting plant at points where it is impossible to get in machinery.

To the west of Weaver Creek and at the base of the hills forming the divide between it and Perry Creek, quite a number of mineral locations have been made and a considerable amount of work done. The claim best known and most developed is the *Prospector's Dream*, around which are grouped the *Old Abe*, *Last Chance*, *Annie*, *Ben d'Or*, *Parker*, *Lennie*, and the *Pauper's Dream Fraction*. How these claims lay I could not exactly determine, so much re-staking had been done, as many as twelve posts being found within a radius of as many feet, and nothing short of an actual survey would untangle the claims. The same general conditions, however, apply to each, and I was able to identify certain works as belonging to certain of the claims.

Prospector's Dream. Mineral Claim. Owned by J. C. Green *et al*, Fort Steele. The country rock, seemingly, is entirely of igneous origin, probably a syenite or diorite. A quartz vein has been exposed, outcropping nearly horizontally along the hillside, and dipping into the hill N. 30° E. at an angle of 15°. This has been developed by a 20-foot open cut leading to a 40-foot inclined tunnel, both on the vein.

In the open cut the quartz was very much broken, but nearer the mouth of the tunnel the vein was more solid and showed a width of 5 feet of solid quartz. Following the tunnel down, the width of quartz seems to gradually diminish, until at 40 feet in, the vein has only a width of some 6 inches. About 15 tons of quartz, of a rusty nature, was piled on the dump, which is said to run $10.00 in gold to the ton. The vein-matter will show free gold in the pan almost anywhere, but not indicating high values. The apparent pinching out of the vein in this one tunnel has discouraged for a while, deeper prospecting and the continuity of the vein to the dip remains to be proven.

Whether the gold obtained is the result of the weathering of iron sulphides carrying gold, or whether it will continue to a depth as free gold, has not yet been determined.

I am informed that one or more shafts have been sunk on this property on another vein, but these shafts I was unable to find, being filled, doubtless, with water. In these the vein showing is said to be nearly vertical and to carry a width of some 5 feet of quartz with gold values.

Old Abe, owned by Steve Young *et al*, of Fort Steele, is practically an extension of the claim just mentioned.

Pauper's Dream Fraction. Located by Nitzel and Johnson, is supposed to lie between *Old Abe* and the *Prospector's Dream*, some 100 feet east of the workings on the latter. The area of this fraction is uncertain, until the prior claims have been surveyed. There has been some work done on the property, consisting of an open cut and two tunnels, 10 and 8 feet respectively. The fraction was evidently located to catch that portion of the *Prospector's Dream* lead which may not be covered by the main claims.

The *Last Chance*, owned by Wm. Haupt *et al*; *War Eagle*, Hy. Kershaw *et al*; *Annie*, Wm. Thompson *et al*; *Ben d'Or*, J. C. Green *et al*; *Parker*, Gus Theiss, and *Lennie*, J. S. Parker, all of Fort Steele, are all locations in the same vicinity, but with only slight development work done on them that I could find. The limits of these claims I was unable to distinguish without a survey, in the absence of the owners to point out the true lines.

PERRY CREEK.

From Weaver Creek, I followed an old trail leading to the summit of Bald Mountain, on which a number of locations have been made by E. J. Walsh and others. Such of these as I could find were on rather strong quartz leads of considerable width, but without any very strong apparent mineralization. The work done amounted to little more than one year's assessment work, and the locality has not as yet assumed any great importance.

I camped overnight, July 24th, by a spring near the summit of the mountain, at an elevation of some 7,000 feet, and many of the depressions were still filled with snow, but everywhere else above timber line there was a most luxuriant growth of grass, splendid feed for horses being found there throughout the summer. The valleys being generally covered with a dense growth of timber and underbrush with little or no grass, these high level grazing lands are of great value to the prospector, enabling him to keep his pack horses near him for use when required; and numbers of such horses from the various prospecting camps in the valleys are to be found here at any time during the summer.

I failed to find a trail leading past the summit, here 7,600 feet in elevation, but experienced very little difficulty in getting down into the valley of Perry Creek, opposite Sour Dough Creek.

Perry Creek in past years was the scene of considerable activity as a placer field, although little, if any, successful work of this nature is now in progress. The centre of activity seems to have been "Old Town" or "Perry City," which, judging from the remains of old dwellings and stores, must once have been a prosperous town. Now, however, it boasts of one "hotel," the only habitable building left, although not in use as such at the time of my visit.

There is a fairly good waggon road connecting "Old Town" with both Fort Steele and Cranbrook, viâ "The Mission," which was built in the placer mining days.

The stream has been worked for placer gold with varying success for a mile or more above the old town, or as far up as the Falls, and has yielded, as a whole, a considerable amount. At the Falls, and for a distance of two or three miles above, little gold was found in the present channel of the creek. The older channel for this distance passes apparently to the east of a small mountain, which separates it from the present stream. Immediately below the Falls a tunnel has been run in on this old channel, and is said to be in nearly 1,000 feet, a lower or drainage tunnel following it all the way. This has been for some time abandoned by the constructing company, yet is worked occasionally by individual prospectors, who take out good wages.

Two miles above the Falls, near the "Old Shaft," the stream was worked quite extensively by surface sluicing and a shaft sunk to bedrock from 100 to 200 feet deep, from which considerable gravel was removed, but with what result I was unable to learn. The shaft is now filled with water. Here again is to be found a most ingenious and beautifully constructed overshot water-wheel, arranged to do the hoisting and working by an eccentric pinion shaft, a line of rods connected with a "bob" working a deep level plunger pump in a separate compartment of the shaft.

The placer record of the stream drew special attention to the creek and its tributaries, and a great deal of lode prospecting has been done from Old Town to the head of the creek. A large number of claims were, from time to time, recorded, many of which were justified by the discoveries made, but as many more on no apparent values. The work done has proved, however, that there are without doubt a number of very strong parallel quartz ledges, some of great width and traceable for miles, running S. 20° W. or about parallel with the general direction of the creek and dipping nearly vertical.

These ledges are found on the north-west side of the creek, near Sour Dough Creek, through the length of some 18 claims, or for about 5 miles, while further down the creek they re-appear on the opposite side of the stream. The exact point at which they cross I could not determine in the short time at my disposal, but probably about a mile above the "Old Shaft."

The best exposure of the whole series of ledges lies some two miles above Sour Dough Creek. At this point—starting at the ledge highest up the hill—there is a 10-foot quartz ledge exposed in the *Buck Horn* and *Big Horn* claims. Some 1,500 feet below this again is the Big Ledge, about 40 feet wide, on which is a string of some 15 to 18 claims in line, *Teller*, *Apex*, *Cashier*, *Banker*, etc., etc. About 400 feet below the "Big Ledge" is a third, an 8-foot ledge, and again some 1,000 feet lower a series of some three or four 5-foot ledges parallel to each other and about 100 feet apart.

The country rock is composed of hard shales or slates with quartzites in thin beds, the strike of the beds being S. 20° W., with a dip of 55° to the west.

The strike of the country rock and of the quartz ledges are identical, but the dip differs. The upper side of the ledges seems to be fast to the country rock, but on the lower side, in many places where exposed, there appeared to be an igneous dyke of "miner's porphyry," much decomposed on the surface. This was most noticeable on the claims furthest down the creek.

These ledges and the accompanying "porphyry" will give gold colours at almost any point where tried but, as yet, only surface trials have been made. Scattered through the quartz in small grains are iron sulphides carrying gold, and it is an open question whether the free gold found on the surface is not from the weathering of these sulphides.

The following are a few of the locations visited, selected as best showing up the general character of the ledges:—

Big Horn and Buck Horn. These are locations on the upper or 10-foot ledge, and have been developed by a shaft 14 feet in depth. Owners, Watson and Usher, of Fort Steele. They are the only claims showing any development on the upper ledge, and the gold values obtained were not over $2 to the ton on supposed average samples from the present development.

Moffatt Group. Consisting of the *Banker*, *Cashier*, *Apex* and *Teller* mineral locations, owned by T. J. Moffatt, of Butte, Mont., and Geo. Watson, Fort Steele. These locations are all on the "Big Ledge," which is easily traced through the four claims. Very little work has been done on them beyond a few shots put in on a large surface exposure. An average sample taken across the face at the surface is said to have assayed $2 in gold.

Rock of Ages Mineral Claim. This lies to the north of the *Moffatt Group* on the "Big Ledge," and is owned by T. H. Fenwick, of Fort Steele. Here a little surface work only has been done.

Excess, Rory O'Moore and Evil Genius Mineral Claims. The first-named is owned by L. V. Burden, Fort Steele; the two latter by Stevens and Patty, Fort Steele. These are all locations still farther to the north on the "Big Ledge," and have each been developed by short tunnels or shafts of some 15 feet, and give "colours" in the pan at the surface. Assays have been obtained from the quartz as high as $10, but no work has been done to show what the average assay would be.

The British-American Corporation hold some seven claims, the *Perry*, *May-bee*, *Eva*, *Southern Girl*, *Gold Bug*, *Bozeman* and *Manhattan*, located on the lower series of ledges, on each of which a couple of years' assessment work has been done. All show gold, I am told, not in great quantity, yet still more or less promising.

Shakespeare Mineral Claim.

Owners, Emil Banks, *et al.*, Fort Steele. On this property both the "Big Ledge" and the 8-foot ledge show up, the former, here 40 feet wide, being accompanied by a "porphyry" some 200 feet wide, as indicated by small pits. Assays from solid quartz are reported to have given values of some $8 in gold, the porphyry, near the quartz, giving $16 gold. My own sample and assay from a pit sunk 10 feet deep near the contact gave $6 in gold across a face of five feet, while across the face of the exposure, on the 8-foot ledge, my assay gave $4 in gold to the ton.

Red Mountain Group.

Consisting of two claims owned by Sherwood *et al*, located to the north of the *Shakespeare*, and also covering both ledges. The work has been done chiefly on the lower ledge, where a cross-cut tunnel has been run in cutting the ledge about 40 feet deep, and a drift on the ledge has been run about 20 feet to the left. The ledge here seems to be much crushed and broken at this depth. The dirt, when tested by me by panning, proved very irregular, some pans giving very good colours, and others none whatever. There is also a small pit sunk on the outcrop of the ledge to a depth of 4 or 5 feet.

At the request of one of the owners I sampled, 1st. The dump from the lower tunnel which, on assay, gave me only a trace of gold; 2nd. Loose dirt from the upper cut; assay, $10; 3rd. A sample of pure white quartz supposed to carry free gold, not visible, assay, no values. I am satisfied from assays and general indications that the gold is with the iron sulphides, and am confirmed in my opinion as to the inaccuracy of individual small samples in such a proposition. On the dump from the tunnel I found some 20 tons of ore in which gold was visible to the eye, but usually near the "iron."

Elk Horn and Pearl Mineral Claims.

These are two claims on the same series of ledges, on the south-east side of the creek, just above the "old shaft," held by "The Perth Syndicate." On the former are two shafts respectively 25 and 10 feet deep, on a 5-foot ledge, while on the latter there are two openings of 25 and 10 feet on a ledge over 12 feet in width. I have been unable to ascertain the values obtained.

Running Wolf is a location owned by J. H. Harvey, of Fort Steele, on the same ledge as the *Elk Horn*, and has two open cuts, each of 10 feet.

N. Y. Jewellery Shop Mineral Claim.

Owned by Gus. Theiss, *et al*, of Fort Steele, and located on the creek about three miles above "Old Town." A tunnel had been run from the creek bottom into a bluff of talcose schists and quartzites for about 60 feet, from the end of which drifts were set off some 20 feet on each side. No vein was to be seen in the tunnel, while in the drifts there were a few quartz stringers carrying no values. I was unable to see why the tunnel had been driven, but am told that good gold values were obtained in the schists at the creek, possibly washed into the crevices by the stream.

Mill Tests.

Recognizing the futility of trusting to small samples, and that a satisfactory test of the various properties could only be determined by a practical test, Mr. J. E. Hardman, mining engineer, of Montreal, had a small stamp mill erected during 1897, at the mouth of Saw Mill Creek, for the purpose of making mill tests of the ore from the various properties he had under bond. The mill is a small 5-stamp battery, so constructed as to be easily portable, manufactured in Nova Scotia, and is driven by a small upright engine supplied with steam from a vertical water-tube boiler. It is provided with the usual amalgamating plates, etc., for the collection of any "free gold,"

and is, as a whole, a very complete and well-constructed little plant. This mill was set up under the roof of the old saw-mill.

Test runs were made on ore from several of the claims on the creek, in lots of 5 to 10 tons each. The results obtained were not commercially satisfactory, for, notwithstanding the fact that some gold was saved, in no instance were the values obtained sufficiently high to warrant serious work on the claims. The tests, however, do not seem to have satisfied the claim owners, as the results obtained did not tally with their private assays. I heard several complaints about the matter, regret being expressed that the running of the mill had been left to inexperienced men, and the values allowed to escape in the tailings. Of this I know nothing further than was told me by men who might be considered "interested parties."

It was, of course, impossible for me to form any opinion as to how the mill had been run, except by testing the tailings, which I did in the presence of a well-known engineer and mill man, Mr. Farrell, of San Francisco, who likewise made several independent tests for his own information. The tailings from the mill had run down to the creek bottom, some 100 feet, over gravel, and had been subjected to a winter's snow and rain. I panned the mixed gravel and tailings over all of this distance, and in each pan I found I could save, besides the iron sulphides to be expected, a globule of mercury as large as the head of a match, and a string of amalgam in the bottom of the pan from a quarter to half an inch long. On driving off the mercury on a hot iron I found I had left a very fair sized particle of gold. I collected some of the mercury and amalgam, which I turned over to the Provincial Assayer, who reports to me that the mercury carries over 2% of gold, while the "black sand" contains $20.00 in gold and a trace of silver. Samples which I took of the tailings gave me on assay as high as $4.00 in gold.

As the result of my investigation, I am satisfied that the mill did not save such free gold as may have been in the ores, and that the tests made were not conclusive as to the values of these properties. I am further satisfied that only a portion of the gold is "free," and that some method of concentration would have to be adopted to save the gold occurring in the iron sulphides.

The mode of occurrence and the great strength and permanence of the ledges on Perry Creek, taken in connection with the fact that gold occurs in all of them, makes this creek well worth the attention of a strong prospecting company, as the work is of such a character as to be too expensive for the present holders of the majority of the claims.

Since the stamp mill tests were made public a great majority of the claims have been allowed to lapse, and the remaining claimholders seem inclined to listen to any proposition which will enable them to prove up their claims in a practical way.

Orphan Boy and Orphan Girl Mineral Claims.

These are two locations made on the mountain about two miles to the south-east of "Old Town," at an elevation of 3,800 feet. The country rock is composed of schists and quartzites, in the strata of which are several irregular quartz leads from 12 to 15 inches wide, on which a couple of 10-foot pits have been sunk, showing a slight mineralization but not of much promise. While situated on Perry Creek, these leads are not in any way connected with the main ledges of the creek.

ST. MARY'S PRAIRIE.

Black Hills Mineral Claim.

Owners, J. Angus, W. Tarrant and J. T. Laidlaw. Situated on the low range of hills lying to the north of St. Mary's River and east of Luke Creek.

The formation in the immediate vicinity is composed of an igneous rock, probably diorite, cutting which is a vein 3 feet wide, having a dip of 75° to N.W. and striking N. 75° E. There are three shafts on the property sunk respectively 40, 30 and 20 feet. The 40-foot shaft has the best showing, but the others are similar in many ways, the vein-matter being calcite and quartz, seemingly in alternating layers of varying thickness. In the upper 10 feet of this shaft a fair showing of galena was exposed, but at this depth that mineral disappeared and the shaft was barren until a depth of about 20 feet was attained. At this point copper pyrites appeared on the sides, continuing in small quantities through the vein to the bottom of the shaft, while in the lower few feet a little grey copper was putting in an appearance.

Yankee Girl Fraction.

Situated next to the *Black Hills* mineral claim and owned by the same parties.

The country is so covered by soil it is difficult to get at the country rock formation, save as exposed in workings. On this property the formation seems to be a schist on both foot and hanging walls as exposed in a 20-foot shaft. The vein exposed, and on which the shaft is sunk, is from 3 to 5 feet wide, with strike S. 45° E. and a dip of 70° to N.W., the vein-matter being a mixture of quartz and calcite. Scattered through the vein-matter are small bunches and stringers of copper pyrites, but development has not been as yet sufficient to prove in what quantity the ore may be expected.

"B. C." Mineral Claim.

Title, location. Owners, J. Angus, W. Tarrant, and J. T. Laidlaw. Development consists of an open cut 30 feet long by 4 feet deep, with a pit some 10 feet deeper, in which there is shown up two or three small quartz and calcite veins carrying a small percentage of copper pyrites. The vein is nearly vertical and has a strike about N. 55° W.

Mammoth Mineral Claim.

Same owners as above claims. There is shown up in a small pit, about 5 feet deep, a fairly well-defined quartz and calcite vein, some 5 feet across, dipping vertically and with strike N. 60° W. The country rock is of igneous origin, probably diorite. Some patches of copper pyrites are in evidence, but development is not such as to show what may be expected.

Blue Victor Mineral Claim.

Same owners. Country rock and general conditions are the same as in the above claim, with a quartz calcite vein, 18 inches wide, carrying a small percentage of copper pyrites. While the property has some promise, little can be assured from the development work, which consists of a pit, 8 feet deep. The ore, such as there was exposed of it, was of good quality. A specially selected specimen is said to have assayed 34 % copper, 60 oz. silver, and $22 in gold. I took no samples, as I did not consider the development sufficient to warrant it.

St. Mary's Mineral Claim.

Title, location. Owners on record, Jesse Hutcheson, Michael O'Brien, *et al.* Cranbrook P.O. The country rock is probably a diorite, cutting which is a fairly well-defined quartz-calcite vein of some 24 inches in width, running E. and W. and dipping north (mag.) at angle of 58°. The development work consists of a 15-foot shaft, but the ground, so far, seems to be much broken, and it is a question whether solid formation has as yet been reached.

Overlaying the vein is an "iron capping," and the vein-matter carries quite a fair amount of iron pyrites and occasionally some galena. The indications, so far, are promising, but so little work has been done on the property that it is impossible to form any idea of its value.

Green Monster Mineral Claim.

Owner on record, Geo. Bryant; but I was informed on the ground that the property belonged to Needham & Wolfram, of Vancouver. The general conditions are the same as in the *St. Mary's*, with a quartz and calcite vein of some 18 inches in width, carrying copper pyrites in small quantities. The vein appears to have a strike about N. 60° W. Mineralization does not seem to be confined to the vein, but is shown to a slight extent in the country rock in the immediate vicinity of the vein. There has been a 20-foot shaft sunk in the earth and wash laying up against one side of the vein, and only a skimming has been taken off the side of the vein. The work done is not of a class to develop anything, being little more than a hole in the ground, consequently nothing has been shown to indicate the value of the property.

Martin Mineral Claim.

Title, location. Owners, H. L. Vanwycke, *et al.*, situated on the north side, and near the summit of the low range of hills lying north of St. Mary's Prairie. In this claim there is exposed an 18-inch quartz vein, cropping along the hillside in a nearly horizontal line about north and south, and having a dip of 45° to E. The foot-wall seems to be a quartzite and the hanging wall an igneous rock, probably the diorite which is found just south in other claims, but of lighter colour. In an inclined shaft sunk on the vein, and now down some 10 feet, there are exposed some beautiful bunches of azurite and grey copper, which at the outcrop were in considerable quantity, but the quantity seems to diminish with depth. A couple more openings have been made on the outcrop, and here also the ore is less in evidence further down, yet the depth attained is so slight that not much can be decided from it. Undoubtedly there is some very high grade copper ore, carrying silver and gold, but the quantity has yet to be determined. The prospect is one of considerable promise, and it is to be hoped development will be pushed on it.

Carrie Lee Mineral Claim.

A location on the west side of Luke Creek, about half a mile above the Government waggon road, owned by S. D. Pompelly. The country rock is limestone, cut by large igneous dykes. The cooling cracks in the dykes have been filled with calcite, which carries galena with sulphides of zinc and iron, sulphides of copper replacing the galena in places. The ore is of good quality, but has not as yet been found in quantity to justify working. The development consists of a large open pit, 6 to 8 feet deep, and a shaft, said to be 55 feet deep, with short drifts from the bottom. The shaft was partly filled with water at the time of my visit, and I was unable to make a personal examination of it.

Annex Fraction.

A fractional location, next to the *Carrie Lee*, and owned by S. E. Pompelly. Here, in an 8-foot pit, near the creek bank, there is exposed, cutting the limestone, a 20-inch quartz vein, intersected by stringers of calcite and carrying copper pyrites and carbonates, from which some good pieces of ore have been obtained. The development has not been sufficient to warrant me in forming an opinion as to the value of the property.

May Flower Mineral Claim.

A location on St. Mary's Prairie near Luke Creek, owned by Robert Reid *et al.* A small quartz vein has been disclosed cutting the limestone and carrying a small percentage of iron pyrites. The country rock in its immediate vicinity seems to be mineralized in the same way.

Sarah Edith Mineral Claim.

A location about a mile and a-half above the Government road crossing of Luke Creek, and owned by S. D. Pompelly. Elevation, 3,250 feet. In a 9-foot pit sunk in diorite there is exposed a calcite vein running with the dyke almost north and south. The vein carries copper pyrites near the surface, but does not show any in the lower five feet of the pit.

Carbonate Mineral Claim.

Elevation, 3,400 feet. A location on St. Mary's Prairie, near Luke Creek, owned by Reid, Turcotte and others. In a 35-foot shaft there is exposed a quartz and calcite vein, cutting through the igneous rocks, running due east and west (mag.), and dipping vertically. At the surface the vein is 8 to 10 feet wide, in the lower portion of shaft, 3 to 5 feet wide. Some three or four tons of coarse-grained galena were on the dump, derived evidently from the upper fifteen feet of the shaft, where mineralization was most marked.

Lottie Mineral Claim.

Elevation, 3,250 feet. A location near Luke Creek owned by F. P. Norbury, H. W. Barnes and others. A quartz calcite vein, 24 inches wide, of considerable strength cuts the igneous country rock, running N. 30° W., and dipping 70° S. There is a 20-foot shaft on the vein, from which has been taken a quantity of fine-grained galena.

MARK CREEK.

Omenica Mineral Claim.

Title, location. Owners, Wm. Robertson and Frank Tracy. Situated on the west side of Mark Creek, about one mile above the bridge, on St. Mary's waggon road. The country rock is a syenite, rising in a low, flat hill some little distance back from the creek. There are two fairly well-defined 24-inch quartz veins on the property, dipping N. 45° W. into the hill. The lower vein dips at an angle of about 45°, and on this a shaft has been sunk about 60 feet in depth. Some 200 feet further up the face of the hill is the second vein, dipping in the same direction, but at an angle of 60°. On this a 10-foot shaft has been sunk. Scattered through the quartz of the veins are small pockets and stringers of copper and iron sulphides, but not showing up, as far as I could see, at any point in sufficient quantity to be of value.

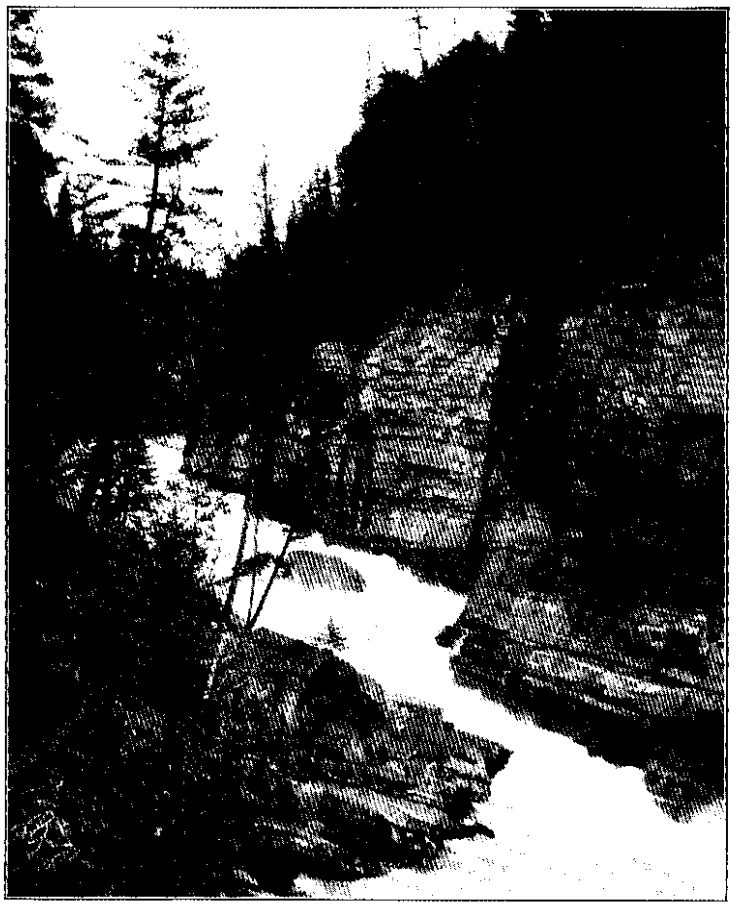
Josephine Fraction.

Title, location. Owners, W. H. Brown and W. H. Cruger, situated on the west side of Mark Creek above the bridge. The country rock is here a semi-crystalline limestone with strike about N. 40° W., in which is interbedded a vein dipping vertically with a calcite gangue, and in which the discovery was made. This vein is cut by a small quartz vein of no great strength, frozen to the walls of country rock, but free when it cuts the calcite vein, at which juncture it carries copper pyrites in very fair-sized masses but, as far as I could see, only near the surface. There is on the property a shaft about 25 feet deep, and a small open cut.

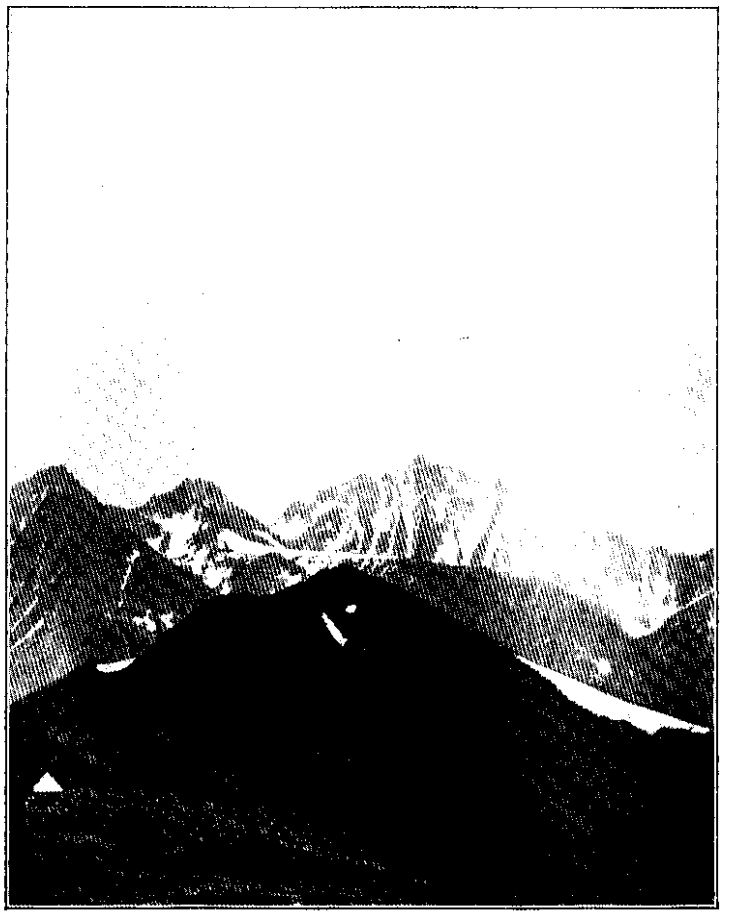
NORTH STAR HILL.

North Star Group.

This comprises the *North Star*, *O. K.*, *Dreadnaught*, *Buck Horn* and *Midnight*, all Crown-granted, and a number of full-sized and fractional locations. It is owned by the North Star Mining Co., Limited, of Montreal; President, D. D. Mann; Secretary, H. S. Holt, Montreal; Business Manager and Agent, N M Curran, Fort Steele, B. C. Particulars as to these properties were given in the Report of this Department for 1896, to which little need be added.



BULL RIVER CANYON—S. E. K.



DIVIDE BETWEEN BULL RIVER AND WILD HORSE, S. E. K.
ELEVATION, 9,000 FEET.

Up to the present the same mode of transportation there referred to has been in use, but surveys have already been made for a branch railway connecting the line of the Canadian Pacific Railway between Cranbrook and Fort Steele with the town of Kimberley, on Mark Creek, at the foot of the North Star Hill. From the terminus of this branch, construction of which will be begun sometime during the coming year, it is expected, a tram line will be run to the mine, thereby materially reducing the costs of transportation of ore and supplies, which now so seriously reduce the profits on the ore.

The assay value of the ore shipped this season, as given me by Mr. Curran, averaged 50 oz. silver and 50% of lead, figures exactly corresponding with the official returns for 1897.

No ore has been mined during the present year, except such as was taken out in development work. Shipments have been continued from the stock pile at the "Landing," on the Kootenay River, proceeding thence by steamer to Jennings, and then on to Great Falls, Mont., by rail. Mr. Curran estimates that about 8,000 tons have been shipped to the Landing to date.

The Company has maintained all this year a small force of 12 to 15 men on development work, but has made no important addition to its plant.

To the north of the ore body, and on the general strike of the same, a prospecting shaft was being sunk on a body of iron oxide containing masses of galena. At a depth of some 50 feet a drift had been set off to the south for some 20 feet in the same mass of oxide, which here seemed to be bounded by walls that had a more defined appearance than I was able to note elsewhere.

The main ore body has been left standing waiting for better transportation facilities, and the development has been made with the expectation of proving the existence of an extension of the main ore body to the north and to the east. The prospects were favourable at the time of my visit, July 5, but such extension had not then been found.

The *Midnight* is a property the Company has acquired since the last Report, and lies to the north of and adjoining the present workings. Some prospecting shafts, etc., have been sunk on this property, which have shown up bodies of iron oxides containing masses of galena, but no solid ore has been yet encountered.

Stemwinder Mineral Claim. Owned by the North Star Mining Co. and — Wade. Situated on the steep south bank of Mark Creek, nearly in a line between the *North Star Mine* and the *Sullivan Group*, extending from a stake in the creek bottom up the hill towards the *North Star* mineral claim workings. There is a tunnel on the property which is 150 to 200 feet above the level of the creek, and had been driven in some 50 feet at the time of my visit, July 6. It cuts through beds or layers of dark iron sulphides and oxides, principally the latter, which seem to be dipping N. 30° E. at angle 45°, which would make the strike nearly parallel to the creek at this point. The tunnel runs (mag.) N. and S., and is therefore about 30° from line of dip of the iron layers. About two-thirds of its way in to face there is a layer of soft red iron oxide, while in the face of tunnel, in the lower right-hand corner, there had just been exposed a layer of very soft, loose material, chiefly iron oxides, but seemingly carrying some lead carbonates, which assayed $1.00 in gold and $\frac{3}{10}$ oz. silver. The tunnel stops here without showing what this layer may contain further in.

Dean Group. Consisting of the *Dean* and *All Over*, both Crown-granted, and the *Gold Bug* and *Silver Bug Fractions*, both locations. Owned by R. O. Jennings, C. D. Porter, *et al*, of Fort Steele. Situated on North Star Hill, in the immediate neighbourhood of the *North Star* Mine.

The general country rock seems to be the same as, and the conditions similar to, those in the *North Star*, excepting that, so far, no galena to amount to anything has been found in place. In several places there is an "iron capping" resembling a true "gossan," and embedded in it there have been found boulders of galena. In one or two places there have been exposed stringers of mineral, sometimes in quartz, consisting chiefly of iron sulphides, with occasionally a little galena. No development, however, has so far succeeded in tracing these stringers to any ore body.

From the position of the *Dean*, relative to the *North Star*, it would appear that the ore body of the latter, if it continued, should partly enter into *Dean* ground, but serious development work has failed to discover any such extension as yet.

On these properties there has been sunk one shaft 50 feet, two shafts 22 feet each, and one 20 feet, together with other smaller shafts and a large number of open cuts. Work was still in progress at the time of my visit, and some four men were employed under the management of Mr. R. O. Jennings.

Sullivan Group. Consisting of three claims, all Crown-granted, *Hamlet*, *Hope* and *Shylock*. Originally located by Pat Sullivan, Jno. Cleaver, E. C. Smith and W. C. Burchett; now held by the Sullivan Group Mining Company, of which F. P. Hogan, of Spokane, Wash., is president, Chas. Wolf, treasurer, and F. L. Williams, secretary. Situated on the north-east side of Mark Creek, on what is known as Sullivan Hill, about one and a-half miles north of the *North Star*, and the same distance from the projected town of Kimberley, at the foot of the North Star Hill.

At the time of my visit, on July 4, every pit was full of water and I could not, therefore, form any very definite opinion of the group from my own observations. My conclusions have been largely based on information given me on the ground by Mr. E. C. Smith, one of the original locators. Considerable prospecting work has been done on these three claims, as already fully described in the Report of the Department for 1896, and galena and iron have been found in various places. When the property was taken over by the present company the body of solid galena exposed in the *Hamlet* was the most promising, and on this there has been sunk a prospecting shaft, said to be down 30 feet in solid ore.

The company sank a 5 by 9 working shaft dipping 70° to the west at a point distant some 50 feet from the old prospecting shaft, and which was supposed to be to the dip from the exposure of the ore body. This shaft, I am told by Mr. Smith, passed through some 20 feet of solid ore when the solid ore ceased. After being driven some 30 feet farther in country rock the work was, for the time being, abandoned by the company. Further prospecting was then begun by Mr. Smith, and an open cut was made running east and west, about 75 feet to the north of the shaft. This cut, although partly filled with water, I was able to examine. A very little stripping revealed a mass of iron oxide, below which lay a mass of iron sulphides and galena, while at a depth of 8 or 10 feet the iron had been largely replaced by almost solid fine-grained galena, which showed up in the cut for a width of some 20 feet. I could see no wall or anything to indicate a vein, and could not decide as to the nature of the deposit from the amount of development done. It looked as if the ore body was dipping to the east, *i.e.* down the hill, at rather a flat angle. If these indications prove correct it will, to some extent, explain why the shaft, with a dip to the west, ran out of ore, that is, only cross-cut the ore body. I cannot agree with the idea advanced that the ore in this cut is a new discovery, but am of the opinion that it is the same ore body that had been struck in both the discovery and working shafts.

I took what was an approximate average sample of the ore in the cut, and my assay showed lead, 43.36%; silver, 17.5 oz.; gold, trace.

Mr. Smith was on the ground with men preparing to unwater the cut and go ahead with further development. He expected to have a pump and other machinery on the ground this summer, when an attempt will be made to prove the extent of the ore body, which promises so well for the small amount of work done. The property has great advantages in the way of transportation, being so near the North Star waggon road, which is a public road; and if the projected railway from the Canadian Pacific Railway to Kimberley becomes a fact, the mine will be within two miles, by easy grade, of railway transportation.

Goodey Mineral Claim.

Situated on the north bank of Mark Creek, nearly in line between the *North Star* and *Sullivan Groups*. Location; owned by Dave Newell, C. C. Farrell, *et al.* In the steep rock cliff forming the bank of the Creek there was exposed a rather poorly-defined quartz vein some 24 inches wide, containing a small percentage of copper, as bornite and pyrites, together with a little grey copper. Through the quartz were small cavities filled with calcite. From the outcrop and following the lead a tunnel has been driven in about 20 feet. It was explained to me by one of the owners that this was being driven to strike a contact "between the syenite, in which the vein occurs, and a dyke of more recent igneous rock, probably a diorite," which contact, it was expected, would be reached in about 40 or 50 feet. The "diorite" could be seen on the steep side of the cliff, a little higher up the creek, in contact with the syenite, the line of contact running about N. 45° W. and into the creek, at which point it is said to carry mineral. I could not get to the point, however, as the water in the creek was too high at this season of the year.

ALKI OR JOHN CREEK.

A small creek flowing into the upper end of St. Mary's Lake from the north.

From Fort Steele and Cranbrook a good waggon road extends up the St. Mary's River as far as Matthew Creek, a distance of some 25 miles, from which point the mouth of Alki Creek is reached by a good Government trail, which continues on over the summit to Pilot Bay, in West Kootenay, and is much travelled in the latter part of the summer. From October to July continuous snow on the summit renders it almost impracticable. The trail up Alki Creek from its mouth is a private trail and was found in poor condition and very steep.

Maud Mineral Claim.

Elevation, 5,300 feet. Situated on the east bank of the creek, and owned by C. H. Pollen, of Nelson. A tunnel had been driven into the wash in the hillside, composed of water-worn boulders and clay. At the time of my visit, August 1, the tunnel was in some 15 feet, and still in the wash.

Blue Peter Mineral Claim.

Situated on the west side of the creek some three miles from its mouth. At an elevation of 5,450 feet, a lower tunnel has been driven in some 25 feet in wash, with the evident intention of reaching the outcrop of the quartz ledge developed by the upper tunnel. On August 1st the tunnel was still in the wash, but a number of boulders, about 6 inches in diameter, of copper pyrites were being encountered. The country rock is quartzite, laying flat, cut by strong igneous dykes.

The upper tunnel (elevation 5,525 feet) has been driven in for 45 feet along the south side of a quartz ledge running nearly east and west, and then makes a right angle turn to the north, cross-cutting the quartz vein, at this point 12 to 15 feet wide. The quartz carried copper pyrites scattered through it in bunches in very appreciable quantities, the showing in

the tunnel giving promise of a good concentrating ore. Selected sample is said to have assayed: copper, 14 %; silver, 6 oz.; gold, $3. The ledge is traceable up the hill from the tunnel for 100 or 150 feet, and is accompanied by an iron capping. At this point the main ledge is cut by a smaller quartz ledge, running north and south, and could not be further traced by me. The smaller ledge has not been developed to any extent. The four men at work on the property were living in tents, no cabins having yet been built.

Capt. Petty's Claims.

In the basins at the head of Alki and Matthew Creeks and on the dividing summit, Captain Petty, representing the Selkirk Mother Lode Copper Mines, Ltd., and R. W. Western, *et al*, has had a force of 18 men at work since about July 1st—the only organized prospecting party in East Kootenay, where the work is directed by one man and carried out by ordinary paid labour. The party were camped in tents in the Alki basin, where was also situated the blacksmith shop and store. The men boarded themselves and went from camp to their work daily, in some cases a walk of an hour and a half, carrying their steel with them.

The Selkirk Mother Lode Copper Mines, Ltd., is working on the *J. K.*, *Glenora*, *Hilda*, *Golden Chief* and *Ragland*, all apparently on the same lead, running S. 65° E., a lead some 50 feet across where measureable, and seeming to be at the contact of a large igneous dyke with the quartzites, etc., of country rock. In places the quartz is heavily mineralized with arsenical iron and copper and iron pyrites. At the time of my visit the claims had only been opened up about a month, and the little work done on each did not serve to prove the value of any of the properties. The work done was in the nature of assessment to cover all the claims, the purpose being to later develop the most promising.

The tunnel in the *Golden Chief* is on the outcrop of the lead and in some 20 feet. A shaft has been started on the *Hilda* and was down 10 feet, the intention being to continue it until it cut across the lead. Work on the *Glenora* (elevation 7,550 feet) consists of a 20-foot tunnel on the outcrop, and was similar to that in the *Golden Chief*, and the *J. K.* (elevation 7,830 feet), showed strong mineralization in an inclined shaft started on the quartz lead and down some ten feet.

R. W. Western *et al* have located the *Parparea*, *Elise*, *Swift*, *Toodles*, *Buttons* and *Charlie K.*, but enough work has not as yet been done to show up anything. These claims lie alongside the S. M. L. C. M.'s properties, but are on a different lead.

Captain Petty, I was informed, was working a force of 12 or 14 men near the head of Copper Creek, at the *Pyramid Group*, but as the force had only been in a short while doing assessment work, and the Camp had been reported on in last year's Report, I did not feel it imperative to spare the two or three days necessary to inspect it.

"1900" Mineral Claim.

Situated on the mountain some 700 feet above St. Mary's Meadows, at an elevation of 4,100 feet. The lower tunnel, which is in some 8 feet, has a very fair showing of coarse grained galena occurring in quartz. I was unable, however, to trace any definite vein, or anything to indicate a continuous ore body. Locally, the country rock is very much broken and appears as if it had moved down the mountain.

Lake View Mineral Claim.

Held by Karl Neitzel *et al*, and situated above St. Mary's Meadows. There is here a quartz vein 3 inches wide exposed in the side of a cliff at an elevation of 4,350 feet. The vein is exposed in a small open cut, and the quartz is slightly mineralized with iron sulphides.

WILD HORSE CREEK.

Placer Mining.

McMillan's Placer Claim, a placer lease on the east side of Wild Horse Creek, slightly below and on the opposite side of the creek from the mouth of Brewery Creek, and below the *Nip and Tuck* hydraulic property. The claim is being worked by J. McMillan and Eric Bergren, in association with N. A. Wallinger, of Fort Steele.

The owners, believing in the existence of an "old channel," are making a very determined and plucky attempt to prove the theory that a gigantic slide has occurred on the mountain side whereby the old channel of Wild Horse has been filled up and the river forced into its new and present channel, commencing at a point near the lower end of the *Nip and Tuck* property. Having driven several short tunnels and sunk prospecting pits from which to obtain data, they are driving a tunnel near the present bed of the creek, now in some 160 feet, to cut what is supposed to be the western rim rock of the old channel, and according to their calculations should be nearly through it.

Their theory as to the existence of an old channel seems to be based on good reasoning and to be supported by the facts so far as known. The venture is, of course, a risky one, for even should the theory be found to be correct, it will still remain to be proved whether at this point the old channel carries value. On this point, however, the presumption is in their favour. The bed of Wild Horse, for some miles above Brewery Creek, has produced very large quantities of placer gold, estimated at $20,000,000, and has been the scene of successful placer operations since the early "60's," and is still a producer to a limited extent. The records of the past show that the "pay" stopped at just about the point where the old channel is supposed to have taken off. Below this point the present channel has proved barren.

The work has all been done in such good shape—more particularly the timbering in the tunnels driven in difficult ground for prospecting purposes only—that it is evident the men are expert placer miners, and are experienced in this particular work. This fact inspires confidence in their theory. The plucky way in which they are putting in hard and honest work—their own time for years—asking no one's assistance, shows that the spirit of the old-time placer miner is not yet dead. Few men in the District where pretended development work is not uncommon will, I think, grudge to this honest though problematic endeavour any and all success that may attend it.

Hydraulic Mining.

There are three companies now working by hydraulics the gravel banks of Wild Horse Creek. The Nip and Tuck Gold Hydraulic Mining Co., of London, Eng., is operating a property on the east bank held as a Crown grant. It is working a bank about 50 feet high, of which the upper 20 feet is loam, sand, etc., carrying very low values. The lower stratum is a blue boulder clay, laying on a bed-rock of chloritic slates, standing at an angle of 65°. The operations were being conducted under the superintendency of Mr. Buckstone, who was employing eight men, and it was expected that 150,000 cubic yards would be the season's work, the season lasting from April to September. A 6-inch Giant was at work under a pressure of 200 feet head, together with a couple of ground sluices, the water for which was being taken from the creek, about five miles above, and brought down by a hill-side ditch. A portion of the ground has been sub-let to a company of Chinese, who were working in a small way with a canvas pipe and a 2-inch nozzle.

The Invicta Gold Mining Company is operating a mile of property on the west side of Wild Horse Creek under lease, the work being under the management of Mr. J. W. R. Young, M. E. An extensive plant is on the ground, described in the Report of the Department for 1896, and the company is preparing to erect an hydraulic elevator for removing the

gravel from the lower levels of the bench, which is expected to be in working order for next season's operations. No washing has been done on the property this past year.

The Chinese Hydraulic Company, Quong Young Tong Company, has a lease of about a mile of river bank just above the Nip and Tuck ground, and has removed considerable dirt this past season. I have been unable, however, to secure returns as to the value of the wash-up. They are rather imperfectly fitted as to piping, etc., and are using canvas hose with a small nozzle, but are reported to be doing good work.

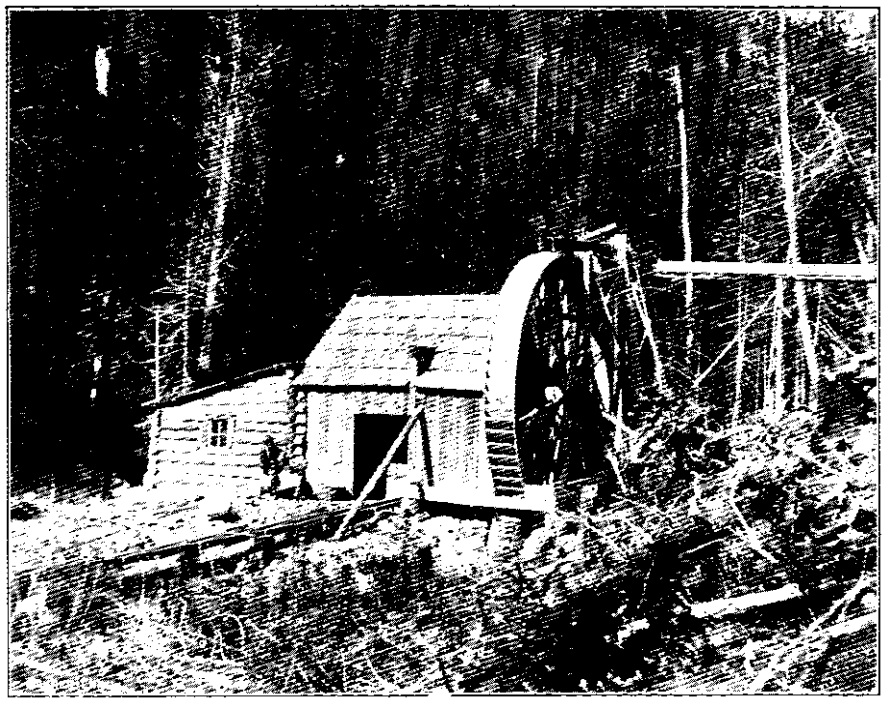
Maple Leaf Mineral Claim. Situated on Lone Mountain, about four miles from Fort Steele, at an elevation of 3,500 feet. Owned by D. Studtlander and D. Hunter, of Fort Steele. Reached by a rather indefinite trail, but over a country through which a trail could easily be made. The country rock is composed of quartzites, overlayed by a crystalline limestone dipping N. 25° W. at an angle of 40°. There is exposed in a 30-foot tunnel a 24-inch vein, striking N. 30° E., and dipping N. 60° W. at an angle of 70°. The tunnel is near the junction of the quartzites and limestone, and the vein seems to be continuous in both rocks. It is composed of alternating layers of quartz and calcite, while on the hanging wall there is a layer of some 3 inches of iron oxide. The vein is more or less mineralized with iron sulphides, and an average sample is said to have given a value of $7 in gold.

Kootenay King Mineral Claim. A location, owned by W. Voss *et al*, of Fort Steele, situated on the mountains on the west side of Wild Horse Creek, to the south of Victoria Gulch. The country rock is composed of shales, quartzites, etc., dipping N. 50° E., at an angle of 65°. The first tunnel, elevation 6,650 feet, driven in 25 feet, shows only slight mineralization. A second tunnel, elevation 6,750 feet, driven across the measures due west for 120 feet, cuts several porphyry dykes, all more or less decomposed and containing only slight values in silver and copper. A third tunnel, elevation 6,850 feet, driven due west for 80 feet, shows no ore in place, so far as I could see, but on the dump was a quantity of sandy shale, heavily impregnated with galena.

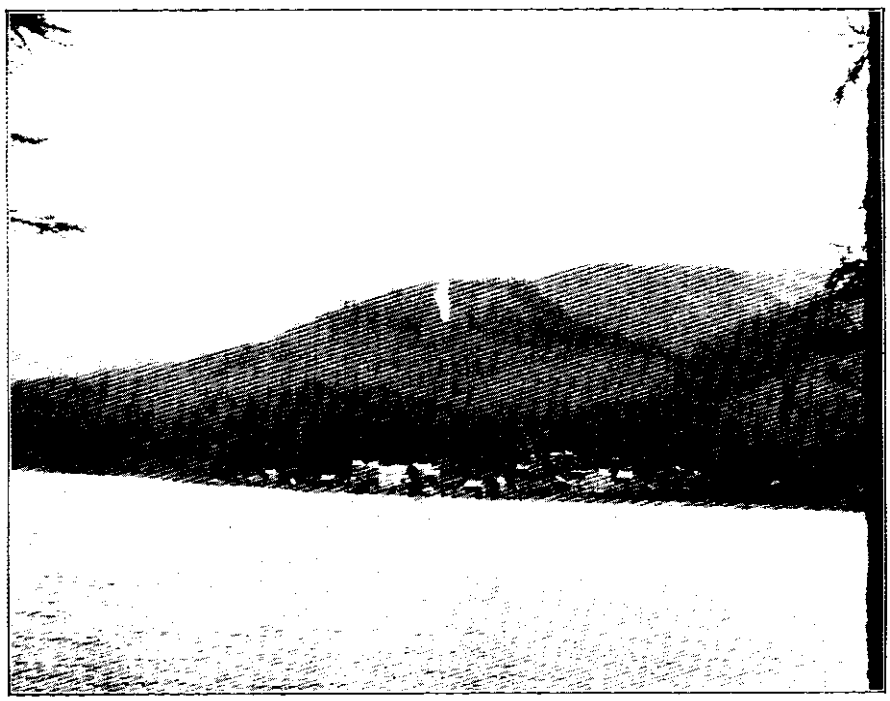
In a gulch, some 150 feet above the last mentioned tunnel, there outcropped a small quartz vein, 5 inches thick, cutting the quartzites, but seeming to dip under the next bed of slate. This small vein was heavily charged with galena, say 3 or 4 inches solid, with some grey copper, and carried good silver values. No development work has been done on this lead, although I am told that samples giving high assays and credited to the property have been taken from this outcropping.

Tiger Mineral Claim. Situated on Victoria Gulch, at an elevation of 4,500 feet, and owned by W. Voss *et al.* Two tunnels have been driven in on a quartz ledge carrying galena and grey copper, but not yet in quantity to be profitably worked.

Tit-For-Tat Mineral Claim. Situated on the south-east side of Wild Horse Creek, opposite a point about a mile below the mouth of Victoria Gulch. Elevation 6,250 feet above sea level, or 3,500 feet above the creek bottom. This property is better known in East Kootenay as the *Lily May*, under which name it achieved some notoriety, having been floated as a company in the United States for a very large amount—$600,000, it is reported. Some omission vitiating the registration of the company, it was re-located by A. J. Robertson as the *Glad Surprise*, the *Lily May* owners being "left out in the cold." A legal flaw, however, was found in Robertson's title, said to be the lapsing of his free miner's certificate, and the property was again re-located by Dave Griffith, one of the *Lily May* shareholders, who, not inappropriately, gave it its present name.



DARDANELLES ARRASTRA AT WILD HORSE CREEK.



MOYIE CITY—S. E. KOOTENAY—FROM ACROSS THE LAKE.

The country rock is composed of shales, quartzites and talcose schists, dipping N. 65° W., at an angle of 55°, and in the immediate vicinity of the vein there are several small igneous dykes crossing the measures and the vein at right angles and nearly vertical.

The vein is quartz some 12 to 18 inches thick, dipping N. 65 E., at an angle of 25°, into the hill, cutting the measures nearly at right angles, the outcrop being traceable along the hillside, nearly horizontal. The vein seems to be free on the hanging but frozen on the foot-wall. On this outcrop considerable work has been done. Starting at the most south-easterly opening not far from the south-east side of the property, an inclined shaft has been run on the vein, but exactly how far I could not learn. I was down some 40 feet from the surface, but water in the shaft prevented further examination. The vein shows all the way down to this point, but is only slightly mineralized. There are also two or three surface strippings on the outcrop. A second incline has been driven about 35 feet, showing a quartz vein 18 inches thick, with some galena and iron sulphides. Tracing the outcrop along the precipitous face of the cliff, I again came to still another incline driven down 15 or 20 feet, and at present used as a blacksmith shop. The vein here is more or less broken by a dyke almost 24 inches wide, and shows a somewhat stronger mineralization, galena and iron sulphides. About 40 feet north-west of this point there is a fault which appeared to cut off the vein. It is said to have been traced farther, but I could not again find it.

The quartz is reported to have yielded many samples containing free gold, and I have been shown such samples said to have been taken from the property. A diligent search failed to reveal any such gold quartz in place. From the general conditions I am of the opinion that the vein, such as it is, will not hold with depth, and my samples failed to show the gold values claimed for the property. I must admit, however, that small samples of a gold property are not conclusive.

Dardanelles Mineral Claim.

Situated on the south-east side of Wild Horse Creek, almost opposite the mouth of Victoria Gulch, which lies about ten miles from Fort Steele and is reached by a good waggon road following the valley of the creek. Owned by Banks Bros., of Fort Steele. There exists a very fair trail leading from the Arrastra, on the creek, direct to the mouth of the tunnel. The horizontal length of this trail is said to be, from actual measurement, about a mile and a half, while the elevation of the tunnel above the creek is some 2,200 feet. In the fall of 1896, 30 tons of ore were hauled down over this trail on a "go-devil"—practically a sled with spikes in the bottom to prevent too rapid a descent. The ordinary load was said to be three tons in sacks, and but one horse was employed; the empty sled being turned "spikes up" for the up haul.

The country rock is composed of shales, slates, schists, and beds of quartzite, the shales forming the greater part of the mountain. In the working tunnel the shales seem to be somewhat distorted, but the disturbance appears to have been more or less local, judging from surface indications. The surface, however, is heavily covered with rock slide, rendering observation difficult. On the trail, at an elevation of 4,850 feet, the measures seem fairly regular, with a strike of about S. 45° E., and a dip of 55° to S. W.

At an elevation of 5,700 feet, and exposed in several shallow cuts on the side-hill, there is a quartz vein, outcropping in a nearly horizontal line, striking nearly east and west and dipping into the hill. An inclined shaft has been sunk on the vein for some 175 feet, the first 125 feet being at a dip of 20°, while the last 50 feet dips at an angle of about 35°. As exposed in the incline, the vein has a thickness of about 3 feet at the surface, widening out to 4 feet and then diminishing to 12 inches at a point about 125 feet from the surface. Here the vein seems to split, one portion apparently going into the roof, the shaft following the other

for some 50 feet, in which distance the vein has pinched out to 3 inches. To determine whether the vein had in fact split, an uprise was driven into the hanging wall at the point mentioned, but it failed to disclose any such spur going farther than a few feet.

The shaft was in a very dangerous condition, the shales showing an inclination to slack. No sufficient timbering had been done, and the roof was falling in many places. At about 50 feet down the incline the measures were cracked, indicating a sliding of the whole face of the hill. At this point the roof of the incline was covered with icicles, which were apparently forming and not melting, despite the fact that it was one of the warmest days of summer without, and that near the bottom of the incline it was comparatively warm.

Judging from exposures on the sides there must have been some good ore taken from the incline, consisting of galena with grey copper, and copper as carbonates and pyrites, said to contain good values in silver and gold. It was supposed that the quartz carried considerable free gold, but I doubt if such existed to any extent. The ore seems to have been confined chiefly to the first 40 feet of the incline, not showing below that point in any quantity, although there is more or less mineralization all the way down. The surface indications were so good that it is to be regretted that no serious development work has been done at any other point on the outcrop. At present, at the points exposed to view, the ore does not continue to a depth to make a mine.

There is a good cabin on the property, but in summer it is a mile or more to drinking water.

The Dardanelles Arrastra.

In 1896 the owners of the above mine built an arrastra on the bank of Wild Horse Creek, at the bottom of the trail from the mine, for the purpose of working their ore. On trial it was found that the ores were unsuited to such treatment, and although a number of tons were treated the venture was not a success, and the clean-up did not give any returns. The pulp was ground to almost a 20 mesh nominally, but the screens seem to have been defective.

As a piece of construction the arrastra is very creditable, and shows what can be done in a locality where the machinery must be made on the spot, and of the timber found at hand. The arrastra itself is a tight, wooden, circular tank 9 feet in diameter and 30 inches deep, bound with iron bands. The wooden bottom is paved over with large stones tightly wedged in. In the centre of the tank is a vertical 12 by 12 inches wooden shaft set in a suitable step-bearing and provided with four wooden arms, to each of which there is attached, by chains, two stone drags, making eight in all. These drags weigh from 200 to 500 pounds each.

Motion was conveyed to this shaft through a horizontal, wooden gear-wheel, 5 feet in diameter, with wooden teeth which, in turn, connected with a similar but vertical wheel on the main horizontal shaft of 12 by 12-inch timber, on which was hung an overshot water-wheel, 20 feet in diameter, with a 24-inch face and buckets 9 inches deep. The water for driving the wheel was carried from higher up the creek by a 12 by 12-inch overhead box flume. The arrastra is covered with a shed, and connected therewith is a good log assay and living room. The whole is "home-made," and constructed practically of wood, only a few nails and straps of iron being added to the material at hand.

Coronado Locations.

At or near the head of "The South Fork of the East Fork of Wild Horse"—or Collet Creek, as it has been called—the first creek from the south on the east fork of Wild Horse, there has been a long string of locations made on what is supposed to be an igneous dyke, cutting the measures in a general direction about magnetic north. Starting at a point on the east side of the basin at the head of Collet Creek, we have in succession, crossing the basin diagonally, the

following locations:—*Colossus*, *Yukon*, *Klondyke*, *Coronado*, *Arena Fraction*, and *Arena*, which reach to the summit of the divide Still following the same line into the basin at the head of Wallinger Creek, we have then in succession the *Dodo*, *Keystone*, *Neosha*, *Red Mountain*, and *Defender*.

All of these locations are of comparatively recent date, few, if any, being made before the summer of 1897; and as I visited the series on the 16th July, 1898, when the snow had just left the hills but still lay in the basin, very little work other than the yearly assessment had been done on any of the claims.

The country rock, at an elevation of from 7,000 to 8,500 feet, on the summit of the hills to the west of Collet Creek, is dolomitic limestone about 500 feet thick, underlaying which is an 100-foot bed of conglomerate, and again underlaying this are shales and occasional quartzites. Until these measures approach the very head of the creek, and the divide between Wild Horse and a tributary of Bull River, they are fairly regular, dipping N. 55° W. at an angle of 40°, but on the divide there is evidence of much disturbance in the contorted and broken shales. Except on the precipitous face of the west side of the creek, the surface is heavily covered with wash and broken shale, making prospecting difficult. So little work was done, and the surface was so covered, that I was unable to trace the dykes to my own satisfaction.

There is a fairly good Government trail up Wild Horse Creek as far as the point on the east fork where Collet Creek branches off. Beyond this point, and for the rest of the way, some 3 or four miles, the trail is the work of prospectors and was very imperfect.

Colossus, Yukon, Klondyke. These are full locations, owned by Frank C. Collet *et al*, Fort Steele. They had very little more than surface scratchings to show, and are situated on a heavily timbered side-hill. On what I take to be *Klondyke* ground is a very neat log bunk and mess house.

Coronado, Arena Fraction, Arena. These lie on the western side of the basin, at an elevation of 7,000 feet, and are locations belonging to A. Polson *et al*. On the *Coronado* a tunnel was being driven, under contract, for 50 feet, and at the time of my visit had been driven 20 feet, in limestone, which showed no mineral of value. On the surface, chiefly in the wash, were numerous pieces of copper ore, carbonates, and sulphides. In several cases the ore appeared to be in place, but this was not very clearly proven. A certain amount of iron gossan also appeared near the surface, but the development showed up little of value.

Dodo, Keystone. These are locations on the summit of the divide, at an elevation of 7,800 to 8,000 feet, and are held by Frank C. Collet *et al*, of Fort Steele. On the *Dodo* there appears to be a capping of iron oxide, which extends pretty well the length of the claim, and probably into the *Keystone* adjoining. On this iron capping a small tunnel has been started on the Bull River slope of the hill, but it was only in a few feet, and while it showed slight mineralization—chiefly iron and galena—it did not prove much beyond the existence of the iron capping.

Neosha Mineral Claim. A location at the very head of and on the east slope of Wallinger Creek, at an elevation of 7,550 feet, and owned by K. J. Highby *et al*. of Fort Steele. A tunnel has here been driven in some 35 feet through successive layers of iron oxide, supposed to be a capping of gossan. These layers seem to run about conformable to the slope of the hill-side, as if the iron had been

brought from some point higher up the hill in solution, perhaps from some spring, and deposited at different times. In the face of the tunnel there was a layer, some 12 inches thick, of pale blue talcose clay, the tunnel not cutting through it. No mineralization was in evidence in the tunnel, excepting the iron oxide.

The *Red Mountain* mineral claim, belonging to Wm. Walsh *et al*, and the *Defender*, belonging to A. Polson *et al*, are extensions on the same belt to the south, but on neither has any serious work been done.

Colossal, Cornucopia.

These are locations in the bed of the east fork of Wild Horse Creek, near the junction with the main creek, and extending up the hill on either side. Owners, H. Amme, Van Ardsdale *et al.*, Fort Steele.

The discovery was made in the creek bottom, and at this point the development has been done, chiefly on the *Colossal* claim. Some 150 feet of ground sluicing has been done, exposing the ore body, but the high water had caused the bank to cave in, and I could not see anything in the cut. An 80-foot tunnel had also been driven in from the creek bottom, but this also was partly filled with water. I managed, however, to get into this, and could see that in the sides a quantity of iron pyrites was exposed, amounting to from 5 to 10% of the rock near the mouth of the tunnel, and perhaps less as the tunnel went in. From this pyritic ore good values in gold are said to have been obtained. The pyrites occurs in thin layers, about one-eighth of an inch thick, as if deposited from solution.

Although considerable work had been done on these claims, the high water in the spring had so covered it that I was unable the form an accurate opinion of the deposit.

SIX-MILE CREEK.

Six-Mile Creek is a small creek flowing in a south-westerly direction from the Rockies, and emptying into the Kootenay River about six miles above Fort Steele. On it a number of locations have been made, but as yet little beyond assessment work is apparent.

Paris-Exhibition Group.

This group is composed of two claims, the *Paris* and the *Exhibition*, and work done has been confined to the former. The properties were located by H. Ohlsen and P. Larsen, and are bonded to a Victoria syndicate represented by Mr. Bushby.

As exposed along the trail leading up to the claims the country rock composing the greater part of the mountain seems to be made up, in ascending series, of quartzites, quartz-shales, shales, schists, slates and limestone. The *Paris* property is a location situated about 6 miles up Six-Mile Creek, at an elevation of 6,200 feet, or over 3,500 feet above the valley of the Kootenay. The country rock in the immediate neighbourhood is the limestone usually found in the Rockies at this elevation. Considerable work has been done on the property and several good log cabins erected, the camp being one of the best kept in the District.

1st Tunnel. In 35 feet N. 60° E, started on a quartz vein 20 inches wide, which ran in 20 feet when it was cut off. Other smaller veins appeared, but after continuing 10 feet they also were cut off. The quartz carries iron sulphides, in rather irregular patches. Samples taken from the dump are said to give values of $4.00 in gold.

2nd Tunnel. Is about 20 feet vertically above the first tunnel and some 30 feet farther to the south, and on August 9th was in about 175 feet. This tunnel was started on a vein composed of 18 inches of quartz and 15 inches of calcite, which continues in the tunnel for 120 feet, when it bears off to the right at a certain "slip" in the country rock. At the same

point another vein of 24-inch quartz appears in the roof of the tunnel. The first lead was here abandoned and the tunnel follows the second lead for from 30 to 40 feet when a small fault cuts the measures. This seems to have reduced the size of the quartz ledge from 24 to 4 inches, while at the face it is about 3 inches wide.

TRACY CREEK.

Tracy Creek runs in a south-westerly direction from the Rocky Mountains to a point some ten or twelves miles up the valley of the Kootenay River from Fort Steele, and then disappears underground near the new town of Tracy, in the immediate vicinity of which a number of locations have been made, the majority, as yet, but little developed. A good waggon road connects Tracy with the main Government stage-road from Golden to Fort Steele, at a point near Hanson's; and from Tracy, good trails lead to the various properties on Tracy Lewis and Wasa Creeks.

The town of Tracy is prettily situated on a plateau, at the base of the main range of the Rockies, and consists of some eight or ten houses, a couple of stores and a very comfortable hotel, the "Estella," kept by Albert Mutz, formerly of the "California Brewery," of Butte, Mont.

Estella Group. This group consists of the *Estella*, *Skylark*, *Raven*, *Cashier*, *Alice* and *Mountain Daisy*, owned by A. Mutz, Geo. Scott and others, and is bonded to Alex. Polson. The claims are situated on the mountain back of Tracy, two or three miles distant, at an elevation of about 6,000 feet. The country rock is composed of shales and schists.

Copper Lead. Work has been chiefly confined to the *Estella*. A quartz vein some four feet wide was exposed in a gulch made by a small stream, the vein dipping directly into the hill at an angle of 30° to the S.E., and the outcrop on the main side-hill being nearly horizontal, striking S. 40° W., and traceable for 2,000 feet on the hillside. On either side of the gulch, on the outcrop of the vein, a tunnel has been run in; that to the N.E. being in 30 feet and the one to the S.W. some 60 feet.

In both of these tunnels was found a very considerable amount of gray copper, together with copper carbonates and some galena; and a number of tons of good copper ore is now on the dump. While the ore is not altogether solid, it amounts to some 40 or 50 per cent. of the vein as exposed in the tunnel.

These tunnels let in so much water that no attempt was made to sink on them, and in order to reach the vein at a greater depth a tunnel was started down the hill-side some 150 feet, vertically, below the upper tunnel and at an elevation of 6,000 feet. The hill here slopes to the north-west, at an angle of 30°, and the dip of the vein is 30° to the south-east, so that the lower tunnel will have to overcome both of these slopes. Should the dip of the vein remain constant, as in the exposure in the upper tunnel, the lower tunnel will have to be driven some 520 to 600 feet before it can be expected to cut the vein. But if the vein should assume a flatter angle the tunnel would have to be driven much farther.

At the time of my visit, August 11th, the lower tunnel was in about 480 feet, and still progressing, the work being done under contract by Martin Anderson, at $14 per running foot, for a 5 x 7 tunnel.

Galena Lead. Some 300 feet above the copper lead already described, there outcrops an igneous dyke apparently, carrying galena, which dips south at an angle of 50°, and has a strike about due E. and W. The outcrop of the galena deposit cuts the outcrop of the copper lead some 500 feet to the south-west of the line of the main tunnel. It seems unfortunate that this tunnel had not followed in the galena, for it would then have cut, eventually, the copper lead at about the same point aimed at now, and thus developed both deposits.

I traced the galena outcropping over the hill for from 500 to 800 feet and found the width, as exposed on the surface, to be from 6 to 24 inches of almost solid galena. Only surface stripping had been done on this deposit, all energies having been confined to the copper lead.

As is evident, little but surface work has been done showing mineral, but from these developments I have great hopes that further success will be met with in the lower tunnels.

LEWIS CREEK.

St. Lawrence Mineral Claim. A location on Lewis Creek, at an elevation of 3,500 feet, owned by A. Bain, *et al.* The formation here is chiefly shales, striking S. 45° E. and dipping N. 45° W. A small quartz vein, some 4 inches wide is exposed, striking the same as the country rock, but with a dip N. 30° E., carrying a small amount of copper. Three tunnels have been run. The first, in 25 feet, is not on the vein but it is supposed it will cut it farther in. The second is 300 feet to the north of the first tunnel, at an elevation 3,600 feet, and was in some 25 to 30 feet in wash. Above it, from 25 to 30 feet, are two so-called "iron chimneys" about 12 feet high, composed of fragments of country rock cemented together with iron and lime. The third tunnel was in some 10 feet, assessment work only. Above this last-mentioned tunnel some 50 feet, there is an outcropping of what appears to be a 24-inch quartz ledge, but no work has been done on it. Where it outcrops it is barren.

Iron Mountain Mineral Claim Is a location staked by Wm. Pfeifer, and appears to be on St. Lawrence ground. Development consists of an open cut, run in some five feet in a mass of rock slide, which is cemented with iron and lime.

Tiger Mineral Claim. A location near Lewis Creek, owned by J. Conklin, *et al.*, and reported to be under bond to the Fort Steele Development Company (Limited). On this property there is exposed in a small open cut a quartz vein some 6 to 8 feet wide, somewhat broken and laying between a black slate and a mass of igneous rock, and dipping N. 15° W., at an angle of 40°. Near the surface the vein shows galena in stringers. There is in addition to the open cut a tunnel in some 5 feet, also showing galena. With such slight development little can be said of the property. Surface indications are, however, favourable.

The *Minnie* mineral claim lies above and adjoining the *Tiger*, and probably is on the same lead. It is a location owned by J. W. Arthur, and little work beyond one assessment has been done on it.

WASA CREEK.

Wasa Group.

This group consists of two locations, the *Wasa* and the *Mammoth*, owned by Wm. Thompson *et al.*, of Fort Steele, and is situated on Wasa Creek, a tributary of Wolf Creek. At an elevation of 4,650 feet a tunnel has been run in from the outcrop on the vein and parallel with the strike, for a distance of 75 feet. The vein, as here exposed, is of quartz, some 2 feet thick, laying on the top of a black slate and underlaying a white schistose limestone dipping in the tunnel at an angle of 10° to 15°. Between the slate and the quartz there is a parting of red oxide of iron, carrying no values, from 2 to 4 inches thick in places.

There is a pile of several tons of ore on the dump composed of gray copper, copper carbonates and oxides from which are said to have been obtained assays of 22 per cent. copper, 110 oz. silver, and $10 gold, but this is higher than would be the average. At the face of the tunnel there was ore showing, but not as yet in quantity to be profitably worked.

At places on the outcrop the quartz lead is said to be very much wider than the two feet mentioned, and is given a width of over 25 feet in certain points. As night was coming on and I had to return over a rather bad trail, I could not get to see these outcrops on which very little work had evidently been done.

THE FOLLOWING IS THE REPORT OF J. F. ARMSTRONG, GOLD COMMISSIONER FOR THE FORT STEELE DIVISION.

I have the honour to report as to the progress of mining for the current year. The office statistics are as follows :—

Free Miners' Certificates issued	795
" substituted	4
Mineral Claims recorded	669
" " partnership	4
Placer Claims recorded	13
" " partnership	9
Certificates of work issued	741
Certificates of Improvement issued	27
Mining Leases issued	15
" in force	20
Entries in Records of Conveyances	361
" Record books	766
" Records of Water Grants	16
" Records of Abandonments	8
Number of Affidavits filed	1,237
" other documents filed	213
Mining receipts	$7,074 85

These include $1,420.00 for Mining Leases and $134.75 for Water Rights.

Three sections of the Division, each of an area of about one thousand square miles, contain ninety per cent. of the mining properties of the Division. They are :—

1st. The watersheds of Wild Horse Greek, Bull River and of the smaller streams flowing into the Kootenay from the east, within 20 miles of Fort Steele.

2nd. The watershed of the St. Mary's River.

3rd. The watershed of the Moyie.

The sections lying respectively north and south-east of these have not been much visited by prospectors, and many square miles of these have never been seen by a white man. The following table gives the recorded mining progress during this season :—

Section.	Certificates of Improvements.	Certificates of Work.	Location Mineral Claims.	Placer Claims.	Mining Leases in Force.
Northern	.....	14	19	.....	.....
Wild Horse, Bull River, etc	.....	218	216	22	12
St. Mary's River	26	370	294	.....	1
Moyie River	1	99	106	.....	7
South-Eastern	.....	40	38	.....	.....
	27	741	673	22	20

As the Provincial Mineralogist has visited the Division during this season and will report thereon more fully and more accurately than I can do, I will not go into particulars as to the value and nature of the ores of the Division.

Northern Section. The claims recorded in the northern section lie on Skookumchuck and Cherry Creeks. Though few in number they prove the existence of a mineral belt extending from the St. Mary's River to the region in the Windermere Division, where rich discoveries have been made this year. This section is worthy of the attention of prospectors, as the country is not difficult of access and ore could be transported at a reasonable price to the Kootenay River, which can be navigated with ease as far north as the mouth of Skookumchuck Creek.

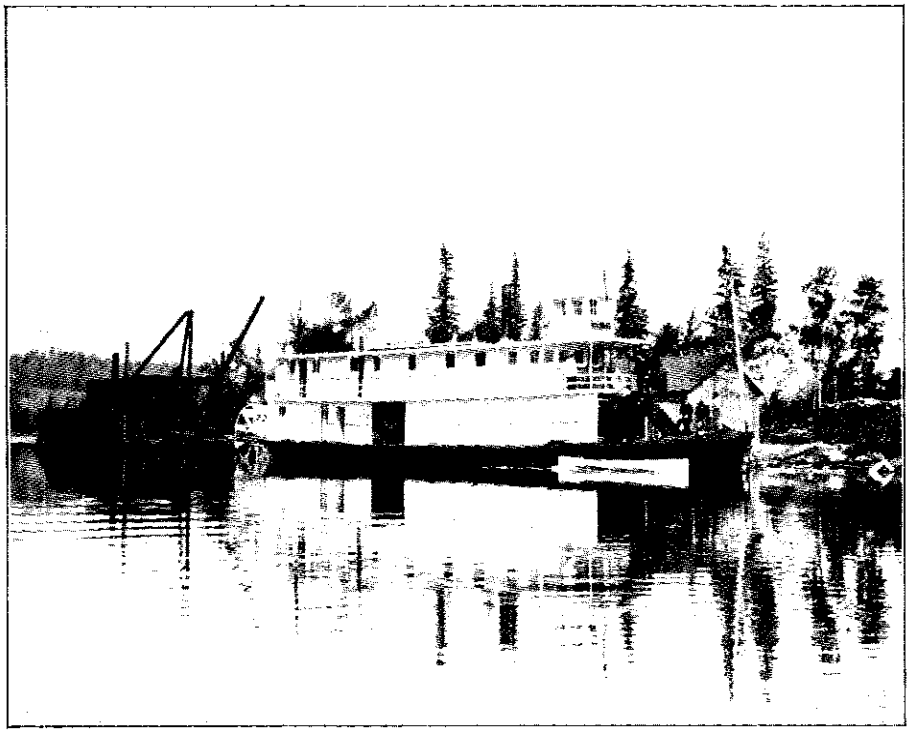
Wild Horse Section. The Wild Horse section, as the oldest mining ground in Kootenay, is well known. Many rich discoveries have been made during this season. Now that machinery can be imported with less expense, hydraulic mining will be resumed. Several lode mines will probably become shippers next year.

St. Mary's Section. The St. Mary's section contains one half of the mining properties of the Division. The North Star is the only mine which has shipped ore, but several others are ready as soon as transportation can be secured at remunerative rates.

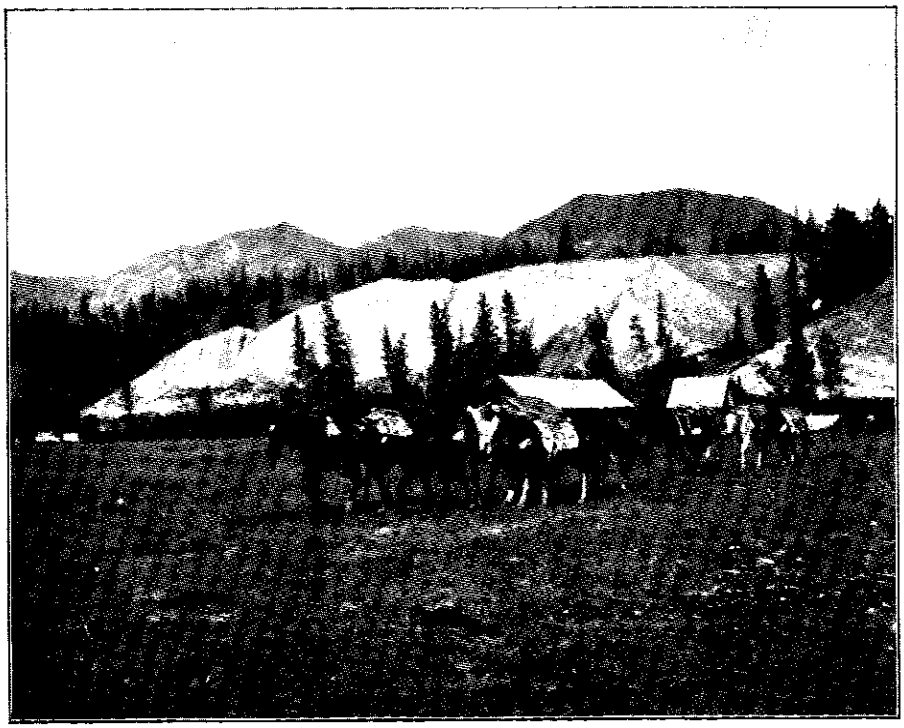
Extensive development work has been done during the past year with satisfactory results. The upper St. Mary's country is increasing in importance every year and the improvements made in the trails during the past year will decrease the cost of laying down the necessary material for development work.

Moyie Section. The Moyie section has the advantage of a railway within half a mile of its most important mines. The *St. Eugene* and other groups are awaiting the construction of railway sidings from which to ship their ores.

South-Eastern Section. In the south-eastern section development work has been done on lode mines near Sand Creek, on Elk River, and at Tobacco Plains. This section includes the coal measures of the Crow's Nest Pass and Wigwam River and the petroleum lands of the Upper Flathead Valley. The selection by the British Columbia Southern Railway of its land grant will leave some of these lands open



STEAMER "DUCHESS" - FROM GOLDEN - ON LAKE WINDERMERE.



"DELPHINE" PACK TRAIN - LEAVING THE SALMON BEDS.

to the public, and I expect that prospecting for coal and petroleum will be a feature of next year's business.

The construction of the Crow's Nest Railway has not as yet had much effect on the lode mining of the Division, uncertainty as to the rates of freight has in fact retarded development, holders of mines preferring to wait until they can make closer calculations as to the cost of laying down the ore at the smelter.

The coal mines at Fernie are extending their operations, their out-put being increased as the railway extends in carrying capacity, which is limited at present by its unfinished condition. The manufacture of coke commenced on the first of December. Coal is also being mined at a point on Michel Creek. Coal from both points is now in use for railway, manufacturing and domestic purposes, and in a short time its adaptability to the various uses will be known.

WINDERMERE DIVISION.

Location. The Windermere Division comprises that portion of North-East Kootenay which is drained by the Upper Columbia River and its tributaries as far as and including Horse Thief Creek on the west and Aylmer Creek on the east. It also includes the watershed of the Upper Kootenay River down to and including Findlay and Mud Creeks, its eastern boundary being the summit of the main range of the Rockies, its western the summit of the Selkirks

The drainage area of the Upper Kootenay, above Canal Flats, has as yet received very little attention from the prospector, and no important locations are recorded for that portion of the Division. This whole area, together with the east slope of the Columbia Valley, is geologically a part of the Rocky Mountain Range, which has not so far proved a fruitful field for the prospector.

In consequence prospecting in the Division has almost exclusively been confined to the Selkirk Range, west of the Columbia, and it is to be noted that the past summer has seen an influx of a large number of experienced prospectors from both the north and the south. In the latter part of the season a large number of promising prospects were recorded as a result of this movement, chiefly in the vicinity of Boulder and Horse Thief Creeks, and the coming season will see these properties developed.

Last season's success will cause a still greater number of experienced men to try their fortunes in this part of the Kootenays, which until now has not received its proportionate share of attention.

The few claims which have been developed to any extent have so far continued promising, although in no single instance has work been done on any property which would warrant its being called more than a prospect.

Physical Features. The country lying to the east of Windermere, or Lower Columbia Lake, is rolling bench land, large tracts of which are now under cultivation, yielding splendid crops wherever any care has been taken to provide for irrigation. The Indians on the Reserve, near Windermere, are cultivating their lands well and intelligently, and some of their grain fields seen by me would have been a credit to any white man.

Towns. The only town in the Division is Windermere, which consists of two hotels, as many stores, a school-house, and a few private dwellings; and here the Mining Recording Office of the Division is situated.

Transportation. During the summer months, when navigation is possible on the Columbia River, a line of steamers, owned by the Upper Columbia Navigation and Tramway Co., and run under the command of Capt. Frank Bacon, make two round trips weekly between Golden (on the Canadian Pacific Railway) and Windermere.

On the "Duchess" the accommodation and service are both of the first class, good state-rooms, good meals, and every attempt made by the officers to accommodate passengers and to help the mining interests of the District. The Company transport all samples of ore without charge, refusing all payments for such services, and I, myself, among others, am indebted for this courtesy during the past season.

A stage runs twice a week between Windermere and Fort Steele, connecting there with the Crow's Nest branch of the Canadian Pacific Railway. After navigation closes on the Columbia the Fort Steele stage continues on from Windermere to Golden.

Roads. There is one good road—the stage road—running through the Division on the east side of Windermere Lake and on the west side of Upper Columbia Lake. From the "Salmon Beds" trails lead off to Toby, Boulder and Horse Thief Creeks. These are all fairly good, although last year they were somewhat in need of repair, and required to be cleared out in several places, and doubtless will receive in the spring the necessary attention from the authorities.

Mineral Springs.

Near Brewer's Ranch, about thirteen miles south of Windermere, and only a few hundred yards from the main road, there is a series of hot springs, which at this point bubble out from the side-hill. The waters as they leave the ground have a temperature of from 90° to 120° F.

These springs, some twenty or twenty-five in number, cover an area of several acres, and are of varying size and temperature, the largest running about as much water as would come out of a 3-inch pipe under a 10-foot head.

The water is clear as crystal, and is evidently highly charged with lime and a little iron, judging from the deposits which form on the surface around the springs. This deposit forms in the shape of a circular basin with the spring in the centre—regular natural bath tubs —much used as such by the people of the locality, who credit the waters with great medicinal properties, a belief handed down by the Indians of the neighbourhood. There are several of these basins in the creek bottom with waters at a temperature of 100° F., while within five feet flows a good sized creek with water at 40°, providing the "hot bath and cold plunge" of the Turkish bath.

The country around is exceedingly beautiful, with good fishing and shooting to tempt the sportsman, and as fresh supplies can be had at all times from Brewer's Ranch, the spot forms an ideal place for the camper out. The property is held by Mrs. Sarah L. Galbraith, of Fort Steele, but nothing has been done as yet either to improve or utilize it in any way.

FINDLAY CREEK.

Findlay Creek flows into the Kootenay River near "Canal Flats," its watershed forming the southern boundary of the Windermere Division. A good flow of water characterises it, said to amount to 7,500 miner's inches, the fall of the stream being from 75 to 100 feet to the mile.

In the immediate neighbourhood, situated within two miles from the upper end of Upper Columbia Lake, quite a number of locations have been made, all on a series of quartz ledges, which run about north and south, and which are all of the same general character.

I am indebted to Mr. Jas. Brady, M. E., who is interested in many of these claims, for his courtesy in meeting me and pointing out to me all the development work done, in addition to imparting much information in connection with the properties.

Starting with the most northerly, we have in succession the following groups:—The *Sun Lake*, *Thunder Hill*, *Jupiter*, and *Soudan*, and on the south side of Findlay Creek the *Gold Hill* Group.

Sun Lake Group. This group, owned by Jas Brady *et al.*, consists of four claims in one block, all locations; situated about 1¼ miles west of Sun Landing, on the Upper Columbia Lake, and one mile from the main stage road running from Golden to Fort Steele. Elevation, 3,100 feet, or about 400 feet above the lake. Country rock, slates and schists, running in a general N.E. and S.W. direction and dipping N.W., with occasional igneous dykes occurring in a general N. and S. direction.

There appear to be three distinct quartz ledges running through the properties—running with the bedding of the schists—which outcrop and have been stripped in several places, proving their continuity. They are somewhat irregular and pockety, jumping from one layer of schist to another. These ledges, which are each from 15 to 50 feet wide, are made up partly from white quartz and partly from a grayish quartz, which gives the impression that it may be a very highly altered quartzite. Interbedded here and there are quartz and talcose schists.

The gray quartz and the schists near the lead are spotted here and there with small cubes of iron pyrites carrying gold, and with occasional particles of galena. The proportion of these sulphides in the quartz I estimated at about from ½ to 1 per cent. Numerous assays were shown me from material taken from the open cuts, which ran from $1.05 to $1.85 in silver and about $4.00 in gold. These assays were from near the surface and on material which was much weathered, and serve merely as indications as to what may be expected with depth.

Considerable work has been done on these properties, but confined as yet to open cuts and other surface developments.

Of good water and timber there is an ample supply, sufficient for all mining needs. A good log cabin, divided into two rooms, has been erected, and the property can be easily reached by waggon, the surface thereabouts being comparatively clear and the slopes gradual.

Jupiter Group. This group is owned by Jas. Brady *et al.*, and consists of four locations in one block, 1½ miles from Upper Columbia Lake and the stage road, and is at an elevation of 3,500 feet or 800 feet above the lake. The general occurrence of the ledge is here the same as in the *Sun Lake* group, two or three parallel quartz ledges on a ridge 250 to 300 feet above the surrounding country. The out-crops vary from 20 to 60 feet in width and maintain a general N. and S. direction, showing on three of the claims.

West Ledge. On the *Jupiter* claim an open cut, 150 feet long, has been run and the ledge cross-cut some 25 feet. From this open cut an inclined shaft has been sunk for 30 feet, near the hanging wall.

East Ledge. The east ledge is large and has been exposed on the *Jupiter* and *North Jupiter* in a series of open cuts.

On the west ledge the quartz contains a certain amount of galena in places, together with iron pyrites, but neither as yet exposed in very appreciable quantities. The mineralization, however, is stronger than on *Sun Lake* or *Thunder Hill.* Should subsequent development reveal ore in sufficient quantities to be worked, the properties are so situated as to be cheaply operated and the ore could be readily transported to the Thunder Hill Concentrator, which, however, would have to be remodelled to suit the ore.

Thunder Hill Group.

This group, owned by Jas. Brady *et al.*, consists of four claims, one of which is Crown-granted, the others being locations. A large amount of work has been done on these properties, said to aggregate $12,000, inclusive of the mine buildings, and this not taking into account a tramway of almost two miles in length connecting the mine with the millsite on the lake, to be noticed later.

In a general way the conditions are the same as prevail in the two groups already described. At the point where the main workings are, there is a quartz ledge about 100 feet wide which has here been faulted and thrown to the west about 50 feet and nearly at right angles to the ledge. For about 50 feet on the line of this fault, where the two ends of the ledge come together, there appears to have been a rather considerable deposit of galena, which might be described as a chimney of ore. This has now been taken out to a depth of about 50 feet, and was the deposit on which the property was started, and to treat which the concentrator was erected on the lake shore.

Small quantities of galena are to be found elsewhere in the ledge, but in no place do they give promise of such ore in quantity. Iron pyrites carrying gold occur scattered through the ledge, but, so far as was visible, only to a small percentage, seemingly less than in the *Sun Lake.*

A tunnel has been driven through 75 feet of the solid ledge, the rock from which lay on the dump. This rock I sampled as being representative of the general ledge, Mr. Brady, who was present, agreeing with me as to its representative character, The sample I turned over to the Provincial Assayer, who reports to me that it does not carry more than a trace of gold.

As regards the property generally, the existence of the immense quartz ledge is proven beyond doubt, yet such galena as has been found does not continue in quantities to warrant working. The expectation of the owners is that the property will turn out to be sufficiently high in gold to be profitably worked. I am satisfied that the gold does not exist as free gold and that such gold as there is occurs in the iron pyrites, which in working would have to be concentrated. Fine grinding would have to be resorted to and the concentration effected with suitable appliances. The future of the properties, it may be said, therefore, depends on the percentage of iron pyrites in the rock, as the grade of the concentrates will remain fairly constant, and from my observations values will not exceed $100 to the ton of concentrates. As far as was pointed out to me, or as I could see at any point on the property, the percentage of iron pyrites in the ledge, as it would have to be mined, did not exceed one or, at the outside, two per cent.

There are several log buildings at the mine, office, bunk-houses, blacksmith shop, stable, etc., now somewhat out of repair, yet serviceable if ever required.

Thunder Hill Concentrator.

On a steep sand bluff, on the shore of the Upper Columbia Lake, there has been erected a "50-ton Lead Concentrator," constructed by the Chicago Iron Works. The plant consists of the usual buildings and bins, and the machinery may be thus itemized:—1, 7 x 10 Blake crusher; 2 sets, 26 x 12 rolls; 1 set, 16 x 10 rolls; 2 sets, double, 4-compartment jigs; 2 sets, 2-compartment jigs; 1, 18-in. double-decked Evans table; an automatic ore feeder; and 3 revolving screens, with all necessary elevators, etc. The power plant consists of 2 Watrous boilers, a Watrous engine and all necessary pumps. The entire plant is still in good condition and practically new.

A surface tramway connects the mine ore-bins with the overhead concentrator ore-bins, and is equipped with iron ore cars which run down by gravity and are hauled up empty by horse-power. An inclined tramway was likewise provided for taking the concentrates to the dock to be loaded on to the steamer.

Good and suitable office and laboratory buildings are on the ground, together with ample accommodation for employees.

As already noted, this plant was erected to treat a certain body of galena occurring in the mine and was constructed before the limited extent of such ore body was known. It now stands idle, never having had ore on which to run.

Swansea Mineral Claim.

Situated on Windermere Mountain, at an elevation of 5,100 feet, and bonded to the Mines Development and Guarantee Trust Company, of Rossland, who are doing some development under the superintendency of Mr. Powers.

The country rock is a quartzose limestone which appears to be much faulted and broken, there being evidence of a series of faults running N. 45° W., or almost with the range of hills. Along the line of one of these faults there is evidence of a crushing effect, which extends a short distance into the country rock on either side leaving the rock still in place, but much crushed. It would seem as if this crushed material had been more or less cemented with lime which had filtered through it; the waters in the same way bringing copper in solution, which, deposited in the crushed zone, now exists as blue and green carbonates, occurring in masses, mixed with the broken rock. These masses are sometimes of considerable size, but as yet have not shown any continuity.

Some 20 to 30 tons of selected ore were on the dump at the time of my visit, of which I took a sample and found it to assay 17.5 per cent. copper, but with no gold or silver values.

Lake View mineral claim is a location 300 feet higher up the hill, owned by F. W. Mulholland, of Rossland, but it is merely a prospect with little work done on it. A 2-inch seam of red iron oxide is exposed in a small cut, but I could see no mineralization of value.

TOBY CREEK.

Mineral King Mining Claim.

A location on the mountain to the north of the main creek, about six miles above the North Fork, or twenty-three miles from the "Salmon Beds." Elevation, 6,800 to 6,900 feet. Owned by and bonded to the same parties as the *Hot Punch*, presently to be described.

The point where the mineral was discovered is a steep bluff of rock standing out of the hillside which has elsewhere a somewhat regular slope of about 20°. In the face of this bluff, and necessitating very little work to expose it, there is a great blow-out of quartz, over 150

feet wide, through which, running in all directions, are stringers of galena up to 8 inches wide, with occasional widenings to 24 or 30 inches of solid ore. Occasional streaks of gray copper also cut the quartz and likewise the galena.

I was unable to find any definite ledge of quartz leading to this large surface exposure, and am somewhat at a loss to definitely classify the exposure from the development done.

About 50 feet below the exposure, and about the same distance to the north-east, a tunnel had been run in 50 feet, N. 65° W. This tunnel was expected to cut the ore body at a depth, but had failed to do so. Galena shows in the roof at only one spot, and there, not very strongly.

The country rock, as exposed in the tunnel, is quartz-schists and quartzites. Above, and to the west of the "blow-out," there is an exposure of a rock composed of quartz and lime, but only slightly exposed. A little further down the hill and underlying are exposures of black shales.

The surface exposures of ore are very considerable, and the ore is of good quality. The galena occurs both in large crystalline masses and also in the finer crystalline form. A sample of the coarse-grained galena taken by me gave on assay, 75.2 % lead, 51 oz. silver. The gray copper is also present in very appreciable quantities. There is certainly a remarkably good surface showing, and the fact that the tunnel failed to reach it at a depth does not, to my mind, prove that the ore does not go down. In my judgment the tunnel should have been driven further to the south to determine the point definitely.

NORTH FORK OF TOBY CREEK.

Hot Punch Mineral Claim. A location on the North Fork of Toby Creek, about six miles up from the main stream, at an elevation of 6,200 feet. Owned by Ben. Abell and E. Stoddart, of Windermere, and bonded to Collett & Starbird, of Fort Steele.

On a steep bank of a small tributary creek coming in from the west a quartz vein of from two to three feet wide, outcropping nearly horizontal, has been traced for several hundred feet. The outcrop at many points where exposed is heavily mineralized. At one of these points an inclined shaft has been sunk some forty feet on the vein, which was found to dip S 70° W. at an angle of 30°. From this shaft several tons of galena, carrying gray copper, had been taken, assaying 50 to 80 oz. silver to the ton.

The ore exposed in the side of the shaft would indicate a thickness of from 6 to 20 inches of solid galena, which continued down for some 20 feet, when the galena became largely mixed with iron pyrites, an amount of calcite appearing in the vein about the same point. Some 200 feet to the east of the tunnel, and on the trail, there is a good outcropping of galena 12 inches thick, accompanied by arsenical iron.

Sufficient work has not yet been done on the property to show what might be expected, further than that a fairly well defined vein exists, carrying in places galena and gray copper in considerable quantity.

I have a letter from Mr. Collett, dated December 20th, in which he says:—"We have sunk 70 feet and drifted 30 feet north and south. At the bottom of the incline was 30 inches of clean ore (galena), carrying a good deal of gray copper and some copper pyrites. The ore assayed 50 % lead, 120 oz. silver, 3 % copper, and $3.85 gold."

Royal Crown, Nos. 1 and 2. Two locations about half a mile south of the *Hot Punch*, owned by Matthews, Stoddart & Fraser, of Windermere. Elevation, 5,800 feet. There is exposed, in a 10-foot open cut and in some 100 feet of stripping on the steep hillside, a slip in the schists carrying from 1 to 3 inches of galena. The vein is exposed on one side and surface wash has filled in the crevice. Very little work had been done on the property and such of the vein as was exposed did not give much promise.

Delphine Group. This group consists of three full locations on the steep hillside to the east of the North Fork of Toby Creek, and some 6 to 8 miles from the main creek, or about 20 miles from the "Salmon Beds," the head of steamer navigation on the Columbia River. The claims are known as the *Eureka*, *Delphine* and *"616"* mineral claims, and adjoin, lying in a general north and south line, with the *Eureka*, the most southerly. Owners, R. A. Kimpton, Geo. Starke and Arthur Harrison, of Windermere. Having only this year been located, but little work had been done on these properties at the time of my visit, August 27th, but such slight work as was in evidence gave great promise.

A vein of solid galena, varying from 12 to 36 inches, had been exposed in a series of open cuts for a distance of some 150 feet; while surface scrapings further along the same line would seem to indicate that the vein extended pretty well through two, at least, of the claims. The vein is somewhat broken at the surface by small slips, etc., but has every appearance of being a true fissure vein, with strike S. 15° E., and dip S. 75° W., apparently cutting the schists.

When I viewed the properties the greatest depth attained was about ten feet and the length of the exposure in the cut about 30 feet, the work having all been done on the *Delphine*, the central claim. Some 25 or 30 tons of galena had been taken from the surface showing, of which 20 tons were afterwards packed over the trail to the "Salmon Beds" with the intention of making a trial shipment of them. Unfortunately, the sudden fall of water in the Columbia at that time, rendered it impossible for the steamer to ascend the river so far and the ore had to be left over until spring.

A sample taken by me as representing the ore from which the shipment was made gave on assay 64.68 % lead, 50 oz. silver. Certain of the ore will undoubtedly go higher than this, and it is as yet, too soon to say what will eventually prove to be the average.

Should subsequent development fulfil the promise of the surface showing, a large body of ore will be found, and so situated on a steep hill that it can be reached at a depth by a tunnel. A waggon road could be built from the "Salmon Beds" at a reasonable cost, and will be so built as soon as it is justified by the mining development.

COPPER CREEK.

Mineral and Copper Creeks are two short creeks flowing into Toby Creek from the south, two and four miles respectively, above the North Fork. At this latter point the elevation of the main stream is in the neighbourhood of 4,500 feet.

Between these two creeks and surrounding their basins a large number of locations have been made, the district being generally known as the Copper Creek district; the trail following up the creek of this name. It is by no means an easy trail to follow, being very steep and poorly made.

The claims here mostly show copper, but as yet in no workable quantities. Few, if any, have more than one year's assessment work done on them, for which reason it is only possible to speak of indications.

Paul Mineral Claim.

A location, owned by C. Troyer, of Windermere, situated on Copper Creek slope, at an elevation of 5,700 feet. No work has been done on this claim with the exception of a little surface scratching near the discovery post, where a deposit of quartz in a quartzose-schist has been uncovered, carrying a few patches of copper pyrites and considerable blue copper carbonate stain not in very encouraging quantities.

Index Mineral Claim.

A location staked by Isaac Norton in June, 1898, near the *Paul* mineral claim, at an elevation of 6,000 feet. Practically, no work has been done on this property. At this particular point the country rock is completely covered with wash, but at the discovery post there is showing a loose piece of quartz, carrying a little copper pyrites and some blue stain.

Lying next to the *Paul* is the *Morning Glory*, a location owned by C. Troyer. I am informed that certain development work has been done on this claim, but continued searching for an hour, on my part, failed to show where it was.

Troyer Mineral Claim.

This location, owned by the same party, lies above the *Morning Glory*, and the same quartz ledge is supposed to run through both claims. On this property considerable work has been done in the way of open cuts. Exposed in these is a quartz lead, some 24 inches wide, interbedded between the schists and dipping N. 30° E. at an angle of 65°. In places there is a quantity of copper pyrites showing in the quartz, but as yet not very strongly.

On the summit, between Mineral and Copper Creeks, on a claim known as the *Cracker Jack*, three quartz veins are exposed, respectively, 6 feet, 3 feet and 1 foot wide, which cut across the schists and slates. The quartz contains a small percentage of copper sulphides and stain, which is strongest in the smallest ledge. Very little work has been done on these as yet. The same remark applies also to the *Copper King*, a location owned by E. Stevenson, in which the general conditions are the same as in the *Cracker Jack*.

A number of additional prospects have been located in the neighbourhood, all equally undeveloped, recorded as the *Copper Queen*, *Sunny Queen*, *Sunny Princess*, *Shady Prince*, *Horse-Shoe*, *Grass Valley*, *Golden Star*, *Shady Park*, and *Letter B.*

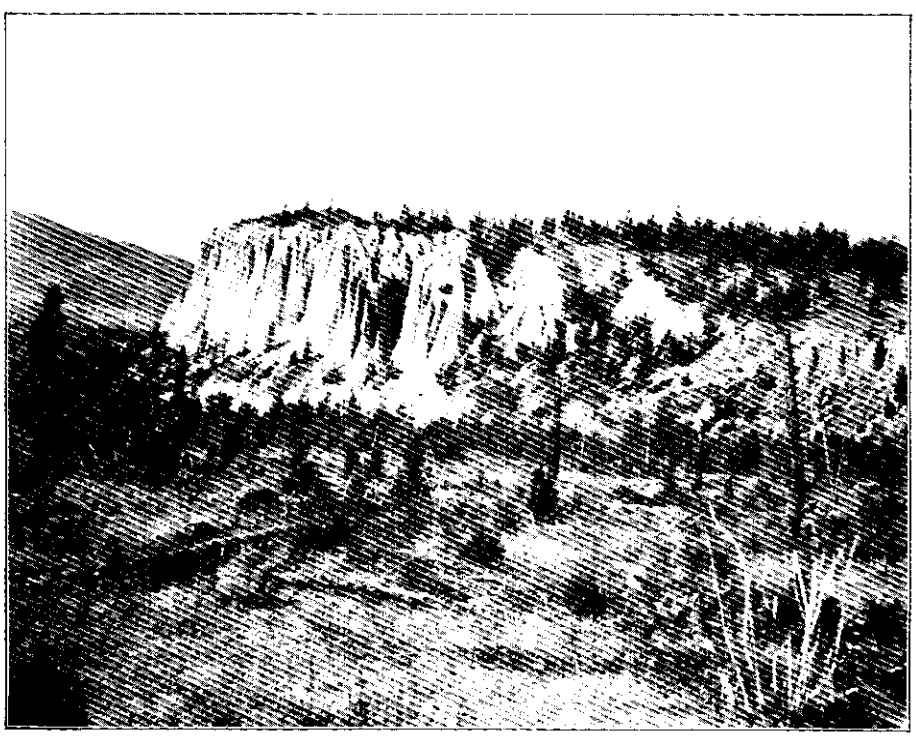
BOULDER CREEK.

Pretty Girl Group.

This group consists of six locations, viz., the *Venus*, *New Chum*, *Pretty Girl*, *Minniehaha*, *Old Chum*, and *Beauty*, held by the New Golden B. C. Company of London, Eng., represented by W. G. Mitchell-Innes, of Golden. The claims are located near the head of Boulder Creek, on the right-hand side going up, and form a belt extending over the summit into Law's Creek. Work has been confined to the *Pretty Girl*, which lies on the summit of the divide. The altitude of the valley of Boulder Creek, below the claims, is 6,200 feet, while the open cut on which the work was done on the *Pretty Girl* is at an elevation of 9,250 feet, more than 3,000 feet above the valley.

This open cut, 12 feet in length, has been sunk 10 or 12 feet in a soft shale, dipping nearly vertical, and striking, approximately, N. 25° W. Lying between the layers of the

THUNDER HILL CONCENTRATOR—UPPER COLUMBIA LAKE.



CUT BANK—MOUTH OF DUTCH CREEK—WINDERMERE DIVISION.

shales or slates across the cut were bands of gray copper and some carbonates of copper, forming a highly mineralized zone some 6 to 8 feet wide, from which large pieces of splendid ore had been taken. The shales were very much weathered and soft to the depth attained here, and are liable to an alteration of dip as they go down.

There seems to be no vein, in the usual acceptance of the term, but a zone in the bedding of the shales, which, at the surface, carries very considerable quantities of ore. A fairly representative sample of this ore gave me, on assay, 26.68 % copper, 55.5 oz. silver to the ton.

Upon the very meagre data obtained when the open cut was down 8 feet, and with no other positive surface showing, the Company started a tunnel 150 feet vertically below the cut, and approximately 250 feet horizontally from the same. It was expected that at 90 feet in this would cut the ore-body at a point where a bend in the same was supposed to occur from the indications of the surface shales. From this point the tunnel, it was supposed, would run on in ore. At the time of my visit, September 2nd, the tunnel was in 200 feet, and had failed so far to find the ore-body. The management had just begun to sink a shaft in the surface showing to obtain more data as to the dip of the ore, which they intended following down 30 or 40 feet. From this data they would then drift to the right or left from the end of the tunnel.

I am since informed that the ore has been struck from the tunnel, and has been found very promising, both as to quantity and quality; but am unable to obtain any reliable figures regarding same.

There is connected with the property a good large log cabin, situated at an elevation of 7,500 feet, just above timber line, from which point all mine timbers have to be packed to the workings. The trail from the valley up to the property has been built by the Company, and is in very fair condition.

Delos Group.

This group consists of four locations, viz.: The *Calamity Jane*, *Delos* and *Trojan*, on the right-hand bank of Boulder Creek, and across the creek the *Colossus*, owned by Tom Jones, of Golden, and bonded to the Mines Development and Guarantee Trust Co., of Rossland. The claims are situated on a steep bank and the work has been done on the *Delos* a few feet above water level.

The country rock is composed of slates, which appear to be bedded nearly horizontally, while the cleavage planes are usually vertical, although in one or two places they seem to be horizontal.

Running through the slates and parallel with the cleavage planes, is a belt or zone some 150 feet wide, composed of quartz stringers running with the belt, but very irregular as to direction. These stringers vary in size from 1 inch to 24 inches, and at the surface where a lot of stripping has been done, are very much jumbled. It is probable that several of these stringers will get together, forming a larger ledge which may be followed to a depth, but this has not as yet been proven. Along this surface outcropping quite large masses of copper pyrites are found in the quartz, from which several tons of ore could be obtained.

At the lower end of the stripped surface a tunnel has been driven in 53 feet, of which the first 39 feet was a cross-cut and the remainder on a quartz ledge about 20 inches wide, in which occurs a very fair percentage of copper pyrites. This ore has certainly a very striking appearance, being often in great masses of solid pyrites. My sample of the clean ore gave me on assay 32.48 % copper, with only traces of silver.

Whether the large surface showing is connected with a large and more regular ledge remains for further development to prove.

GOLDEN MINING DIVISION.

The Golden Mining Division comprises the drainage area of the Columbia River and tributaries below Horse Thief Creek and above the Town of Moberly, which lies between Golden and Donald.

This Division, I regret to say, I was unable fully to examine, entering it from the south on September 12th and nine days later encountering fresh snow on the higher elevations, which greatly retarded my work. The snow continuing to fall I was obliged to give up the work for the season, except on such claims as were at a low elevation. There was over a foot of snow on the claims on the 29th September, and in a district where the development work consists chiefly of open cuts, it was impossible under existing conditions to form any idea of the merits of a property.

Golden. The only town in the Division is Golden, on the main line of the Canadian Pacific Railway, a progressive and flourishing centre, with many comfortable homes; but viewed from the railway not making much display, the chief residential portion lying across the Columbia River. Its hotels are good, the Columbia House being worthy of special notice, and would be a credit to any town in the Province.

Here are situated the Government Offices and the Mining Recording Office for the Division. The mineral collection at the office af the Mining Recorder, Mr. Lang, is well worthy of a visit. It is the best arranged collection of its kind I have seen in the Province. It was my intention to have had an illustration in this year's Report showing its arrangement, and I would have had but for a mishap to my negative.

SPILLIMACHENE AND JUBILEE MOUNTAINS.

On both the Spillimachene and Jubilee Mountains, lying at the junction of the Columbia and Spillimachene Rivers, a large number of claims have been recorded, of which a few are Crown-granted. Within the last two or three years, however, little work has been done on any of these claims, and attention was paid by me to but a very few of them.

Rothschilds Mineral Claim. A Crown-granted claim, 1,500 by 600, owned by Sheriff Redgrave, of Donald. This claim is on the south-west slope of Spillimachene Mountain, at an elevation of 3,700 feet, and is reached by a good trail used at one time as a sleigh road from Spillimachene Landing, a distance of eight miles.

There is a tunnel run in about 50 feet, the first 30 feet in wash and the remainder in a highly silicious limestone, resembling more the rocks of the Rocky Mountain series. I could observe no mineral of value, either in the tunnel or in the country rock, but on the dump found a few pieces of rock with galena. The work showing, I was informed, dates back to about 1886.

Giant Mineral Claim. A Crown-granted claim, 1,500 by 1,500, on the south-west side of Spillimachene Mountain, owned W. J. R. Cowell, Assayer, of Victoria.

Lower Tunnel. In 300 feet in limestone. At 100 feet in from the surface there is a deposit of "heavy spar," carrying about 15 % of galena, but, as far as I could see, the deposit was of the nature of a pocket. The rest of the tunnel is in limestone, through which, here and there, are stringers of galena, "frozen" to the country rock, and in no instance of very appreciable size or strength.

Open Cut. Above this lower tunnel, to the north-west, and at an elevation of 3,825 feet, is an open cut, showing lime and heavy spar, heavily charged with galena. About 10 feet under this, there is an outcropping of slate, dipping to the south at an angle of 60°, and with a strike about E. and W. (mag.)

Upper Tunnel. At an elevation of 3,850 feet, there is another tunnel, said to be in 100 feet, but now caved in. Judging from the dump, this tunnel was run in a black shale, which does not seem to have been very highly mineralized. I noticed in the shales concretions or kidneys of zinc blende and galena, but in no great quantity.

Shaft. Within 50 feet of the upper tunnel there is a shaft, said to be down 20 feet, but which I could not descend.

Hidden Treasure Mineral Claim. A Crown-granted claim, 1,500 x 1,500 feet, owned by Henry Croft, of Victoria; a continuation of and situated above the *Giant*, at an elevation of 4,250 feet.

From the development done, it would appear as if, at the contact between the lime and slates already mentioned, there was a deposit of heavy spar (sulphate barium), which follows the contact as far as I traced it. This heavy spar is all more or less mineralized, the mineralization sometimes extending into the country rock. At lower points on the hill the mineralization seems to be chiefly zinc blende, which, as one proceeds higher up, changes to galena, while still higher up the mineralization seems to be chiefly copper.

The principal work on the claim is an "excavation" in the side of the hill, started as an open cut and continued as a tunnel. In this spot, some very fine carbonates of copper and some copper glance were found. A shipment of from 5 to 10 tons is reported to have been made, which gave a return of 53 % copper. In getting this ore out, however, they "gophered" the deposit in all directions, following small stringers of ore, and not leaving enough ore in place to give me a good sample.

BUGABOO CREEK.

Bugaboo Creek is a long and rather important stream flowing from the west into the Columbia River near Galena P. O. The trail leading to the claims on this creek, starts in from the Columbia at a point opposite Spillimachene Landing, to reach which, from the Golden and Fort Steele waggon road, it is necessary to swim the horses across the Columbia. The distance from Spillimachene Landing to the head of Bugaboo Creek is 28 miles, over a rough but not difficult trail.

No. 21 M. C. and Western Cross M. C. Are situated at the very head of Bugaboo Creek, on the summit of the divide, between Hawser Creek in West Kootenay, and Bugaboo in East Kootenay, at an elevation of 7,500 feet. These are locations made by T. Mercier, and bonded to the Golden and Fort Steele Development Company.

The country rock is composed of a dark slate or shale, lying rather flat, through which cut various quartz leads of small size, and occasional stringers of solid galena accompanied by iron sulphides. These galena veins, so far, have not been found wider than a few inches, and the quantity of ore exposed is not great. The assays as given me, however, from the selected ore, are high, running from 100 to 175 oz. in silver.

The development is not sufficient to prove what may be expected as to quantity, but should the quality continue as good, such ore could be profitably shipped even from this inaccessible point.

The first tunnel started, after getting in about 20 feet, struck such a stream of water that it had to be abandoned, as the men could not continue working. A second tunnel was therefore started and was in a short distance at the time of my visit, but had not proceeded far enough to prove up anything.

Discovery Cut. An open cut, 50 feet long and 5 feet deep, shows a rather indefinite quartz vein running S. 45° E., with some galena and iron. Selected samples are said to have given values of $75.00. There are other open cuts and pits, but nothing very definite could be learned from them.

Iron Seam. Six feet of black looking sulphides is showing in an indistinct vein in the slates, but I could not learn the values obtained.

Copper has also been found on the property, but not in paying quantities.

The *Western Cross* lies just above the *No. 21*, at an elevation of 7,650 feet. I could find no vein on this property, but a zone in the rather soft slates, lying just above their contact with a more compact argillite, is highly impregnated with galena and iron sulphides.

FRENCH MOUNTAIN.

French Mountain is situated to the west of Bugaboo Creek, just where it leaves the marsh forming the basin at the head of the creek, from which point the trail branches off.

There have been a large number of claims staked on this mountain, the best known being the *French Group* and the *Bugaboo Group*.

French Group. This group consists of three locations, the *Last Chance*, *France* and the *Agnes*, held by Dr. H. E. Langis and T. Mercier.

Last Chance. Elevation, 6,800 feet. The country rock is composed of slates and some conglomerates. Through the slates are a number of white quartz veins, from 18 inches to 6 feet thick, the quartz being vitreous and highly crystalline. Pockets of galena show up here and there through the quartz, not in any great quantity as far as exposed, but reported as running high in silver. Also occurring in the veins is a steel grey mineral, which seems to be a mixture of galena and sulphides of iron, weathering to an iron oxide, which carries values in gold, silver and lead.

Agnes Mineral Claim. Elevation, 7,600 feet. On this claim is a large deposit of what appears to be arsenical iron and iron pyrites mixed, in fine grains. Showing in a 10-foot open cut there is a 6-foot ledge of this traceable for a considerable distance. The values contained I could not obtain. A talcose schist forms one side of the vein.

Bugaboo Group. This group, also owned by Dr. H. E. Langis and T. Mercier, consists of three claims, all full sized locations, the *Surprise*, *Magda* and *Hortense*.

Surprise Mineral Claim. Elevation, 7,250 feet. In this claim what is apparently a large dyke of igneous rock cuts through the shales in a general S. 35° E. direction and with a variable dip, the rocks being much distorted. In this dyke and running with it is a fair-sized quartz vein, the rock on both sides of which seems to be of the same character, although on the foot-wall it is somewhat fine-grained.

Development consists of an open cut and a 20-foot tunnel, running N. 70° W., driven on a quartz vein from 12 to 20 feet wide, the tunnel only gaining a depth of 15 feet from the surface. Another open cut and similar tunnel has been driven 50 feet higher up and to the east, and shows stringers of galena 3 inches wide, frozen to the walls. A 22-foot shaft has also been sunk on the same vein, about 200 yards to the north. The vein is mineralized wherever exposed, but not showing mineral in quantity as yet.

Magda Mineral Claim. This location lies 300 yards to the N. E. of the *Surprise.* There is here exposed a large quartz ledge in which a 20-foot open cut has been run. The quartz is more or less mineralized with iron sulphides.

Balrath Group.

This group consists of the adjoining mineral locations, the *June Bug* and *Riverside*, owned by Hon. F. W. Aylmer, of Golden, situated on Bugaboo Creek, at an elevation of 3,600 feet above sea level, or 700 feet above the Columbia River, and distant therefrom by trail from Spillimachene Landing about 8 miles.

1st Vein. Just above the Falls there is exposed on the creek bank a 10-foot ledge of iron-stained quartz, running approximately N. 70° W., and cutting at a slight angle the slates and quartzites forming the country rock, which run nearly E. and W. (mag.) The dip of the ledge is nearly vertical. Although strong, the ledge is not very clearly defined, being mixed toward the edges with slaty material, which seems to be a part of the ledge. The quartz carries no free gold, and where exposed is mineralized with iron pyrites carrying gold, but not in sufficient quantity to have any practical value. The exposure on the bank of the creek is about 12 feet high, and above this there has been a small amount of stripping done, exposing the ledge.

2nd Vein. Just below the Falls, and some 75 to 85 feet farther to the east, or lower down the stream, and about 25 feet, vertically, below the exposure on the 1st vein, a tunnel had been driven in about 25 feet on the foot-wall of a 24-inch vein of quartz, stained with iron, and not very clearly defined. This vein runs about parallel with the 1st vein and has the appearance of being a separate ledge, but may prove to be a spur from the main lead. The quartz in this is of the same character as in other vein, and does not carry important values.

After following this ledge in 25 feet, N. 70° W., the tunnel bears off to the left (S. 60° W.) for 125 feet, cross-cutting the country rock, here consisting of fine-grained quartzites and cutting on the way several small quartz stringers running irregularly. At this point a drift was run to the right for 15 feet in the country rock, but without result. The main tunnel makes a bend still further to the left for about 15 feet, and in so doing cuts obliquely the 1st vein, here about 10 feet wide, at a point not exceeding 15 to 20 feet from where it was uncovered in the open cut already referred to.

A shaft, said to be 45 feet deep, is on the property, very well timbered and provided with a horse whim, but it was so filled with water that I could not get down. This shaft is clearly not in line with the course of either of the ledges exposed, and I was unable to discover any outcropping to indicate upon what it had been sunk.

MIDDLE FORK OF THE SPILLIMACHENE RIVER.

So far locations on this stream have been pretty well confined to the vicinity of its source, the trail to which starts from the Columbia River, at Carbonate Landing. At the landing horses can usually be obtained, and good accommodations are provided at the hotel, conducted by C. Cartright.

The trail, after leaving the landing, crosses over the summit into the valley of the North Fork, below Loon Lake, thence climbing over another summit into the valley of the Middle Fork, which it follows. The trail is a good one, well kept and not very rough. The distance from the landing to the head of the Middle Fork is about 30 miles.

VERMONT CREEK.

A number of claims have been located on Vermont Creek, one of the tributaries of the Middle Fork, and a large amount of work has here been done. Some years ago a considerable quantity of ore was shipped from here and hauled over the sleigh road down to Wells' Landing. Much of the ore, however, never got further than the river bank where it was left, as being too low grade,—the result of having no competent assayer at the mine to guide the sorting of the ore.

As very little work has been done on the creek in the past two or three years, I did not visit the old workings.

COPPER CREEK.

On this creek a number of prospects are located, some said to be very promising, but not as yet developed to any extent.

CARIBOO BASIN.

This basin is situated at the head of Cariboo Creek, which flows from the north into the Middle Fork, about 24 miles from Carbonate Landing. There are a number of locations in and around the basin, the most important of which are noted below.

Ellen D. Mineral Claim. Located in the Cariboo Basin, at the extreme upper end, at an elevation of 8,900 feet. It is a 1,500 x 600 Crown grant, owned by L. B. Keyser and J. C. Jolliffe, of Golden. On this property there is a 65-foot tunnel on a 6-foot quartz vein, carrying a pay-streak of iron sulphides, averaging about 2 inches wide, from which streak good values in gold are said to have been obtained. The rest of the vein is not mineralized and does not carry values.

Buckskin Mineral Claim. Is a Crown granted claim, adjoining the *Ellen D.*, and is held by the same owners. Elevation, 8,700 feet. A tunnel driven in 50 feet crosscuts a number of small quartz stringers, and near the face has cut a quartz ledge 24 to 30 inches wide, carrying a small percentage of iron sulphides containing values chiefly in gold.

I am of the opinion that the quartz in this locality does not carry free gold, except near the surface, and as the result of the decomposition of the sulphides.

BOBBIE BURNS BASIN.

This lies to the north of the Middle Fork, about three miles, at the head of a creek of the same name, and is distant from Carbonate Landing some 27 miles. There are a number of locations in and about the basin, mostly on well-defined quartz ledges, carrying varying quantities of iron sulphides, with gold values, but, with the exception noted below, only slightly developed.

Robert E. Burns Mineral Claim. A Crown-granted claim near the centre of the Bobbie Burns Basin, at an elevation of 7,650 feet, and owned by Robert Frothingham, of Ottawa. The country rocks are slates and schists, having a strike about N. W. and S. E., and dipping at a high angle. Cutting these rocks, and having a strike about N. W., is a series of quartz veins from 1 to 4 feet wide, while a cross-course series of smaller veins cuts this main series nearly at right angles. The veins are all mineralized, more or less, with cubical iron pyrites and a small quantity of galena, with occasionally some arsenical pyrites. The mineralization is not uniform, being greater in certain spots, and would appear to be greater in the cross-course veins than in the main series. A concentration of mineral usually occurs at the intersection of veins of the two series.

On a knoll, near the centre of the basin, an open cut has been run for a distance of from 150 to 200 feet, N. 45° W., on a vein of the main series, exposing such vein, here about 3 feet wide, the vein matter having been excavated to a depth of 6 to 8 feet. In this cut, two or three cross-course veins come in from the sides. The veins, to the depth exposed, have been affected by the surface influences, and the iron sulphides, which evidently existed in considerable quantities, have become oxidized and partly removed, leaving the quartz in a honeycombed condition, in which it is sometimes possible to find visible gold. The surface material from this cut has in the past produced some free gold, by washing, but I am of the opinion that such gold was only superficial, and was entirely the result of the surface oxidization of the sulphides. In the bottom of the cut, even at a depth of 8 feet, sulphides of iron, both yellow and white, were beginning to appear, and will probably continue to be the form of mineralization in the veins, as depth is attained.

The veins are strong, and seem to be regular fissures, and it is exceedingly possible that, as soon as the prospectors get tired of hunting for free gold and turn their attention to the development of the veins, for the sulphides contained, such sulphides may be found in paying quantities.

Stamp Mill. About the year 1891, a Fraser & Chalmers 5-stamp mill, with 750-lb heads, was erected in the basin by the then Bobbie Burns Company. The mill is still standing and in good condition, in a substantial log building on the hill-side, and so situated that the waggon road, about half a mile long, brings the ore from the "open cut" referred to to the level of the feeding platform. The mill is well equipped, with a "Tullock automatic feeder," plates, etc.

The tailings were run down to a small flat, where they were empounded and collected, probably for further testing.

The mill was run by power supplied by a Pelton wheel, the water for which was conducted from a small stream in 8-inch iron pipes, under a head of about 100 feet.

I have been shown a report on the operations of this mill, by a well-known mining engineer, written at that time, in which he states that 70 tons of ore were run through the mill, and that 2 dwt. 3 grs. of fine gold per ton was recovered by the mill, while the average of the tailings in the pits was 12 dwt. 23 grs. This ore was taken from the surface cut, and may have been enriched by natural concentration, but of which there is no record.

The operations go to prove that, even at the surface, the greater part of the gold values are in the sulphides; and I think that with depth, practically all the gold will be found to so exist.

MIDDLE FORK PROPER.

Lincoln Mineral Claim. Is a location on the Middle Fork, just below the Bobbie Burns Creek, at an elevation of 6,000 feet, and is owned by W. C. Tillson, Salem, Or. A tunnel has been driven in about 90 feet, N. 45° W., cross-cutting a couple of small barren quartz ledges near the mouth of the tunnel. The remainder of the tunnel is through the slates, etc., forming the country rock.

Flying Dutchman Mineral Claim. Also a location on the Middle Fork, just below Bobbie Burns Creek, at an elevation of 6,100 feet, and is owned by G. B. McDermott, G. E. Foster, and Jno. Henderson. The country rock is composed of the slates common to the district, and through these cuts a quartz vein, accompanied by stringers of spar. The slates are much disturbed, and the vein is very irregular as to width. The vein, having a strike of N. 30° E., with a dip to N. of 70°, is exposed on the face of the hill for 50 to 100 feet, and then cuts into the hill. A short distance to the east of the

surface exposure a tunnel has been run in 150 feet, cross-cutting the ledge. After going right through the ledge and into the country rock, the tunnel makes a sweep to the right of 180°, and cuts the ledge again from the inner side, forming a letter S, when it follows the vein for 10 to 15 feet.

The quartz is here 3 or 4 feet thick, and scattered through it are patches of iron sulphides, in some places forming a considerable portion of the vein, but not averaging over 5% of the same.

I took a sample of the iron sulphides, as pure as could be obtained with the hammer, and I find, on assay, that they contain $20 per ton in gold. Here, again, the gold values depend entirely on the quantity of sulphides occurring in the vein, as the quartz carries no free gold.

INTERNATIONAL BASIN.

This basin lies at the very head of the Middle Fork of the Spillimachene River and 30 miles from Carbonate Landing, the basin being at an elevation of over 8,000 feet, while the claims on the hillside extend up to a height of over 9,000 feet, continuing over the summit into the Duncan River country of West Kootenay.

The basin is above timber line and is surrounded by glaciers. The trail passes over the foot of one glacier which extends down into the valley to an elevation as low as 6,200 feet.

The slope of the sides of the basin is about 20°, broken by small plateaux and covered with rock slides, above which the cliffs rise seemingly perpendicularly.

The development work done on the claims shows that there is a system of large quartz ledges cutting through the basin about N. 70° W., and plainly visible, continuing up the face of the cliff, cutting the slates and shales comprising the country rock. A secondary series of cross course veins, evidently of later origin, cuts the main ledges mostly at right angles.

These secondary veins are much smaller than the main ledges, but seem to be more highly mineralized.

I reached the basin on September 23rd and was unfortunate in that a heavy fall of snow, of the previous day, lay on the ground, filling up all the open cuts and covering all the dumps, so that I was not able to make as minute an observation as I should have liked.

The principal claims are noted further on with as much detail as was possible under the circumstances. The main quartz ledges, mentioned as cutting the cliffs, continue right through the hill, and on the other side of the hill upon these ledges, and others similar, is located the much-talked-of Bennison Group. This group, although lying within less than a mile of the basin, I was unable to reach, as the trail led over a dangerous glacier, and, with fresh snow on the ground such an attempt was considered too dangerous to be risked, leaving as the alternative a trip of over 50 miles around to reach this group.

International Mineral Claim.

A Crown-granted claim, 1,500 by 600 feet, owned by J. L. Spink *et al.*, of Toronto, and situated at the upper right-hand corner of the basin at an elevation of 8,400 feet. There are at least two strong main quartz ledges cutting through the property, the out-crops plainly traceable on the surface for several hundred feet and running N. 55° W.

On these main ledges are several open cuts and a shaft, said to be down 50 feet, also some smaller pits. I was unable to get into any of these and had to judge of the mineralization from the material on the dump, evidently piled up as ore. From this I should say that the quartz carried a small percentage of galena, not of great importance, and a still smaller amount of gray copper. The chief source of mineralization was iron sulphides, which are

BOBBIE BURNS BASIN--MIDDLE FORK, SPILLIMACHENE.

MIDDLE FORK, SPILLIMACHENE RIVER--NEAR HEAD.

irregularly distributed through the quartz, and which carry certain gold values. Judging from the dumps I should say that on the gold values contained in these iron sulphides the value of the property depends.

A certain amount of free gold has been found on the surface, but I am satisfied that the quartz carried no such gold except as associated with the iron sulphides, or from the oxidization of the same. As to the percentage of iron sulphides present in the quartz ledges as exposed, I am unable to form an accurate opinion for reasons already stated, but the amount is such as to at least encourage further development.

Favourite Mineral Claim.

A location owned by Geo. Stark, M. Dainard *et al.*, and is situated directly below the *International*. The quartz ledges of the *International* probably extend into this claim, but are not exposed on the surface or by any workings that I could find. A tunnel has been started below the *International* ground and has been run in for two sets in slide rock. There was no mineral in place visible either in the tunnel or on the surface.

Standby & Maud S Mineral Claims.

Crown-granted claims owned by J. C. Jolliffe and A. H. Stracey, of Golden. These claims are adjoining and are to the north-east of the *International*, the *Maud S* being an extension up the hill of the *Standby*. The main quartz ledges cut through both these claims and are very strong and permanent.

On the *Standby* there is a 90-foot tunnel, also a 40-foot shaft and a number of open cuts on the quartz ledges. In the tunnel the work was started on one vein, but after going a few feet cross-cut to the left and followed in another ledge. A little galena is found with the quartz, but the principal values are in gold occurring in iron sulphides. I was unable to get down the shaft, but the ore on the dump showed a fair amount of iron sulphides.

On the *Maud S* there is a tunnel in 250 feet, which in its course has cut three large quartz ledges. The largest, 10 feet wide, has a strike N. 75° W., while the other two run N. 50° W., perhaps indicating the possibility of a third series of veins. These veins are somewhat mineralized with iron sulphides carrying gold.

Some 150 feet further up the hill there is an open cut on the big ledge, which here, in addition to the iron, has a considerable quantity of galena showing, amounting to about 5 % of the face of exposure.

Lochinvar Fraction.

Formerly the *Whistler Fraction*, is a location held by Dugald McDougall. An open cut of 10 feet was started on a large quartz ledge, which seems to cut out at a few feet below the surface. The strike of the quartz is N. 55° W., and it is barren where exposed. There is a second open cut on one of the cross-course veins, showing a small quantity of iron and galena. The surface here is quite bare and I traced the vein for some 100 feet, but was unable to trace it any farther.

Picton Mineral Claim.

A location owned by L. B. Keyser, of Golden, and lies next to *Maud S* and above the *Standby*. A 24-inch white quartz ledge is exposed on the face of the cliff running N. 40° W., but apparently quite barren. A tunnel was started in about 10 feet to the right of this, and run in parallel with the ledge for 25 feet, when it cross-cut on an angle of 45° for 15 feet until the ledge was cut following it along 10 feet farther.

McMURDO CREEK.

McMurdo Creek is the largest branch from the south, flowing into the North Fork of the Spillimachene River.

This district of country is reached by trail from Carbonate Landing, a distance of about 35 miles over a fair trail.

A new trail has been cut this last year, starting in from Bear Creek, on the C. P. Ry., following up Beaver River for a short distance, and then cutting over Prairie Mountain, but of this trail I can only speak from hearsay.

I got up the North Fork and on to McMurdo Creek on September 29th, when another and heavier fall of snow came, and I was only able to visit two claims. Such examination as I was able to make of these was very incomplete and, therefore, unsatisfactory.

I. X. L. Mineral Claim. Is a location on McMurdo Creek, at an elevation of 6,800 feet, belonging to H. Richardson *et al.* The country rock is slate, cut occasionally by igneous rocks. A 24-inch quartz ledge outcropped on a steep hillside, with a strike to the westward on the surface, but, as development progressed, the vein was found to turn off sharply to the south.

There is at present a 10-foot open cut, leading to a 10-foot tunnel, with a second smaller open cut above. At the surface there was a showing of several inches of solid galena, which is not as strong at the inner face, but the development is not sufficient to prove anything.

Some iron sulphides also occur in the quartz, and I saw free gold panned from the surface dirt, probably from the oxidization of these pyrites.

Pill Chicamon Mineral Claim. A location held by H. G. Low *et al.*, and is near the *I. X. L.* A 12-inch quartz vein is exposed, dipping into the hill at an angle of about 15°, with a strike N. and S. Very little work has been done on the property. The quartz is mineralized with galena and iron sulphides, while the surface dirt will yield free gold in the pan.

DONALD MINING DIVISION.

REPORT OF J. E. GRIFFITH, GOLD COMMISSIONER.

From Donald the trail leaves for the Northern country, down the Columbia to the Big Bend and up Canoe River to Tete Jaune Cache; the trail is completed to within 45 miles of the Cache, but as the balance is a fairly open country, not much trouble was encountered in getting through to the Fraser. Several prospectors, with exceptionally large outfits, are working there this winter, and from reports gathered, in all probability that section of the country is destined to prove valuable as a placer ground and good reports will probably be heard from there next spring.

Some very good prospects, carrying galena and copper ore, have been located close to Donald this year, giving wonderfully good assays, but as yet not sufficient work has been done to determine their actual value.

Considerable development has been done on the *Bald Mountain* property, consisting of ten claims, altogether some 300 feet of tunnelling; and a trial shipment was sent for a mill test, but the result I have been unable to learn.

The *Little Brother* group, bonded to Mr. Knowlton, has also been the scene of considerable activity, from which assays have been taken showing high values, although the ground appears to be pretty well broken up. With careful stripping and development work, it is expected good results will follow. Considerable development was done this fall and work will be continued in the spring.

OFFICE STATISTICS—DONALD DIVISION.

Free Miner's Certificates issued	36
Mineral Claims recorded	22
Placer Claims "	1
Mineral Claim transfers	10
Placer Claim "	1
Records of Assessment Work, mineral	24

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GOLDEN MINING DIVISION.

REPORT OF J. E. GRIFFITH, GOLD COMMISSIONER.

In the Division in general, there has been very little actual development work done this season (with one or two exceptions) beyond the necessary assessment work. All the well-known claims Crown-granted are no doubt held by the owners at high figures.

Considering the large area embraced in the McMurdo district, with 140 miles of trails and a large number of well-known claims, it is to be very much regretted that they are allowed to stand idle. The present state of affairs is liable to exist unless some energetic company proves beyond doubt that there is pay ore, then transportation facilities will no doubt be easily acquired.

Considerable work has been done in the Bugaboo district this summer, by the Golden and Fort Steele Development Company, at the head of the creek, where several claims are located showing mineral, and several tons of ore are now on the dump ready to ship.

Some trouble was caused by the water encountered in one of the tunnels, and probably a different system will have to be practiced in order to thoroughly test the property. The great distance from transportation facilities, in this case and many others, is of course a drawback, but will be overcome when sufficient work is done to prove the property. There is undoubtedly a good showing on the surface, from which assays have been obtained up to $100 to the ton.

The *Balrath Group* is another property on which considerable work has been done, but is at present idle.

The *Certainty Group* has been bonded to Mr. Knowlton, and the *Porphyry* and *Iron Hill* to Mr. McIntosh, both of whom will commence work in the spring.

The *I. X. L.*, which is under bond to Vancouver parties, has very good surface indications. A 20-foot tunnel was driven on the lead, but enough work has not been done to demonstrate the actual worth of the property, although what ore there is in sight is of high grade.

A good deal of work has been done on the *Bennison Group* which is situated near the headwaters of the Beaver and distant about 33 miles from Bear Creek Station, on the C.P.R. This property is owned by the Kootenay Consolidated Mining Company, and is under the management of Major Clohecy, and is probably the most advanced of any of the claims in the

District as far as development work is concerned. The Government built a trail this past summer from Bear Creek Station, but there is still about five miles to be completed before the mine is reached; possibly next summer may see it converted into a waggon road. The location is good and does away entirely with the different summits which were encountered by the old route up the Spillimachene.

The following report taken from the "Golden Era" is said to give a good account of the work done up to date:—The open cut on the Boston shows up a body of ore extending over a width of 32½ feet, the ore being galena interspersed with gray copper. At 100 feet below this cut a tunnel (No. 1) has been driven 192 feet. At a distance of 150 feet from the mouth it cuts the Boston lead and follows on the western wall of the ore-body which was exposed at the surface in the open cut. At a point 54 feet from the mouth, a vein of rich galena was cut. Two drifts have been run north-west from the tunnel, and one north-east, one of which cuts the Boston lead at 15 feet, another is in 64 feet and cuts a stringer which shows splendid ore. About 300 feet west of the tunnel an opening has been made on the western system of leads, which forms so prominent a feature of the property, and a tunnel has been run in on them for a distance of 35 feet. One of these leads is a contact vein, two to four feet wide, running with a porphyry dyke and is a particularly promising lead.

No. 2 tunnel is 750 feet below tunnel No. 1, and is run to develop the Bennison lead, a body of gold-bearing quartz. After running along this lead for 158 feet the tunnel crosscuts it, and the crosscut will be continued this summer to cut the Boston and other leads to the south-east; this will practically develop the lead to a depth of a thousand feet.

Assays made on ore from the western system of veins show gold, silver, lead, and copper.

The property is now at that stage at which very little more work can be done till proper means of transportation are obtained, so that machinery can be got in and the property placed on a working basis.

The following work is also reported as having been done on Ottertail Creek:—29 feet of tunnel and 37 feet of shaft on the *Sunday Claim*; and 70 feet of tunnel on the *Hercules*.

On the Middle Fork of the Spillimachene, 25 feet tunnelling on the *Ellen D.*; 50 feet on the *Lincoln*; 20 feet on the *Bryan*; 40 feet on the *Lucky Jack*; and 150 feet on the *Crown Point*.

OFFICE STATISTICS—DONALD DIVISION.

Free Miner's Certificates issued	205
" " " to companies @ $50	2
" " " " @ $100	3
Records of Assessment Work recorded	113
Payments instead of work	5

WINDERMERE MINING DIVISION.

REPORT BY J. E. GRIFFITH, GOLD COMMISSIONER.

There has been considerable activity in the Division this year, due not so much to actual development work as to the number of new locations with good surface showings, which have drawn considerable attention, resulting in several sales, offers, and bonds taken up and, in the ordinary course of events, next summer should see a big change in this Division.

There are many good locations on which no assessment work had to be done this year and it might be considered out of place to mention them before they are developed.

Considerable work has been done this year on the *Pretty Girl Group*, the property of the New Golden British Columbia, Limited, England. This group is situated on Boulder Creek, a tributary of Horse Thief. A tunnel has been driven in 235 feet, tapping the vein about 90 feet below the surface, where a shaft is being sunk on the ore to connect with the tunnel. This is a copper-silver proposition. A thousand pounds of the ore was shipped to England for a mill test, and is said to have run $65 to the ton. Judging from the present indications, the outlook is very encouraging, and, in all probability, permanent camps will be put in next spring and development work continued on a larger scale. The same Company also own several other locations of a promising nature, but so far only assessment work has been done on them.

The *Hot Punch*, on North Fork Toby Creek, bonded to Messrs. Collett & Starbird, is looking well. An inclined shaft of 75 feet and a 35-foot tunnel have been driven. The quartz lead is about 4 feet in width, with a pay streak of 18 inches of solid galena, carrying copper and gold. The ledge is uncovered for about 500 feet, and shows ore the entire length.

The *Delphine Group*, on the same creek, owned by Messrs. Starke, Harrison & Kimpton, from present appearances is likely to turn out a very valuable property. The ore is galena, carrying gray copper, the pay streak being from 15 to 30 inches. Although practically very little actual development work has been done, 20 tons of ore were packed down to the Columbia River, but unfortunately too late to be shipped, on account of low water. Good buildings have been erected close to the claims, which are favourably located, and development work is to be vigorously carried on throughout the winter.

The *Swansea*, under the management of Mr. Mulholland, of Rossland, is also being worked this winter. A 140-foot tunnel has been driven, as well as a shaft sunk. About 4 tons of ore were shipped for a mill test. Considerable work has been done in the past on the property, but not of a systematic nature, but under the present management it will be thoroughly tested. The surface indications and assays are good.

The *Delos*, under the same management, from which splendid samples of copper ore have been taken out, is also being developed.

Mention might be made that several propositions have been bonded to Nelson and Spokane parties for large figures and on excellent terms, on which work will be done next spring, and undoubtedly some very good mines will be the result. They are in good hands, and there is every reason to believe that Toby and Horse Thief Creeks, and their tributaries, will soon be the scene of great activity.

It is to be regretted that at the time of the visit of the Provincial Mineralogist to the Division, a number of the claims, especially the new discoveries, were inaccessible, and that a good many were only recorded subsequently.

OFFICE STATISTICS—WINDERMERE DIVISION.

Free Miner's Certificates issued	71
Mineral Claims recorded	293
Records of Assessment Work	62
Bills of Sale, etc	84

SUMMARY.

NORTH-EAST KOOTENAY, 1898.

Free Miner's Certificates issued	310
" " " to companies @ $50	2
" " " " @ $100	5
Mineral Claims recorded	416
Placer Claims recorded	1
Records of Assessment Work	199
Payments in lieu of Work	5
Claims Crown-granted	6

WEST KOOTENAY DISTRICT.

REVELSTOKE MINING DIVISION.

REPORT BY J. D. SIBBALD, GOLD COMMISSIONER.

I have the honour to submit for your information my report on the progress of mining development in this Division for the past year.

In order to place matters in as clear and practical a shape as possible, I shall start at a point in the Big Bend about 65 miles north of Revelstoke, and take in succession the different points at which active operations are going on.

SMITH CREEK.

On this creek, situated on the west side of the Columbia River, about a mile above Gold Stream, there are at present 4 placer leases legally held. This creek produces "colours" of gold anywhere on the surface of both slopes, but the difficulty, so far, has been the great depth to bed-rock, one leaseholder being down at least 100 feet and not on bed-rock yet. In all this depth "colours" of gold can be found in every foot of gravel, at times to a much greater extent than others, and the leaseholders are hopeful and are still pushing down for bed-rock. At the mouth of the creek the bed-rock, to the north of the stream, has been cleaned and some very coarse gold found, but this is not on the channel of the creek. The depth of bed-rock makes Smith Creek an hydraulic proposition, and if, when it is reached by the present shaft, a good showing is obtained, I look for a very active camp on this creek next year.

MCCULLOCH CREEK.

A large amount of work has been performed on this creek, and a great deal of gold has been taken out, but it requires capital to make it a paying proposition. During the year the Ophir bed-rock lease changed hands, and the purchasers are now arranging to put in an hydraulic plant, which will be at work next season with very great possibilities. There are four leases on this creek.

CAMP CREEK.

On this creek, a tributary of Gold Stream, there are three leases now held, the owners of which are preparing for work by putting in a flume.

FRENCH CREEK.

French Creek is another tributary of Gold Stream, on which the French Creek Hydraulic Company have put in a large plant. I am indebted to Mr. James M. Skeaff, the Engineer in charge, for the following report:—

"Preliminary surveys and investigations for construction of the plant were commenced May 26th of last year. Construction was commenced June 14th, and suspended for the season November 3rd. It was commenced again this year May 12th, as soon as weather would permit, and finished August 1st. Washing was commenced August 9th and continued (more or less interruptedly) until November 7th, when frost prevented further washing.

"The water for washing is taken from French Creek, through substantial head-works, by a $3\frac{1}{2}$ x 4-foot flume, 12,200 feet long. Connected with the flume are 1,587 feet of wasteways.

The capacity of the flume is a little in excess of 75 cubic feet per second. On the flume line there are some heavy cuts, 3,151 feet of trestle from 2 to 40 feet high, 2 bridges (the larger 187 feet long and 90 feet high), and 2 tunnels, 5 x 5½ feet in the clear, and 100 feet and 279 feet in length. The elevation of the flume gives an excess of pressure at the mines; this was the result of obstacles to flume construction at a lower elevation. From a point near the end of the flume to bed-rock in the mine the elevation is 412 feet. A branch flume takes the water from the main flume at this point and conveys it to a penstock 45 feet long, at an elevation 112 feet lower, from which a pipe line 1,825 feet long conveys it to two No. 6 Giants in the mine. The bed-rock flume is 108 feet long, and is set in a rock excavation 30 feet deep in solid rim-rock. A derrick of 6 tons capacity, operated by a Pelton wheel, is used to remove the boulders in process of washing. To supply lumber for the construction of the plant, the Company built a saw-mill, with a capacity of 12,000 feet of lumber per day. The mill is operated by a turbine wheel supplied by water through a 600-foot flume. A logging flume 2,802 feet long was another adjunct to the saw-mill. This summer a boarding-house, sleeping houses for the men, storehouses, and office have been built of sawed lumber.

"The installation of the plant would have been well on to completion last Fall had there not been the many very serious delays caused by the lack of transportation facilities between Revelstoke, the base of supplies, and the mine, and the wretched condition of the trails, which was aggravated by an exceptionally wet season. Part of the supplies were packed the entire distance of 70 miles from Revelstoke to the mine. Towards the middle of the season, the Company succeeded in getting the C. P. R. to take four steamer loads of machinery and supplies from Revelstoke up the Columbia River to La Porte, about 46 miles, from whence it was packed to the mine on animals. Small boats were also employed between Revelstoke and La Porte. The Company had 50 pack animals of their own, besides 24 others under contract, and in addition, got some assistance from local packers. Last year the Company spent on pack-train outfit, packing and freight charges, between Revelstoke and the mine, about $12,000.

"This year the Company got the steamer "Lytton" to make three trips with additional machinery and supplies, from Revelstoke to La Porte, as soon as the river was high enough to take the steamer up, about the middle of May. Small boats were again employed in September and October to take provisions up for next spring, and some of the provisions were packed from Revelstoke to the mine to insure against delay. Packing and connected expenses to the mine, and river freight, cost about $6,000. This is exclusive of railroad freight on machinery, etc. As washing was commenced towards the end of the season the Company did not expect much more from the mine than to shape the work and the ground and leave it in a more workable and systematized condition for the spring. But even under the circumstances better results would have been obtained had it not been for the serious lack of labour. Owing to this a night shift could not be run, and about three-quarters of the time since washing was commenced there was only a half-day shift. It is to be regretted that so heavy an investment as this Compay has made on French Creek (which amounts to about $100,000) for construction of plant alone and expenses directly connected with construction, exclusive of purchase price of property and operating expenses since washing commenced, that it should be jeopardized for lack of labour when there is supposed to be so much unemployed labour in the country, and when it is led to believe that such enterprises are hailed with enthusiasm to give labour employment and open a section of undeveloped country, which has been actually pioneered by this Company on the first large scale. Tent life is unavoidable during construction, but now the Company has comfortable warm buildings of ample size for its employees, and a boarding house stocked with the best provisions the country affords, and, as stated, it is a very

SINCLAIR HOT SPRINGS—NEAR WINDERMERE, N. E. K.

FROM INTERNATIONAL BASIN—MIDDLE FORK, SPILLIMACHENE.

serious drawback to this and similar investments that may follow, that labour will not take a better hold of this class of work when opportunity for work is afforded.

"When construction was finished and operating commenced, the Company began to systematically prospect the undeveloped part of their property, to the extent that the limited amount of labour would allow. This work will be continued next year until the whole of the property is thoroughly prospected."

On this creek are several other leases. Prominent among them is the *Consolation* which has taken out a large amount of gold by drifting on the bed-rock: in the last four or five years, I understand some $30,000, in which some very coarse gold was obtained, one nugget as high, as $50.

GOLD STREAM.

This creek is shallow diggings, and has been pretty well worked over, though gold is still taken out by "sniping," but not enough to justify any amount of work.

GROUND HOG BASIN.

This lies at the head of McCullough Creek, and contains many promising mineral claims; the ore being principally free milling quartz. The B. C. Alliance Syndicate have a number of properties said to be of a very promising nature. There are a great number of claims in this camp, but so far the bulk of the work done has been in surveys; prominent among the locations are the *Orphan Boy*, *Homestake*, *Last Chance*, *Roseberry*, *Rocket*, *C. O. D.*, *O. K.*, *Gold Hill*, *Gem*, *Ground Hog*, *Ole Bull*, *Kesef*, *Big Bend Belle*, *Alice*, *Bonanza King*, *Keystone*, *Gaspe*, and *Heather Fraction*. Work, to any extent, has only been done on the *Ole Bull* and *Orphan Boy*.

KEYSTONE MOUNTAIN.

This camp had its first locations made in 1895, but owing to lack of transportation facilities has not developed very fast; it is situated about 40 miles north of Revelstoke, and has a large number of claims (about sixty). The principal work has been assessment, with the exception of two groups on which about 300 feet of tunnel have been run, of which 200 feet are on the *Carbonate Chief* and 100 feet on the *Keystone*, and preparations are now being made to work several claims this coming winter. The character of the ore is arsenical iron, carrying gold, copper, galena, and copper pyrites. The iron leads are generally heavily capped, showing strong and continuous veins. Lead ores run from 60 to 80 per cent. lead and as high as 80 oz. in silver.

The *Standard Basin Group* adjoins Keystone Mountain on the east side, and has some 20 claims; the first located a year ago. This year only assessment work, and preparatory work for more active development another season, was done. The ore is composed of arsenical iron and copper pyrites, the copper predominating. On the *Standard* claim a cross-cut of 60 feet has been run and a chamber excavated and ready for sinking. The formation is lime, serpentine and shale, with dykes of porphyry and granite. This promises to be a good camp, with development. A trail was built this year to connect the camp with the Keystone Trail.

CARNES CREEK.

On this creek are located the well known group, consisting of the *Roseberry*, *Empire Fraction*, *Salisbury*, *Arsenic*, *Jubilee Fraction*, *Kingston*, *Coronation*, and *Imperial*, all owned by the "Carnes Creek Consolidated Company, Limited," and situated on the North Fork of Carnes Creek, easily accessible from the Columbia River.

Roseberry Mineral Claim.

The work on this group is principally on the *Roseberry*, and consists of 361 feet of tunnel and shaft. On the *Roseberry* there is a width of 50 feet well mineralized, containing good values in gold, which can probably be made to pay to work. Within this belt is a vein, averaging about 5 feet in width, containing concentrated ore of much higher value. The vein has been drifted on for 130 feet on one level, and 75 feet at 100 feet lower. In the upper level, there is exposed about 18 inches of clean ore, assaying well in gold, and the face of the lower drift is all in similar ore. The work on the adjoining claims proves that this mineral belt continues for several claims. This group has apparently a great future before it. The character of the ore is arsenical iron. There are a number of promising claims in this camp, but not much development.

LAFORME CREEK.

This creek runs into the Columbia River about 20 miles from Revelstoke. Within the last two seasons a large number of claims have been located, the ore being galena, copper and sulphides of iron. This latter ore is much like that of Rossland in appearance and carries gold values. The galena runs about 50 ounces in silver, 70 to 80 % lead. This is a very desirable locality on account of the facilities for transportation. A majority of the mineral claims on this creek are situated on the north slope of the North Fork, and are reached by 27 miles of pack trail, 20 miles on the Big Bend main trail, and 7 miles up Laforme Creek.

Through a large number of these claims and running nearly east and west is a well-defined vein between the limestone and schists. The vein is made up of iron pyrites and mispickel, with quartz gangue. The ore is in 4 bands, which together aggregate about 3 feet in width. Running parallel with this is a ledge of white quartz 3 feet wide, well mineralized. Both these veins can be traced through the *Adair Group* (5 claims) and the *Uncle Jar Claim*, and I am informed that they have been found on several claims lying to the east of the *Uncle Jar*. On some of the claims to the west of the *Adair Group* there is a galena ledge.

JORDAN PASS.

To the west of Revelstoke, on Jordan Creek, a number of claims have been located. The ledges are large and well defined; the grade of ore varies, but so far generally low grade. The principal claims are about 12 miles from the Columbia, and 13 miles from Revelstoke. The owners of these claims have a very high estimate of them, and say that all they require is a road, in order to develop them thoroughly.

REVELSTOKE.

On the hill back of the town is a location called the *Sultana*, which the owners are working on now. The prospect is gold. The owners are pushing in a drift, and the ledge improves as they get in.

ISAAC CREEK.

This is a promising camp of very large veins of arsenical iron ore, carrying gold. There are quite a number of claims in this camp, which is located about 8 miles from the Arrowhead branch of the C. P. R., on Isaac Creek, which enters the Columbia about 16 miles south of Revelstoke.

The following are the yearly statistics of Revelstoke Mining Division, as reported by Mr. W. G. Paxton, Mining Recorder:—

LIST OF RECORDS OF CLAIMS LOCATED DURING YEAR 1898 (UP TO AND INCLUDING 7TH NOV.)

French Creek	5
Downie Creek	23
McCullough Creek	12
Carnes Creek	19
Revelstoke (vicinity)	6
Jordan River	4
Keystone Mountain	37
Isaac Creek	24
Laforme Creek	11
Smith Creek	8
Standard Basin	2
Big Lime Creek	9
Ground Hog Basin	2
Graham Creek	6
Total	168

RECORDS, VARIOUS.

Bills of sale, mineral claims	65
Do. placer claims	6
Permissions	15
Abandonments	3
Placer leases granted	19
Free miner's certificates issued	365

LIST OF RECORDS OF CERTIFICATES OF WORK GRANTED DURING YEAR 1898 (UP TO AND INCLUDING 7TH NOV.)

French Creek	7
Downie Creek	47
McCullough Creek	21
Carnes Creek	22
Keystone Mountain	17
Isaac Creek	8
Laforme Creek	21
Ground Hog Basin	5
Lakeview Mountain	1
Camp Creek	1
Revelstoke (vicinity)	1
Total	151

LIST OF RECORDS OF CERTIFICATES OF IMPROVEMENTS GRANTED DURING ABOVE PERIOD OF 1898.

McCullough Creek	9

NOTE.—Eight claims on Carnes Creek are at present being advertised, with a view of obtaining Certificates of Improvement for same.

REVENUE OF REVELSTOKE MINING DIVISION FROM 2ND JANUARY TO 30TH NOVEMBER, 1898.

Free miners' certificates	$3,049 00
Mining receipts general	3,742 70
	$6,791 70

ILLECILLEWAET MINING DIVISION.

REPORT BY J. D. SIBBALD, GOLD COMMISSIONER.

The *Donald* and *Roundhill* claims, owned by Woolsey and Caldwell, have an excellent surface showing, and a shaft sunk for 80 feet on the ledge shows a large body of galena ore, but so far of low grade. This claim is 5 miles from Illecillewaet and 3 miles up Flat Creek. Adjoining these are the *Maple* and *Gracie* claims, owned by Robert Jewell. There are quite a large number of claims in this Division, on which 30 had assessments recorded this year, and 36 new claims were recorded.

Up about 28 miles from the station of Albert Canyon, on the main line of the C. P. R., are situated the *Waverley* and *Tangier* mines, the property of the Gold Fields of B. C., Limited, on which, I am informed, a great amount of work has been performed, but, owing to the lack of definite information, I am unable to give the extent. There are several other claims I have not before mentioned in the Illecillewaet Division on which work has been also done, viz.:—

The *Laurier* Mineral Claim, which has a tunnel driven 125 feet on the vein, which will be continued 200 feet this winter. The property is situated one mile east of Illecillewaet and 1,100 feet south of the C. P. R. track. The claim is owned by A. Chilberg.

Sanquhar and *Summit Lode* Mineral Claims have a shaft sunk on the vein 17 feet, a tunnel to tap the vein 108 feet, and a drift on the vein 32 feet. They are situated 3 miles north of Illecillewaet, and are owned by Walter Scott and Andrew Stenstrom.

Elkhorn Mineral Claim adjoins the *Sanquhar Lode*. There are several small open cuts on the vein, all showing high grade, gray copper ore, with a drift on the vein of 30 feet, which shows from 3 to 8 inches of high grade ore. Situated on the east branch of the North Fork of the Illecillewaet River; owner, Benjamin Green.

Big Horn Mineral Claim has three open cuts, showing high grade ore. A tunnel, 119 feet, has been run to tap the vein.

George and *Reggie* Mineral Claim, situated on the North Fork of the Illecillewaet, 21 miles from Albert Canyon, and 400 feet from the waggon road. The vein has been stripped about 200 feet; several cuts have been made on the vein, and a cross-cut of 150 feet.

There are also in this vicinity a number of other promising prospects belonging to private parties.

LARDEAU MINING DIVISION.

REPORT BY J. D. SIBBALD, GOLD COMMISSIONER.

Lardeau Mining Division takes in the east and west of Arrow Lake from Arrowhead down to within a few miles of Nakusp, and up the east arm of the lake to Thomson's Landing, taking Fish Creek, and the tributaries of Pool Creek, Lexington Creek, Boyd Creek, and Kellie Creek to the south-east, and McDougall, McRae, Sable, and Menhenick Creeks to the north-west.

PINGSTON CREEK,

This creek running into the Arrow Lakes, directly across from the St. Leon Springs, has a number of very promising claims, which are gold properties of the arsenical iron character. There has been considerable development work done on some of these properties, but no shipments so far.

Prominent among the claims on this creek are the *Canada Jay*, *Blue Grouse*, and *Laughing Gull*, about 4 miles from deep water. There are, in all, 23 recorded claims on the creek. A tunnel has been driven on the vein 25 feet, exposing 8 feet of massive pyrrhotite. The *Snowshoe Group*, near Pingston Creek, has a tunnel of 200 feet, with excellent showing of ore.

Great Western Group.

The location of this group is on the north-east arm of the lake, and is owned by the Great Western Mining Company, Limited. The ore is galena, and it is a concentrating proposition, and is located within a mile of deep water.

BOYD CREEK.

There are a large number of claims on this Creek, some of which are very promising. Among them can be placed the *Kootenay Chief Group*, comprising the *Kootenay Chief*, *Winnipeg*, and *Tarmacan*. On the *Kootenay Chief*, a tunnel has been run 35 feet, and there are several tons of good shipping ore on the dump. On the *Winnipeg*, a drift on the ledge exposes a vein of 8 inches of solid galena for full length of drift. Another promising property on the same ledge, is the *Anaconda*, which has a tunnel of 91 feet. Assays running well in gold and copper have been obtained from this claim. The formation is schist and lime; a large lime dyke extending through the country, traceable for miles.

LEXINGTON CREEK,

A tributary of Fish River. There are a number of promising claims on this creek, but owing to poor transportation facilities there has not been a great deal of development work done. The bodies of ore are large, but the grade is too low for shipment under present conditions.

The *Nellie Group* consists of three claims. An incline was sunk on the *Nellie*, and a cross-cut at the foot of the incline, a total of 60 feet. The other claims in this group are the *Kitty* and the *Empress*. The face of the cross-cut on the *Nellie* is in concentrating ore.

POOL AND MOHAWK CREEKS.

Pool Creek empties into Fish River, and Mohawk into Pool Creek. This is one of the most promising parts of Lardeau, and contains a large number of locations, and some very promising prospects are being opened. The *Beatrice Group*, one of the later discoveries, is working a number of men this winter. The character of the ore is argentiferous galena, carrying gray copper and a percentage of zinc. There are said to be about 200 tons of ore on

the dump. The work on this claim consists of a breast about 40 feet long and 10 feet high, a shaft 35 feet deep, and a drift on the ledge about 20 feet. The width of ore on the surface is about 9 feet. They have packed some ore out, but the transportation is of such a character that it will not pay unless better facilities can be obtained. There are four claims in this group, viz.: *Beatrice, Edmond, Florence,* and *Folsom.* They are now preparing to rawhide the ore out.

Other promising claims on Pool and Mohawk Creeks are:—

Black Bear, showing well on surface, but little work done so far.

Brunswick, discovered last summer, has a large amount of clean ore in sight; was sold by original locators to Lardeau-Goldsmith Company; has five men at work this winter.

Mohawk. This claim is at the junction of Pool and Mohawk Creeks, and has a good showing of galena ore, carrying sulphides of iron and copper; also values in silver and gold. Very little work was done on it at the time I saw it.

Carbonate Hill Group, Mohawk Creek. This group is near the *Beatrice*, and consists of the *Carbonate Hill, Silver Dollar* and *Old Abe.* A tunnel has been run, exposing a fine vein of ore similar to the *Beatrice.*

Copper King Group. This has a strong vein consisting of copper pyrites, but is low grade in gold and silver.

SABLE CREEK

Has some promising properties. The *Agnes*, owned by the Consolidated Sable Creek Mining Company, has a 40-foot tunnel, and the vein is stripped in several places. This company has spent several thousand dollars in development work.

Sunset, on Scott Creek, a tributary of Fish River, has a shaft sunk 60 feet deep, and a tunnel 25 feet. In both, working stringers of very high grade ore have been encountered.

The Revenue, a good prospect, sold a few weeks ago to Mr. Otto Abeling.

Lost Cup. This is a new strike made this summer, and was sold immediately on discovery to some parties in Rossland, who have six men at work opening it up. A cabin has been built and supplies packed in sufficient to last all winter.

OFFICE STATISTICS—LARDEAU DIVISION.

The following business was transacted at the Lardeau Office in1897-98:—

Claims recorded	407
Free miners' certificates issued	123
Certificates of work issued	79
Transfers	133

There were 552 claims recorded at this office from 31st May, 1897, to 31st October, 1898.

TROUT LAKE MINING DIVISION.

REPORT BY J. D. SIBBALD, GOLD COMMISSIONER.

This camp only requires transportation facilities to make it a most important one, but owing to the lack of the same progress is materially retarded. There is a waggon road from the Arrow Lakes into Trout Lake, Ferguson and Ten-mile.

Silver Cup Group.

One of the officers of the "Sunshine, Limited," has kindly furnished me with the following information about the *Silver Cup Group* which consists of four full claims, viz:—*Silver Cup, Sunshine, Excelsior*, and *Mountain*, and four fractional claims, viz.:—*Silver Cup Fraction, Excelsior Fraction, Mountain Fraction* and the *Silver Side Fraction*.

The principal development has been done on the *Silver Cup* claim, upon which some 2,000 feet of work in all has been prosecuted. The development consists of a cross-cut tunnel, 415 feet long, which connects, when in a distance of 350 feet, with the lower part of the main shaft, 185 feet deep, sunk on what is known as the *Silver Cup* vein above the tunnel. From the point of intersection, drifts have been run on this vein about N. W. and S. E., some 80 feet and 211 feet respectively, and considerable bodies of high grade and concentrating ore have been developed.

Before cutting the *Silver Cup* vein, the cross-cut tunnel encountered, when in a distance of about 300 feet, another vein known as the *Big Vein*, which has turned out to be of very great value. Drifts have been run about N.W. and S.E., on such vein at this level, for distances of 163 and 231 feet respectively, showing up a large body of ore.

From the north-west drift, on the level of the cross-cut tunnel, on the *Big Vein*, a winze has been sunk in ore a distance of 50 feet, and drifts on the vein, N. W. and S. E. for 33 and 73 feet respectively, have been run from the bottom of such winze, also showing up a large ore-body. Some 450 feet from the main cross-cut tunnel, and 130 feet vertically lower down the mountain, another cross-cut tunnel is now being driven and has reached a distance of 270 feet. When in 250 feet, such cross-cut (which has not yet reached the hanging-wall) intersected the *Big Vein*, which proved at this point to also carry ore of a very high value. The cross-cut is being continued towards *Silver Cup* vein, and to another vein beyond it. It is also the intention to drift from the new cross-cut on the various veins, and later to connect such drifts, by means of upraises, with the higher levels.

The depth attained on the property is now about 350 feet, and the veins may be said to have been actually proved for a length of about 700 feet.

In addition to the above workings, various small cross-cuts and upraises have been made.

The *Sunshine* property is situated immediately below the *Silver Cup*. Here a drift has been run on the vein for a distance of about 279 feet, on what seems to be a continuation of the *Silver Cup* vein. Two bodies of ore have been passed through, of the same character as the *Silver Cup* ore, and there is every indication to show that development will prove the property to be of value. During the last few months 650 tons of ore have been shipped from the *Silver Cup* and *Sunshine* properties, about 630 from the former and 20 from the latter. Such ore has yielded (all freight charges from Thomson's Landing, duty and treatment charges deducted) about $68,350. The ore has averaged just upon $150 to the ton, and consists of argentiferous galena, carrying a high value in silver and good values in gold and lead.

The Great Northern Group.

Consists of *Silver Queen, True Fissure, Great Northern, Hillside, Broadview, Old Sonoma, Philipsburg, Alpha, Northern Light, North Land, St. Elmo, Yankee*, and *Copper Chief*.

The *Broadview* has several hundred feet of tunnels and shafts.

Old Sonoma has a 30-foot shaft, and one tunnel 64 feet in length. Some very good ore has been taken out of this claim, carrying gray copper.

Great Northern and *Hillside* have three tunnels, 164, 83 and 30 feet respectively.

True Fissure has one tunnel 84 feet long, and an open cut 20 x 30, showing ore.

Silver Queen has two open cuts showing a body of ore, but requires development.

St. Elmo and *Yankee* has a 20-foot tunnel cutting an 18-inch lead from which good assays were obtained.

The following report furnished by Mr. T. Taylor, Mining Recorder at Trout Lake, gives fuller particulars of this Mining Division:—

I have the honour to submit herewith my annual report of the mining industry of the Trout Lake Mining Division.

Mineral Claims recorded	370
Placer Claims recorded	1
Leases applied for	1
Leases held	2
Certificates of Work recorded	440
Bills of Sale, agreements, etc	227
Revenue collected from the sale of Free Miner's Certificates	$1,460 00
Revenue collected from Mining Receipts issued	3,777 10

With the exception of a few of the older properties, the bulk of the work and development done since last report, consists generally of little more than the annual assessment work required by the "Mineral Act," and until such time as transportation rates become cheaper, we can hardly look forward to anything different. There are undoubtedly a number of properties that could ship ore at the present high freighting charges at a profit, as has already been proved, but on the other hand, in certain localities quite accessible by railroads, where large bodies are known to exist, the grade of ore is not sufficiently high to stand handling at the present rate, consequently it is hoped that the current rumors of railroad communication will soon assume some definite shape and materialize in something more substantial than mere prophecy. Transportation is undoubtedly a consideration of paramount importance towards the opening and speedy development of all mining sections, and the almost phenomenal growth of Rossland, Slocan, and other mining camps in the near neighbourhood, can be attributed in a great measure to the advent of the railroad, and consequent reduction of transportation charges.

Free Coinage. Adjoins the *Silver Cup* on the south-east, and is developed by a tunnel 550 feet in length. At a distance of 182 feet from the mouth of the tunnel an upraise has been carried to the surface for ventilation. At a further distance of four hundred feet another upraise has been started, the ore at this point showing up very nicely, consisting of a pay streak of about 8 inches of galena, and a body of iron pyrites which carries gold values. The ledge has also been cross-cut in several places, the pay ore being found principally on the foot-wall. Several good-sized ore chutes have been cut through during the progress of development, but no effort has been made to ship, the management preferring to wait until transportation facilities improve.

Copper Glance. Joins the *Free Coinage* on the south-east and has a very large lead, but not sufficient development work done to give any results.

Morning Star. Is a south-east extension of the *Copper Glance* and is under bond to a Rossland Company, which is completing arrangements towards a systematic development of the claim. The ledge has been cut through in several places on and near the surface. The pay ore is found to be contained in small veins lying alongside the foot-wall.

MOUNT St. THOMAS—FROM "PRETTY GIRL" CABIN, N. E. K.

SINCLAIR PASS—THROUGH THE ROCKIES—NEAR WINDERMERE, E. K.

The Mable Group. Is situated at the head of 8-Mile Creek, a tributary of Trout Lake, and about two and one-half miles south-east of the *Silver Cup*, and comprises the *Mable*, *Virginian*, *Nora Lee*, *Rainy Lake*, and *Golden Gate* mineral claims. A cross-cut taps the lead on the *Mable* at a considerable depth, and the vein found to be about four feet wide, about two feet being a concentrating galena ore, carrying a little copper and a six-inch streak of carbonates. Adjoining the *Mable* on a parallel lead is another group of claims, among them the *Alice*, which has given high assays in gold. Very little development is done on any of the claims in this group. Continuing on the *Mable* lead are the *Silver Cord*, *I. X. L.*, *Silver Plate*, and *John L.*, all very promising looking prospects, but have very little development work done.

The *American* is situated at the head of Haskins Creek, a tributary of Healey Creek. This claim has a very strong lead of galena ore. About 60 feet of drifts and open cuts have been run, showing 14 inches of galena. This property is under bond to a Rossland company. A good trail leads up to the claim from Trout Lake, a distance of four miles.

The *Black Diamond* and *Copper Leaf* are situated about one mile south-east of the *American*. The vein has been cut at a depth of twenty-five feet, showing about fifteen inches of galena ore and quartz lying between the slate and lime walls.

On Healey Creek and Hope Creek, tributaries of the Lower Lardeau River, a great number of locations have been made on which very little work has been done. The *Pawnbroker* and *Alberton* have good surface showings.

The *J. C.* group, of five claims, at the head of Lake Creek, has a vein of five feet of concentrating galena ore. A cross-cut taps the *J. C.* vein at a depth of 50 feet. Here the ore is coming in better.

The *Crown Point Group*, comprising the *Crown Point*, *Will Cornoch*, *Three Lakes*, and *Black Bear* claims is situated on the east side of the Lower Lardeau River, near Hope Creek. A strong iron-capped ledge is found to traverse this group, but the work done has not been sufficient to give any results. Assays taken from the croppings have given some very good results in gold.

On Poplar Creek, also a tributary of the Lower Lardeau River from the south-west, are several recent locations which should produce good results on development, particularly the *Wandalia*, *Nora*, *Brooklyn*, *Poplar*, *Hecla*, and *Copperhead*. A strong ledge can be traced through this group of claims for upwards of a mile, carrying gray copper and galena ore.

At the head-waters of the South Fork of Canyon Creek are several groups of claims. The *Black Jack Group* comprises the *Silver Crown*, *Black Jack*, *Pedro*, and *Grand Solo*. On the *Pedro*, two veins are traced for several hundred feet, the upper lead being from $2\frac{1}{2}$ to 3 feet wide, and the lower one 2 feet wide. The development work has not attained any depth, but the surface appearance is very encouraging. The ore is galena, impregnated with gray copper The *Columbia* and *Latton Groups*, near by, comprise in all ten full claims. On the *Latton*, an incline shaft is sunk to a depth of 82 feet, the upper part of which is in a vein of concentrating galena ore. After sinking to a depth of 20 feet, the vein straightens up, and the work of running a cross-cut from the bottom of the shaft to tap the vein has begun. On the *Columbia*, a shaft has been sunk on the lead for 66 feet.

The *Brooklyn Group* of three claims is also situated in this locality. On the *Brantford*, in this group, a cross-cut is run for some 40 feet, which, it is presumed, will have to be carried forward another 50 feet before encountering the vein. On the surface the lead protrudes in several places, and lies between granite and slate walls. Some high grade copper ore is found on the surface.

FIVE-MILE CREEK.

The *Silver Bell Group*, at the head of Five-Mile Creek, comprises the *Silver Bell*, *Stella*, *Norway*, and *Hopperanda*. On the *Silver Bell* the shaft is sunk on the vein for a depth of 25 feet in concentrating ore. On the *Norway* a cross-cut taps the lead at 100 feet. The vein is here 6 feet wide and has several seams of solid galena and iron pyrites.

The *Bonanza King Group* of five claims is also on Five-Mile Creek. A cross-cut is run for 25 feet, and two open cuts on the surface are 15 and 18 feet long, respectively. The vein is about three feet wide and is well mineralized.

FOUR-MILE CREEK.

The *Jumbo Group*, on Four-Mile Creek, comprises the *Jumbo*, *Homestake*, *Cyclone*, *Hidden Treasure*, *Independent*, and *Big Four*. Two cross-cuts are run on the *Jumbo*, 30 and 60 feet long, respectively. The lead is also stripped on the surface for a distance of 40 feet. In the No. 1 tunnel a vein is exposed carrying about 3 feet of concentrating ore, and a small seam of carbonates. The No. 2 tunnel is not yet into the ledge.

A number of other locations have been made in this locality, but no work has been done on them.

GLACIER CREEK.

On Glacier Creek, which empties into Trout Lake, is the *Ethel Group*, comprising the *Ethel*, *Esther*, and *Keystone*. A good trail is built from Trout Lake City to the mines, a distance of three and one-half miles. The property is under bond to the Commonwealth Mining and Development Company. A force of fifteen men are developing the *Ethel* by drifting on the ledge, at depths of 100, 200 and 300 feet. No. 1 drift is in 70 feet, where a cross-cut is run to the foot-wall, and a vein of carbonates of 12 inches was found. A winze is being sunk on this vein, which will eventually connect with the lower workings and give ventilation to the mine. The ledge matter encountered consists of white quartz, steel galena, gray copper, and carbonates, and the walls are of slate.

No. 2 drift is in 68 feet, and a cross-cut is here run through the ledge to the foot-wall, a distance of twelve feet. On the foot-wall a vein of 12 inches of galena and gray copper ore was exposed. The drift is now continuing along the foot-wall, and the vein of galena still continues.

No. 3 drift, at a depth of 300 feet, is just in 30 feet, and the galena is here coming in in small stringers about 1 inch wide.

A trial shipment of a few tons of ore was made some months since as a test of the entire ledge in No. 1 drift, and the result is said to have been $70 per ton in silver. The ledge at the lowest depth attained is said to be fully 12 feet wide. The ore in the upper drift is mostly carbonates, while in No. 2 and No. 3 drifts it is found to be principally galena.

A rawhide trail is completed to Trout Lake City, and it is the intention of the management to commence rawhiding ore at once. Active development work will be continued al the winter season. Two ore-houses, a bunk-house, cook-house, blacksmith shop and assay office have been erected at the mine.

The *Klondyke* group, near the head-waters of Glacier Creek, 4 miles from Trout Lake comprises 4 claims. A shaft is sunk on the lead for 25 feet, and the vein is stripped on the surface 40 feet. The ledge is 4 feet wide, and carries from 6 to 8 inches of carbonates. A good trail leading to the group connects with the *Ethel* trail about 2 miles from Trout Lake

The *Homestake* group of 4 claims is situated about half a mile from *Ethel* group. The development work consists of a cross-cut of 65 feet, where the vein was encountered, and a drift extended on the vein for 20 feet. The ledge has a width of about 4 feet, of which about 4 inches is carbonated. A good trail is also built to this group.

TROUT CREEK.

The *Big Hope*, *Bright Star*, and *Sunny South* are situated on Trout Creek, 4 miles from Trout Lake. A cross-cut is in for 47 feet on the *Big Hope*, but the ledge has not yet been encountered. *Copper Stain*, *Peacock*, and *Copper Chief*, on Trout Creek, have a very strong lead traversing them, with a heavy iron cropping, which is found to carry values in gold.

The *Molybdenum* and *Prodigal* claims are also on Trout Creek, 2½ miles from Trout Lake. Five small veins are found on these claims of molybdenite. Copper pyrites and galena, with a gangue of quartz and feldspar, in a ledge about 10 feet wide.

The *Beta*, *Rubicon*, *Evergreen*, *Windthrop*, and *Granite Butte* groups are also on Trout Creek, but not developed.

NORTH FORK OF LARDEAU CREEK.

True Fissure joins the *Great Northern* mining claim on the north, and has a cross-cut driven in a distance of 80 feet, and the ledge is also stripped on the surface for some distance. The *Silver Queen* is a northerly extension of the *True Fissure*, and is developed by a tunnel cross-cutting the formation for a distance of 170 feet, the last 7 feet of which is in ore, consisting of small seams of iron pyrites and galena.

The *Yankee* and *St. Elmo* are on a parallel ledge, and joining the side lines of the *Silver Queen* and *True Fissure*, respectively. On the *St. Elmo* a drift is run near the surface for 60 feet on a vein of carbonates and galena ore from 8 to 14 inches thick. At a further depth of 50 feet, a drift is run on the vein for 45 feet, which has followed the seam of galena and gray copper ore for over 40 feet. In the face of the drift which is now being pushed ahead, the seam has increased in size. A rawhide trail has just been completed, and the ore is being brought down over this for a distance of 7 miles to the Trout Lake Waggon Road.

Continuing from the *Great Northern* ledge for a distance of upwards of 2 miles past the head of Goat, and over the divide to the Lardeau Mining Division (where the chain is further continued), is an almost continuous chain of claims, mostly recent locations and undeveloped. On the *Horne* ledge and North Fork of Lardeau a great number of locations are made, among which may be mentioned the *Glenside Group*, *Horne*, *Silver King*, *Jenny Lind*, *Sunshine*, *Yankee Girl*, *Canadian Girl*, *Centre Star*, *Celtic*, *Morning Star*, *Rob Roy*, *Highland Chief*, and so forth. A strong lead is found cutting through all the above-mentioned claims, with a heavy iron capping. With the exception of the *Glenside* group, they are almost entirely undeveloped.

Glenside Group.

On the *Glenside* claim, three quartz and galena ledges can be traced from Lardeau Creek to a point about 1,000 feet distant, where they unite in one strong ledge which traverses the country for miles. At a point about 500 feet below where the three ledges unite, a tunnel is in a distance of eighty feet, on the centre small lead. It is the intention to follow this lead to the point of convergence of the three leads. An open cut is also run for twenty feet at the point of convergence of the leads, which, after cutting through the iron capping, exposed a vein of well mineralized quartz with stringers of galena, for some distance.

Vera Group.

Comprises the *Vera*, *Alberta*, and *Jessie* mineral claims, and is situated on Surprise Creek, a tributary of the North Fork of the Lardeau. A cross-cut is run on the *Vera* 180 feet. Two ledges were traced on the surface, running parallel to one another and about 100 feet distant. In driving the cross-cut the first and small ledge was tapped, when in a distance of one hundred and twenty feet, and found to be about four feet wide and composed of quartz, iron pyrites, and a small seam of galena. The cross-cut will be pushed through another 25 feet, when it is expected a larger vein will be encountered. This property, as well as the *Glenside* group, belongs to the "Commonwealth Mining and Development Company."

Big Five Group

Is composed of five full claims, and is situated at the extreme head of the North Fork of Lardeau Creek. These leads are traced for a considerable distance, running parallel to one another at intervals of about 250 feet. No. 1 lead has been stripped of surface wash for about 60 feet, the ledge being about four feet wide, with 18 inches of concentrating ore, and 4 inches of galena. No. 2 lead was found to be about 8 feet wide, with lime and slate wall consisting of gray quartz impregnated with gray copper and galena. No. 3 lead can be traced for a distance of three claims, and a cross-cut, at a depth of thirty feet, has developed a four-inch vein of galena ore in a ledge three feet wide.

DUNCAN RIVER TRIBUTARIES.

Black Diamond Group

Of three claims, situated at the head-waters of Silver Tip Creek, which empties into the Duncan River. Two ledges, lying between slate and lime walls, are found in this group. On the upper vein a cross-cut is run and passes through the ledge at a depth of thirty feet, where the vein is found to be three and one-half feet wide, with 8 inches of galena and 4 inches of copper ore on the wall. The grade of the carbonate ore is especially high. On the lower ledge the vein is stripped for about two hundred feet. The ledge is about five feet wide, and has about nine inches of ore, principally carbonates. This group is the property of the "Silver Tip Mining Company," of Rossland.

Flat Head Group

Is a continuation of the *Black Diamond* lead to the north-west. The *Little Robert* group of three claims, is on a parallel ledge to and joins the *Black Diamond* group. *Black Warrior*, *Eva May*, and *White Star* are at the head of McDonald Creek, a tributary of Duncan River. On the *Black Warrior* a drift is run on the vein for about sixty feet, near the surface, and carries about twelve inches of quartz. A cross-cut to tap the ledge at 100 feet depth, is run for 30 feet.

Glengarry Group

Is composed of the *Glengarry*, *Prince Edward*, *Banwell Fraction*, and *Dewey* mineral claims, and is situated on the divide between Boyd and Silver Tip Creeks. The first two mentioned were located in 1892, but owing to the difficulty of getting in, only assessment work was done until 1897, by which time a trail was opened through to the property and more active operations commenced. The development, so far, is principally on the *Glengarry*, where the large ledge, of 15 feet wide, is stripped for 100 feet, showing about 28 inches of galena, and galena and copper more or less through the balance of the ledge. At a depth of 40 feet from the apex of the main croppings, a cross-cut has been run cutting the ledge (length of cross-cut 25 feet), and a drift on the ledge, 22 feet. At the end of the drift a winze is started on two feet of ore, of which twelve inches is galena and twelve inches carbonates. The gangue in the winze is composed of quartz and calc spar, carrying small seams of clean galena through it, from ½ inch to 1 inch in thickness. A test shipment was made this summer of 1 ton to Tacoma smelter. There are twelve

tons of ore on the dump. This property has good prospects, and work will be pushed on the claims as early as possible in the spring. With improved transportation facilities, I believe this will become a producer.

Silver King and Silver Queen Groups, Situated on the West Fork of the Duncan River, comprise in all twelve claims, and are the property of the Old Gold Placer and Quartz Mining Company, of Rossland. The ledge has been pretty thoroughly prospected on the surface, by stripping and small cross-cuts at different points. A shaft is sunk on the *Silver Queen* to a depth of 50 feet, and the lead is found to be about 7 feet wide with 18 inches of ore; the balance of the lead is mostly gray quartz with a little galena. A trial shipment of a few tons has just been forwarded for treatment. A cross-cut on the *Silver Queen*, the adjoining claim, is now in 150 feet.

The Primrose Gold Mining Company, of Rossland, are the owners of some promising claims in this locality, particularly the *Endora* and *Grace C.*

Lade Group, Comprising the *Olive Mabel*, *Foundation*, *Little Fred*, *Goldenville*, *Annie L*, and *Waverly*, are situated at the head-waters of Gainer Creek. This group of claims is particularly remarkable on account of being the first discovery of free gold throughout the Division. The work done, which has not extended beyond the surface, consists altogether of cribbing, and small cross-cuts, principally on the *Olive Mabel*, and has disclosed several small veins, varying from 1 inch to 12 inches, cutting diagonally across the formation, and in which it is reported native gold and tellurides are met with. Many samples have been found in which the gold is plainly visible to the naked eye.

Badshot Group Is situated at the head of Gainer Creek, at the foot of the lime dyke, which cuts through the country for over 40 miles, and comprises the *Badshot*, *Perry Lade*, *Lone Pine*, *No. 25*, and *Butte*. The development work has been done altogether on the *Badshot*, and consists of an incline shaft to a depth of 80 feet. A cross-cut tunnel taps the lead at the bottom of this shaft; a winze is sunk from the bottom of the shaft for 50 feet on the vein, and drifts are here driven to the right and left for a considerable distance on the ore body. The work has shown up a good strong lead of 6 inches of clean ore, with considerable concentrating ore. During the progress of the development work a large quantity of ore has accumulated.

Abbott Group, Situated at the head-waters of Haley Creek, and comprises *Abbott*, *King William*, *Union*, *Kamloops*, and *Wales*. On the *Abbott* a cross-cut tunnel is in for a distance of over 300 feet, which will be pushed forward to catch the vein at depth. The surface is stripped for about 60 feet, and the ledge found to be from 12 to 15 feet in width. Two other large and well mineralized veins have been traced for a considerable distance at 400 and 500 feet, respectively, from the main ledge, and running parallel with it. On the *King William*, in a direct line with the *Abbott*, the ledge is found to outcrop in places for a width of twenty feet, carrying galena and carbonates. The ledge is found to outcrop in several places throughout other claims in this group; also on the *Lucille K*, *Francis Jewell*, and other claims in the adjoining group.

Wagner Group, Comprises the *Lardeau*, *Duncan*, *Ella*, full claims, and the *Auld Jim* and *McCartney*, fractions. Crown grants being applied for. On the *Duncan*, a drift of 100 feet follows the foot-wall. At a distance of 60 feet from the tunnel entrance a cross-cut was run through the ledge 25 feet to the hanging-wall, and 12 inches of solid galena ore, and 30 inches of concentrating was passed through. A winze is sunk for 50 feet on a continuous body of solid ore, averaging 14 inches, and at the bottom of the winze, drifts are extended to right and left for a considerable distance on the ore.

Francis Jewell Group, Comprising the *Lucille K*, *Francis Jewell*, *Princess Marie*, and *Queen Mary*, and several fractions, all of which are applying for Crown grants, are a continuation of the *Abbott* vein. A cross-cut is run on the *Francis Jewell*, and cuts the ledge at a depth of 40 feet, and on the *Princess Marie*, *Queen Mary*, and *Lucille K.*, several open cuts have cross-cut the ledge on the surface.

Bannockburn Group, Consists of several claims, viz.:—*Bannockburn*, *Buckeye*, *Silver Bottom*, *Silver Reef*, *Fossil*, *Evergreen*, and *Iron Mask*, is situated at the head-waters of Hall Creek, a tributary of Duncan River. Development work consists principally of stripping the lead of a light covering of wash at intervals, for the purpose of testing the ore. The *Bannockburn* has been stripped for 700 feet, and the pay ore found. The *Buckeye* has been stripped in the same manner for 200 feet. On the *Fossil* a short cross-cut exposes the vein for 20 feet, and carries a considerable body of ore which gives good values, particularly in copper.

Molly Mack Lead of twelve contiguous locations, is situated on Gainer Creek. This lead is a very strong one, and can be traced for a distance of over two miles. The work which is done is principally on the surface, and little more is known than the indications there found, which show a large lead of low grade cube galena ore, remarkable for its size and continuity and the very heavy lead values which it carries.

Pathfinder Group Of three claims, is situated about four miles from South Fork of Lardeau Creek, on Gainer Creek. A cross-cut is in 200 feet, which, it is presumed, will tap the lead at 300 feet. The surface showing indicates a very strong lead, and is generally supposed to be a continuation of the Wagner lead.

Silver Chief, About three miles from the mouth of Gainer Creek, has a cross-cut tapping the lead at a depth of 80 feet, where the vein is found to be upwards of six feet wide, with about six inches of galena ore.

Black Prince Group Of three claims (Crown-granted), is situated at the foot of the lime dyke, near the head of Gainer Creek. The vein occurs in a contact of lime and slate, and is found to be 18 inches wide.

Empire Group Consists of five full claims, and is situated on the head-waters of Cariboo Creek, a tributary of the Duncan River. The vein, which is a contact of lime and schist, will average fully 4 feet, and on the *Allouez* claim shows a width of 7 feet. As the vein is free of vegetation and wash, you can walk upon it for almost its entire length. The names of the claims forming this group are: *Revelstoke*, *Allouez*, *Negaunee*, *Pewabic*, and *Crested Butte*. This group adjoins the *Wagner* on the north-west, and is reached from Ten-Mile terminus of the Government waggon road by 4 miles of good pack trail. Some 75 feet of development work has been done, showing up good bodies of ore.

SOUTH FORK OF LARDEAU CREEK.

Silver Belt and Agnes Claims, Are situated near the head of the South Fork of Lardeau Creek. A drift on the *Silver Belt* follows the ledge for 43 feet. The vein is about 4 feet wide, with walls of lime and slate, and has several stringers of ore from one to three inches thick.

Ottawa Mineral Claim, Near the head of the South Fork, has a splendid showing on the surface, but lacks development. A small vein of carbonates runs along the wall, giving high assays in silver and copper.

Davie Group

Comprises the *Cheyenne*, *Coon*, *Davie*, *Jubilee*, and *Crescent*, full claims, and the *Glencoe* and *Daisy*, fractions. The *Cheyenne* is situated half a mile from 8-Mile Camp, on the South Fork of Lardeau Creek; three distinct veins pass through it. The south vein is 8 feet wide, and opened on its full width for 30 feet, and shows 6 inches of galena ore on the hanging-wall, and several small stringers of ore passing through the vein. On the centre vein a drift is in a short distance, showing a little galena mixed with the quartz. The *Coon* adjoins the *Cheyenne* on the south-east, and has two veins which have been traced for several hundred feet. On the main vein a cross-cut taps the vein at a depth of 20 feet where the lead is 5 feet wide and carries about 3 inches of solid galena ore on the hanging-wall. On the south vein an open cut of 20 feet exposes a large body of quartz, in which specks and small seams of galena are found. The *Davie* adjoins the *Coon* on the south-east. The work on the main vein consists of an open cut and tunnel 35 feet long; the ore is found on the hanging-wall in small quantities.

Black Eagle and Sunset,

On Seven-mile Creek, a tributary of the South Fork of Lardeau, have a cross-cut and drift 84 feet. Some very good ore is found in a pay-streak of 6 inches on the wall.

Union Jack Group

Is situated near Seven-mile Creek, and comprises seven claims. A cross-cut is run 65 feet on the *Jumbo*, one of this group, and will be carried forward for 20 feet farther, where the lead should be met with at a depth of 70 feet.

Pool Group

Is situated one mile south-east of the Town of Ferguson, and comprises 6 full claims. On the *Nettie L.* a cross-cut is now in some 87 feet, and a shaft has also been sunk on the lead 25 feet.

The *Ajax*, on the same group, has been stripped on the surface, and several cross-cuts put through the ledge on the surface, resulting in showing up a lead which carries a consider able quantity of iron pyrites, giving some good assay values in gold.

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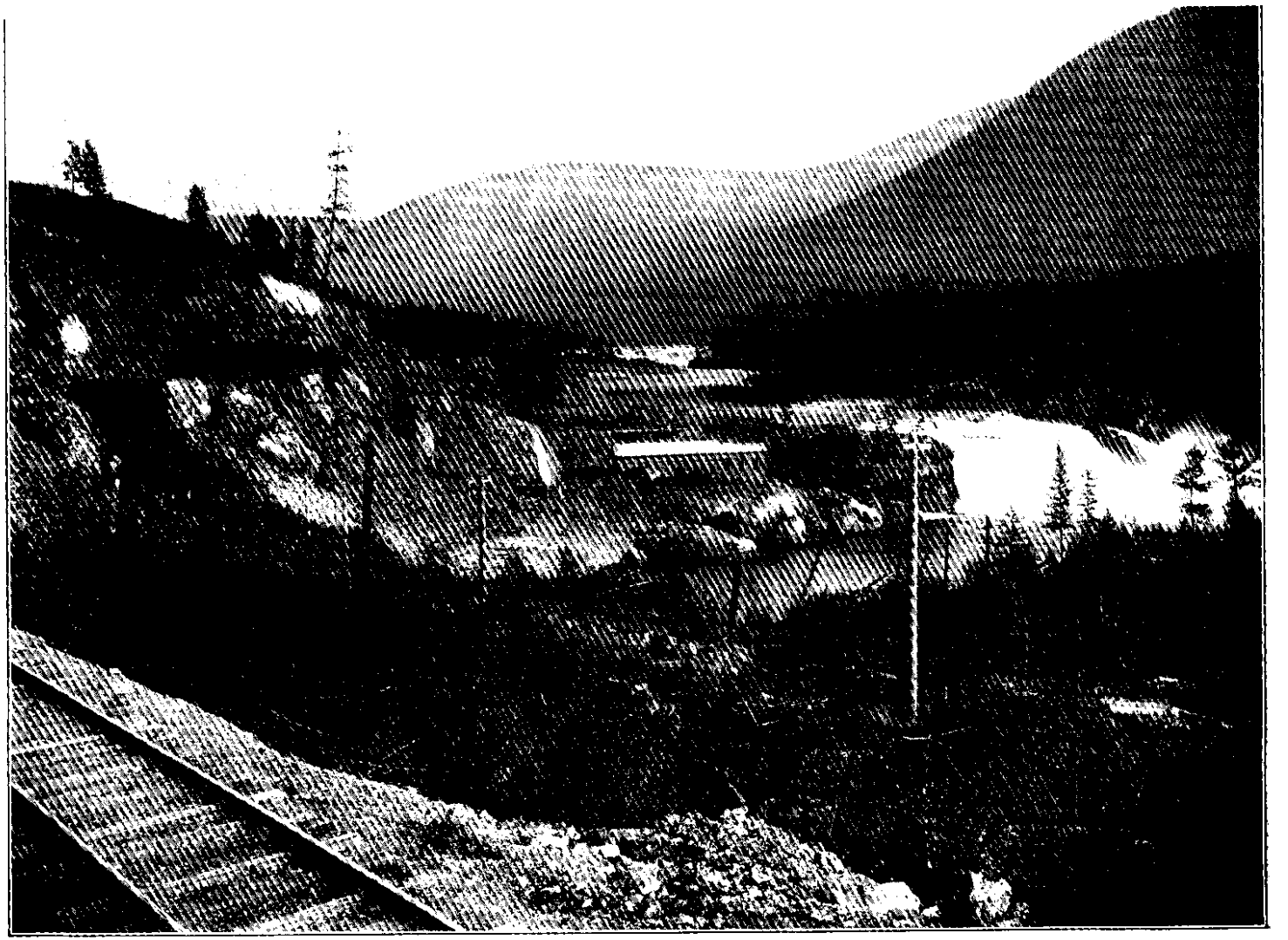
SLOCAN AND SLOCAN CITY MINING DIVISIONS.

REPORT OF ALEXANDER SPROAT, GOLD COMMISSIONER.

SLOCAN DIVISION.

Name of Mine.	Number of men employed.	Tons of ore reported as shipped in 1898.	Ore, Development, &c.
Payne	130	14,000	Galena and carbonate ore.
Slocan Star	110	2,862	Good ore at 900 ft. depth; has a mill and tramway; has done 2,500 feet tunnelling, 1,500 feet upraises and winzes. Ore, galena and concentrates.
Ruth	45	3,250	Ore, galena and carbonates. Has done 3,200 ft. of tunnelling, 2,000 ft. upraises and winzes. It is contemplated to put in mill and tramway.
Noble 5 Group	35	.....	Is supplied with a fine mill and tramway, and is doing steady development work preparatory to shipping.
Last Chance	45	1,700	Ore, galena and carbonates. Is developing large ore bodies; an aerial tramway is about completed.
Sovereign	10	160	1,000 ft. of tunnelling.
Ajax	14	.....	Galena and zinc ore. 1,500 ft. of tunnelling.
Reco	28	480	Rich galena and carbonates. 1,500 ft. of tunnelling and 500 ft. of raises etc. A tramway and mill site have been surveyed.
R. E. Lee	8	.....	Has run 740 feet of tunnel, which is expected to cut the lead soon, gaining a depth of 1,600 ft.
Goodenough	6	.....	600 ft. of tunnelling.
Blue Bird	8	60	Ore, galena. 600 ft. of tunnelling.
Trade Dollar	6	.....	Ore, galena. 100 ft. of tunnelling.
Queen Bess Co.	65	1,700	Ore, galena and carbonates. Has done 5,000 ft. of tunnelling, raises, etc.; also built extensive buildings during the year.
Idaho Mines	45	4,000	Ore, galena. Paying dividends.
Ivanhoe	.....	.....	Has been doing development work for 18 months; has large amount milling ore blocked out; contemplates erection of a mill in spring—difficulty of approach has been obstacle.
Treasury Vault	25	20	Ore, galena and carbonates.
Miller Creek Co	6	40	Ore, galena and zinc.
Dardanelles	14	75	Ore, galena; has 2 ft. of ore at a depth of 500 ft.
Rambler	25	580	Ore, galena.
Antoine	30	350	Ore, clean galena.
Washington / Slocan Boy	12	....	Just commenced work under new management.
Great Western	6	....	Ore, concentrating. 300 ft. of tunnelling.
Madison Group	4	20	A "dry ore," some of very high grade. 175 ft. of tunnelling.
Minnehaha	7	.....	300 ft. of tunnelling.
Red Fox	.....	.....	Closed for winter, owing to difficulty of working.
Wakefield	45	.....	Ore, galena and carbonates. 2,000 ft. of tunnelling done this year; developing all summer, preparatory to shipping over rawhide trail to waggon road.
Comstock	60	.....	600 ft. of raises, 700 ft. of tunnelling; developing all summer; now constructing concentrator on Finnell Creek.
Vancouver	35	300	Developing all summer a large body of righ galena ore.
Galena Mines	12	.....	Developing all summer; has a large body of concentrating ore; well equipped with modern hoisting plant.
Bartlett Group	.....	.....	175 ft. of tunnelling. No shipments, owing to difficulty of access.
Condor Group	8	.....	300 ft. of tunnelling.
Essex / Edinburgh	5	.....	Engaged in development.
Bosun	27	420	Ore, galena. 2 cross-cut tunnels to cut vein, and a 75-ft. shaft sunk in ore. First assessment work on this property was done last May.
California	15	40	230 ft. of tunnelling this summer; shut down for winter.
Marion	11	.....	



GENERAL VIEW - BONNINGTON FALLS POWER PLANT--KOOTENAY RIVER, W. K.

SLOCAN CITY DIVISION.

Name of Mine.	Number of men employed.	Tons of ore reported as shipped in 1898.	Ore, Development, &c.
Enterprise	.....	.....	Ore, galena, high in zinc. Developing only; 450 ft. of raises and 280 ft. of tunnelling; large amount of ore blocked out.
Evening Star	13	.....	Developing, with promising results. A steam hoist has been erected.
Golden Wedge	30	.....	Developing.
Springer Creek	.....	.....	The ore is mostly "dry silicious." 5 carloads have been shipped.
Other Claims	.....	.....	About 8 other claims on Lemon Creek are being developed, but have not shipped.

OFFICE STATISTICS—SLOCAN MINING DIVISION.

Number of Locations recorded	498
" Certificates of Work issued and recorded	807
" " Improvements issued and recorded	112
" Free Miner's Certificates issued	560
" Water Rights granted	10
Cash received in lieu of work done	$1,600

OFFICE STATISTICS—SLOCAN CITY MINING DIVISION.

Number of Locations recorded	356
" Certificates of Work issued and recorded	596
" " Improvements issued and recorded	7
" Free Miner's Certificates issued	340

SLOCAN CITY DIVISION.

BY KINDNESS OF J. C. GUILLIM, B. A. SC., SLOCAN CITY.

No great activity has taken place in this Division during the past year, nor has there been any extensive shipment from the mines which are in a position to ship more heavily.

The only properties worked continuously by strong management have been the *Enterprise*, on Ten-mile Creek, and the *Golden Wedge*, on Lemon Creek. Both of these have confined themselves almost entirely to development and blocking out of ore bodies.

In the past season, 596 records of assessment were made, which goes to show that there are many surface showings worth holding. The whole of this Division lying east of Slocan Lake and River is occupied by mineral claims, with generally a little surface work done, and stripping of the many quartz veins, characteristic of this granite area.

Since the premature booming of this section two years ago, but little capital has been employed in development, and the original prospectors or owners have been working in a limited way, with the result, that as far as it goes the work done encourages confidence in the permanency and values of the ore bodies. At the present time, twenty properties are being

worked, employing about 125 men in all; of these twenty, only five are under strong outside company management. These five employ about 80 men, the rest being scattered in twos and threes, working their own properties on their own limited means and in some cases undertaking cross-cuts and dead work of up to 200 feet in order to reach the ore bodies.

The whole mineralized portion of this Division, so far as known, lies in granite. Two main varieties of veins being worked upon, are:—

1st. The "dry ore" quartz veins, which carry values in gold and silver, associated with iron pyrites and silver sulphides, and also, sometimes, free gold and silver. These are, by far, the most prevalent. Such are *Golden Wedge*, *Chapleau* and *Evening Star*.

2nd. The more or less "wet ores" carrying only silver and lead values, associated with usually considerable zinc blende; such as *Enterprise*, *Arlington* and *Two Friends*.

The development now going on, although somewhat limited, has not substantiated the theory, at one time held, that the characteristic quartz veins are local segregations. With the exception of more or less faulting, according to locality, these veins appear fairly regular and persistent.

A fact of some importance is the wide occurrence of gold-bearing veins throughout this granite area. At times, more or less free milling, and at others, associated with pyrites and silver sulphides; the ratio of gold to silver being of great variation. The occurrence of gold ores on Eight-mile Creek, at the *Joker*, on the South Fork of Kaslo Creek, and the steady occurrence of gold values in all dry ores of Springer and Lemon Creeks, is worth recording, in connection with the attention now being paid to quartz veins in Nelson Division and the introduction of the Golden Wedge Stamp Mill on Lemon Creek.

The following description applies to properties on which development work, other than assessments, has been done during the year, and to properties at present being worked:—

SPRINGER CREEK.

Two Friends—Shaft down 30 feet on eastern vein and cross-cut run in 100 feet; expected to reach the vein in a few more feet. Two men working.

Bank of England—Under lease to local parties. This property is approached through the old workings of the *Two Friends*, and a body of galena and zinc blende recently encountered. Two men at present working.

Aztec—Situated immediately south of *Two Friends*; worked continuously since spring, by J. R. Smith. Open cut 85 feet; tunnel, 40 feet, cross-cutting to vein.

Lilly B.—Some little work done on cross-cut and in sinking, with ore showing in shaft. Not working at present.

Arlington—No active work done since last winter. One man employed to keep shaft pumped out. There is some prospect of renewal of work under change of management. There is an 18-horse-power boiler and hoist at this mine, and a very strong and wide vein shows up for about 300 feet by drifting on the lower level.

Rainbow—Sixty feet of drifting on vein in early summer, and shipment made to Hall Mines Smelter.

Tamarac—About 80 feet of drifting done during the summer. Now under option. Nature of ore, galena, zinc blende, and silver sulphide.

Medina—On Mineral Hill, drift tunnel 40 feet. Owned by eastern people.

Erin Fraction—Near the last, under lease to Andrews and O'Neil. Shaft, on ore body 20 feet. Two men working.

Standard Fraction—Located near the last mentioned. Two men working, drifting on the vein, have driven 30 feet.

Republic Group—A little work off and on being done. Nature of ore-body, quartz, silver sulphide, gold and pyrites; also some ruby and native silver.

Calumet—Owners are driving a 160-foot cross-cut to tap a body of galena ore which follows the contact of granite with a mass of dark slate-like rock. Three men working; tunnel run in 120 feet.

Jubilee—At the head of 12-Mile Creek. Some shaft and drift work done on vein during last few weeks. Owned by Messrs. Clough and Bradshaw.

Climax—Shaft and drifting 40 feet, worked by Messrs. Atchesen and Law.

Evening Star No. 8—Situate on Dayton Creek and now under bond and operation of Hugh Sutherland. Active work began in August; a 3-mile trail built from Springer Creek waggon road, and a 15-horse-power boiler and hoist taken up (made by Lidgerwood Machine Co., of New York). This is the second hoist to be installed in this Division. The main shaft has been driven over 100 feet on the vein with satisfactory showing, and it is intended to carry on the sinking a considerable distance further for exploratory purposes. The nature of the ore-body is a quartz vein with silver sulphides and pyrites, with variable gold value. Twelve men are at present working, altogether on development.

Columbia—Under the same management, and adjoining the *Evening Star*, a good deal of drifting and exploratory work done during the year, and a small shipment made. Some work now going on with more in view.

Upon the development on these veins, together with that of the *Golden Wedge*—both being upon typical quartz ore bodies—a great deal depends in the matter of inspiring confidence in the district.

LEMON CREEK.

Barnett Group—150 feet of incline tunnel and drifting on the vein. Crown grant applied for. Ore, quartz, silver sulphides, and pyrites.

Alexandria—On summit, between Second and Third North Forks of Lemon. Operations begun in past summer and continued since; shaft, 80 feet; cross-cut now being driven; 2 men working. Crown grant applied for. Ore, chiefly galena.

St. Lawrence—Near *Alexandria*. Owned by Eric Lemieux. Cross-cut being driven, now in 66 feet.

Lone Dutchman—Under option to purchase. Said to be large bodies of pyritic ore.

Alpine—Not under active operation, having passed out of hands of the company formerly working under bond. More or less free-milling quartz ore body, with several thousand dollars' worth of work done. On the divide, east of Kootenay Pass.

Monument Group—On the divide, west of Kootenay Pass, partly in Nelson and partly in Slocan City Division. Now under bond to Hall Mines, Limited. Development carried on during the fall up to November 1st; discontinued on account of situation during the winter. The ore is a mixture of quartz, pyrrhotite, and copper pyrites.

St. Lawrence—Near *Monument Group*. A cross-cut, 70 feet, has tapped a strong vein of mixed quartz, galena, and zinc blende. Operated during the fall by W. E. Boie *et al.*

Golden Wedge—This mine is situate some 2,000 feet above the new town of Oro, at the junction of Second North Fork with Lemon Creek. It is reached by pack trail from Slocan City, but during the year 5 miles of waggon road and 12½ miles of sleigh road have been built to connect it with Kootenay Lake and Nelson.

The mine has been worked continuously during the year by the British-Canadian Gold Fields, Limited. An upper cross-cut 50 feet, and drifting on the vein 300 feet. A lower cross-cut, 175 feet long, taps the vein at about 200 feet lower down; 100 feet of drifting on the vein at this point. The ore body is a free milling quartz in the common granite country rock.

A sleigh road of 2 miles connects the mine with the townsite of Oro, where considerable progress has been made, consisting of a saw-mill of 10,000 feet per diem capacity, flume 2,000 feet long, mine offices, assay office, and construction of a 10-stamp mill expected to be in commission during February. This mill will be run by Pelton wheel, under head of 150 feet, and is made by Jenckes Machine Company, of Sherbrooke, Que. It is the first to be built in the Slocan, and is in a position to do custom work for the many, more or less free milling quartz, ore bodies in the vicinity, should such be desirable. Connected with the mine and mills some 50 men are employed.

White Sparrow—On the First North Fork of Lemon Creek. A cross-cut tunnel, now in 130 feet, is being driven by the owners; it is expected to reach a large deposit of pyrrhotite. Two men have been working since July.

Kilo and Saddle Rock—A small trial shipment of gold ore taken out and shipped during the Fall. Not working now.

Howard Fraction—Developed considerably in the past, but not during the year. Crown grants for this group applied for.

Tail-holt—Continuously worked during the past six months drifting and sinking on the vein. Owned by W. Ferguson.

Hoodo—Under lease during the fall to Tutor & Rackliffe; discontinued when snow fell.

Chapleau—On First North Fork of Lemon. Worked by owners up to August 1st, and one car lot of gold and silver ore shipped. Drift tunnel run 90 feet. Ore body, quartz vein carrying gold and silver values in pyrites of iron. Now under lease. Drifting and sinking on the vein to be carried on.

Creole—On Lemon Creek. Drift tunnel being driven in 40 feet. P. W. George *et al.*, owners.

Hope—50 feet of tunnel work done on a rather extensive deposit of zinc blende, hematite, and galena, carrying silver values. Crown grant applied for.

Big 4—South of Lemon Creek. Cross-cut driven 80 feet during summer.

TEN-MILE CREEK.

Joker Group—At the head of 10-Mile Creek and South Fork of Kaslo Creek. Under operation of Klondike Champs d'Or Company, Ernest Mansfield, Manager. Ore body, quartz vein carrying good values in gold. Contract let to sink shaft 100 feet, 40 feet already driven.

Crescent Group—Adjoining claims owned by Messrs. Boie and Rackcliffe, under option to the same people for $30,000.

Ohio Group—Extensions of *Enterprise*, and adjoining it to the south. Cabins built and work being carried on all winter by the owners, Kirkwood and Wells. Drift and tunnel work.

Enterprise—The following information was kindly furnished by Mr. W. F. Dubois, of this mine.

The group consists of two claims and a fraction. Development work now going on with 17 men employed; consists of driving ahead on the vein and making connections between leads.

There are seven tunnels in a vertical distance of 785 feet, three of these tunnels being in over 700 feet. Raises have been driven for air and safety, and all show ore. The development proves a continuous ore chute some 3,000 feet long. When stoping ore about 60 men are employed. One thousand tons of ore were taken out in 3½ months, 400 tons of which have been shipped to smelter, and 600 tons lie at company's wharf on Slocan Lake. During development an additional 400 tons have been taken out. This coming from the tunnels and raises more than clears expenses of development. The latest work done was to drive an intermediate tunnel, 267 feet, to intercept a raise from No. 3 tunnel. When this is timbered the mine will be in excellent shape to take out ore, and one of the best ventilated mines in British Columbia.

Work has also been done on the *Oregon City*, with some ore shown up, as well as on the *Edmonton Group*.

The annual assessments all along Ten-Mile Creek have been well kept up.

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AINSWORTH DIVISION.

REPORT OF JOHN KEEN, MINING RECORDER.

I beg to hand you my report for the current year on the Ainsworth Mining Division, the headquarters of which are in the City of Kaslo, on the west side of Kootenay Lake, about the centre of the Division.

This Division adjoins that of Goat River on the south, and extends in a northerly direction on either side of Kootenay Lake for a length of about 100 miles, having a width of 25 miles and a superficial area of 2,500 square miles.

The major part of the territory is mountainous and heavily mineralized, but there are very many small tracts, varying from 10 to 200 acres, which are suitable for raising good nutritious wild hay, potatoes, cabbage, and general market garden vegetables, for which there is a great demand for camp use, and the supply of which is at present obtained from the United States. With the exception of a few white men operating in the Duncan River Valley and meadows, this industry has been carried on by Chinamen, but the remuneration the white men are realizing from their industry in the Duncan River Valley may, in time, induce others to follow their example, for a quantity of small tracts are still open either for pre-emption from the Government or purchase, at nominal prices, from the Railway Companies, who hold the lands by reserve. It is a matter of great regret that the vegetables required for the camps. should be supplied from the State of Washington, when they could be entirely supplied from the district itself, and be in fresher and better condition. Inexperienced prospectors would realize greater profits from their cultivation than from aimless wanderings over the hills, not knowing valuable mineral when they pass over it, as the experience of the past eight years has so often proved.

BLUE RIDGE CAMP.

Eureka Group.

This group is composed of the following claims:—*Homestake*, *Yosemite*, *Scottish Chief*, *Parrot*, *Eureka*, and *Echo*. The *Eureka*, *Homestake* and *Yosemite* have had the following work done during the year:—790 feet tunnels, 370 feet sinking and upraising, winzes and drifts 220 feet. Ore, argentiferous galena of high grade, of which 130 tons have been taken out. These properties are at present shut down for the winter. One of the owners having been killed in a snowslide, they will in

future only work during the summer season. This group has given employment to eight men during the past season.

Iron Hand. This claim has a tunnel 60 feet long, and considerable prospecting has been done. No ore has been shipped as yet, but about 10 tons are now on the dump awaiting rawhiding. The intention is to work continuously in future and to fully develop the mine. Ore, argentiferous galena of good grade. Six men employed.

There are a large number of other claims or prospects located on this hill, but so far nothing but the annual assessment work has been performed, though the majority have good surface showings. The owners are prospectors and have not sufficient funds to develop them.

HOT SPRINGS CAMP.

This is the oldest camp but one in the West Kootenay District. The bulk of the claims are very old locations, dating back as far as 1883, and have been worked with more or less success since its inception, but the camp is now passing through a transition period from the slow, old-fashioned method of hand-drilling, manual windlass work, and mule packing, to compressed air drills, concentrators, steam hoists and elevated rope tramways.

There are in the camp two concentrators, one worked by steam and the other by water power. Two tramways lead to the former, which is owned by the firm of Maxwell Stevenson & Son. The latter, owned by the Canadian Pacific Mining and Milling Company, is not at present working, owing to certain difficulties in the company.

On Woodbury Creek the *Albion* mineral claim, the *Pontiac* group, and the *Grant* group, together with a number of other single claims are working with a complement of some 60 men in all. These properties are just commencing to rawhide their ore to the Kootenay Lake for shipment to the United States.

The *Little Donald* and *Black Diamond*, lying off the waggon road, are working through a joint tunnel. Other development work, consists of tunnels aggregating about 800 feet in length with cross-cuts, winzes and drifts.

Messrs. Stevenson & Son, the owners of the steam concentrator, have taken over these claims and are constructing a flume to drive the air compressor, with which they intend to work the property.

The ore is of medium grade and is said to average 40 % lead and 90 ozs. silver. Fifteen men are at present employed, which complement will soon be increased to 60.

Number One. This claim is looking well. All the lower workings have proved the claim to be a mine with depth, and the concentrates (4 to 1) have assayed from 300 to 600 dollars per ton. Some clear argentiferous galena has been shipped direct without concentration, but the main ore body will have to pass through the concentrator. Thirty-seven men are employed on the works.

The Skyline. This claim is of the same character as the *Number One*. A contract has been let for the extension of the existing shaft (at present 250 feet deep) to an additional depth of 200 feet, and this is now in course of execution. The shaft is in good ore, which is principally a "dry ore." Eighteen men are employed.

New Jerusalem. This claim is being taken up with spirit. A new cabin has been erected and the tunnels are in nearly 1,800 feet, which gives a depth of nearly 500 feet. A large flume is in course of construction to supply power to an air compressor, and an hundred-ton concentrator will be completed by July, 1899. A

good waggon road has also been completed from the town to the mine. Twenty-six men are employed, and the intention is to work continuously from now on.

Rand. This claim is now working again, contracts having been let for 100 feet of tunnel, to open up a large ore shute showing about 75 feet long on the surface. It is a large, strong vein, and cuts the formation about north-east and south-west. Shipments will commence as soon as this is reached. Twelve men are now employed.

Twin. Work has been resumed on this claim. The extension of the present tunnel (No. 5), which is now in 220 feet, is contracted for, and the ore body, which shows up well in the No. 4 tunnel, is expected to be struck in about 70 feet. Development will continue till sufficient ore is blocked out to commence shipments. Nine men are employed. Ore, argentiferous galena.

Tamarac. This claim is under bond to an American firm and is being operated by their agent, V. A. Johnson, of Minnesota. A tunnel is being driven to catch the vein at a depth of 150 feet. This tunnel is going to be used jointly with the adjoining claim, the *Surprise*. Twelve men are employed. The manager expects to ship ore early in January.

Silver Glance. Work is being continued on this claim and a shaft is being sunk at the side of the ore body. About 180 tons of clean ore are ready for shipment. Six men are employed. Shipments have just commenced.

The foregoing are the principal claims, in this camp, which are being worked and are either shipping or are about to ship ore. One pronounced feature of the camp is the energy with which the inhabitants are now working, the number of enquiries which are being made for "developed" claims, and the readiness with which bonders and bondees reach a business contract. Provisions are being taken up in large quantities to all the mines, and the camp is now assuming a business attitude such as has not been seen for some years past. It has, to a great extent, recovered from the effects of the disastrous fire of 1896, when two-thirds of the town was destroyed, and at the present time there is not an idle man in the camp.

BLUE BELL CAMP.

Blue Bell. This was the first mining camp in the West Kootenay District, the *Blue Bell* claim having been located in January, in 1883, by R. E. Sproul, but was known to the Hudson Bay Company long prior thereto. Since that date several other claims have been recorded surrounding the original claim and were all acquired by Dr. Wilbur A. Hendryx, and by him transferred to the Kootenay Mining and Smelting Company.

For the treatment of the ores this company erected a concentrator and smelter at Pilot Bay, where the ores were, for a time, smelted and the matte sent to the United States, but owing to the cost of fuel and the low grade of the ores, and the then difficulty of obtaining fluxes, the business was not successful and the concern was closed down pending the completion of the Crow's Nest Pass Railway, when cheap and plentiful fuel would enable them to work at a profit. Dry ores, lime rock, and iron ore are now to be had through the Duncan River Camp, Whitewater Basin, and on the east and west side of Kootenay Lake within easy reach of the waterway, having been staked either under the "Mineral Act," or "Land Act," as iron mines or lime quarries respectively. The ore at the camp is high in lead but very low in silver. No work is now being done and the property is simply in charge of a watchman.

Nearly all the claims have been Crown-granted, and the remainder are represented annually by assessment work, but are still in the hands of the prospector, who, in this as in other camps, is too short of funds to open and develop his property.

WHITEWATER CAMP.

Whitewater Mines. This claim was located in 1891 by J. C. Eaton, and has been worked almost continuously since 1894. It has proved to be the best paying mine in the Division, and is now the property of an English company. This year the new owners have applied their energies in blocking out the ore for stoping ground. They employ about 120 men, and have erected the best equipped concentrator in the Division, with a capacity of 120 tons per day. Thirty-four cars of ore were shipped from ore encountered in development work only. The ore is argentiferous galena of high grade. The men's quarters and the whole equipment of the mine are first-class. The management is systematic, close, economical, and business like, and the mine itself is fairly honeycombed with tunnels, winzes, cross-cuts, and drifts.

Charleston Group. This group has had a great deal of prospecting done this year, and the efforts have been directed chiefly towards tracing the ore and developing the claim. No ore has been shipped this year. Eighteen men are employed. The property is owned by a Montreal company.

Whitewater Deep Company. *Whitewater Deep*, *Whitewater Deep Fraction*, *Nancy Hanks*, and *Wedge Fraction*.—These claims, as well as the major part of the townsite of Whitewater, have been purchased by the Whitewater Deep Company. They have erected commodious lodging and boarding houses for the staff, with assay and general offices.

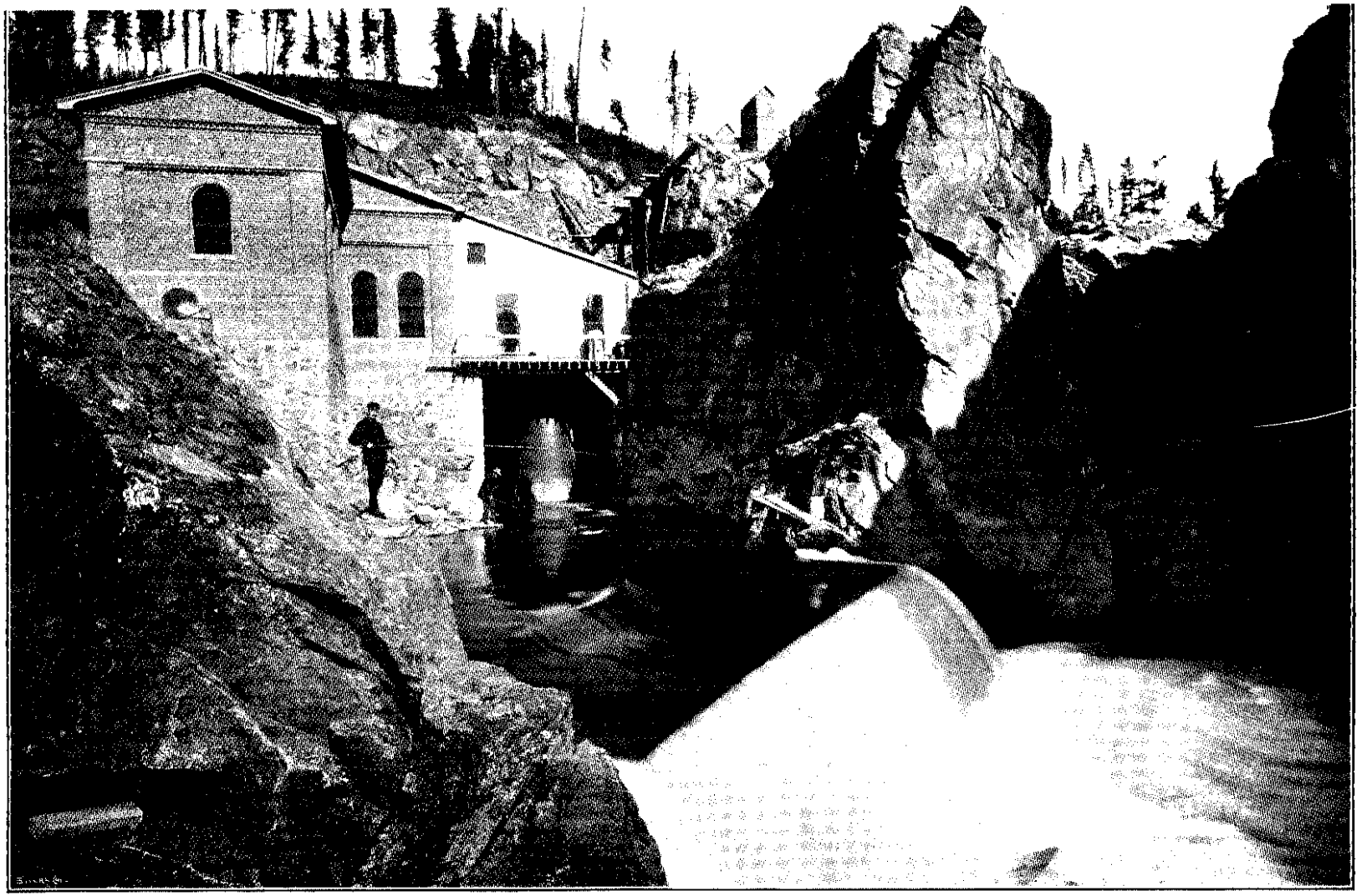
The claims have been developed and opened out during the summer by a force of 80 men. A flume from Lyle Creek, 5,000 feet long, supplies power to the air compressor, which will supply compressed air to the drills in future. Operations have just commenced on the lowest level to drive a new tunnel, 1,800 feet long, to tap, at a depth of about 1,000 feet, the ledges of the above claims which have been exposed in the upper tunnels. A waggon road has also been constructed, about 600 feet long, to meet the Whitewater waggon road.

Bunk houses and boarding houses have been erected for the men at the mines, also extensive ore houses. An electric plant is about to be installed to light the mines and town.

The ore here is believed to be a continuation of the celebrated Whitewater vein, and a sample carload shipped has, I am informed, confirmed this theory, the values realised being the same as from the Whitewater ores, and highly satisfactory to the management. The property is under the superintendence of good business men, who are carrying on the work with tact and energy, and no justifiable expense is being spared to convert the claims into well-developed mines.

There are a very large number of claims in Whitewater Basin, about 3 miles from Whitewater Station on the Kaslo and Slocan Railway, but all, or nearly all, are owned by the prospecting class, who cannot afford to develop; but it is satisfactory to know that nearly all of them have been represented by the annual assessment work and duly recorded.

A few fine specimens (float) of native copper, and also gold rock (white quartz), have been brought in, but the ledges, so far, have not been discovered.



BONNINGTON FALLS POWER PLANT—SHOWING TAIL-RACE.

JACKSON BASIN CAMP.

Jackson Mines.

This group (Crown-granted) is composed of the following mineral claims: *Northern Belle*, *Ophir*, *Dublin Queen*, and *Kootenay Star*. These were located in 1892 by Robert Jackson, who has disposed of his property to an English company The new owners have devoted their attention to development work mainly, and have erected a fine concentrator of 40 tons capacity, which is now running successfully. It is equipped with both steam and water power, the former power to use in the dry seasons, when water may be scarce in Jackson Creek. Three cars of concentrates have been shipped, the returns from which, I understand, were highly satisfactory. The ore is high grade argentiferous galena. Forty-one men are employed at the mine, which is well found and under the direction of an able superintendent.

Alameda and Sir Charles.

These claims (Crown-granted) have been purchased by an English company. During the year a great deal of development work has been done, which has exposed a good chute of concentrating ore. Fifteen men were employed during the season, and now the claims are closed up for the winter. The ore is fine steel galena of high grade.

The *Crown Point*, a very fine prospect, was sold and has been Crown-granted. Work will commence in good earnest when the machinery is in place in the spring. The *Echo*, *Lucky Edd*, and *Franklin* mineral claims have had a little work done, but no systematic development on anything like a large scale has been attempted.

This is a most popular camp, containing a very large number of claims, principally in the hands of the original locators, who have hitherto held them at prohibitive prices.

Every claim in the basin has been represented this year, which fact, in itself, is a very satisfactory feature.

KASLO CAMP.

True Blue.

This claim is under bond to the Hall Mines, Limited. Considerable development work has been executed during the past six month in tunnels, winzes and cross-cuts. The ore is high grade copper, carrying some gold. Fifteen men are employed. A tramway, about two miles in length, will be constructed to Kootenay Lake in the spring. A flume will also be constructed to supply power for an air compressor, after which the work will be carried on by air drills.

A number of other claims have been located around this one, and as soon as the snow has gone development work will be pushed on all of them, as enquiries are now being made in this locality for developed claims.

Leviathian Group.

Situated on east side of Kootenay Lake, about one and a half miles north of Kaslo. The group, which is owned by a Kaslo company, comprises 8 claims, viz:—*Mayflower*, *Tecumsee*, *Tiger*, *Vanderbilt*, *Sunflower*, *Nancy Hanks*, *Consolidated*, and *Mollie Marsh*. The ore is copper, very similar to the ore in Rossland camp, and carries gold. Tunnels and cross-cuts have been put through the claims. Twenty men are employed, but no ore has, so far, been shipped.

Kootenay Ore Company and Sampling Works, Kaslo Bay, Kaslo City. These works, operated by steam power, have a capacity of one hundred tons per day, and are kept busy. Ores are sampled, sacked, and dispatched to any smelter the owners may desire, or are purchased for spot cash at the option of the mine owners.

MIDGE CREEK CAMP.

Winconsin and Lucky Strike.

This camp is situated at the head of Midge Creek, on the west side of Kootenay Lake, nearly opposite the town of Sanca. The ore is copper, carrying a little gold. These two claims are ready to receive certificates of improvement prior to the issuance of Crown grants. Considerable work has been done on the claims since their location by the Hennessey Brothers in July, 1894. Preparations are now being made for extensive development as soon as the machinery is on the ground. Ten men are employed.

A number of other claims surround these original locations, but no work other than the annual assessment has been performed thereon. Efforts will be made to get a waggon road from the Kootenay Lake to the claims in the early spring. If money can be raised for the purpose, the waggon road will be extended from the Lake over the divide to Ymir Town, on the Fort Sheppard and Nelson Railway, and, if the ore in sight next spring should warrant it, a tramway will be constructed for the purpose of accommodating all the claims jointly.

DUNCAN RIVER CAMP.

President, *Two Brothers*, *Hauser*, *Hauser Fraction*, and *President Fraction*. This camp is situate about one mile above Hauser Lake. The claims were located in June, 1893, by the Gallop Brothers, and have been worked more or less since that date. A tunnel is in some 750 feet. The ore is a medium grade galena. These claims have received certificates of improvement for the purpose of obtaining Crown grants, for which application has been made.

A Montreal syndicate has this year been operating on the Upper Duncan River, employing quite a number of prospectors, and a large number of claims were located and recorded, the most valuable of which are the following, on which assessment work has been recorded for the current year:—*Jubilee*, *Taffy*, *Big Annie*, *Svengali*, *Trilby No. 1*, *Trilby No. 2*, *Gecko*, *Midnight*, *Laird*, *Grey Eagle*, *Chicora*, *Canada*, *Teddy S.*, *Jessie*, *Muriel*, *Ptarmigan*, *Whistler*, *Snow Bird*, *Merry England*.

The ores vary considerably, there being argentiferous galena, "dry silver ores," copper and gold rock, but in no case has sufficient work been done to form any definite opinion as to values, though the ore bodies are stated to be very large and well defined on the surface.

Some two hundred other claims have been located in this camp this year, and assessment work has been recorded on a large number of previous years' locations. Should the contemplated railway be constructed up this non-navigable river next year the camp will go forward by leaps and bounds, and bonds on claims in that locality will be eagerly sought for.

WHITE GROUSE MOUNTAIN CAMP.

Harris Group.

This group comprises the following mineral claims, viz:—*Gold Bank*, *Yukon*, *Copper Star*, *Maple Leaf*, *Roseene*, *Bostock*, *Haltonian*, *Alaska*, and *Harris*. They are located in a granite formation, situated at the top of the mountain, and are reached from the Town of Sanca, from which a fair foot-trail runs to the claims. A company has been formed to take them up, but up to the present time, though they are three-year-old locations, nothing but the annual assessment work has been done. The ore carries gold, silver and copper, the ledges being large, and covered with a heavy iron capping.

A large number of other single claims have been located by different prospectors, and are still held by them. The ore is of similar character to that of the *Harris* group, but up to the present time nothing but the annual assessment work has been done; very few of them, however, have been allowed to lapse.

CRAWFORD CREEK CAMP.

Crescent, Cyclops, Black Prince, Grand View, and *Sunrise*. These claims are owned by the Maple Leaf Mining and Development Company, and are situated on Hooker Creek. Sixteen men have been employed all the summer in development work, the result of which has proved satisfactory to the company. The ore on the various claims is of a mixed character, containing copper, gold, lead, and silver. The claims will only be worked by a few men this winter, the intention being to open up the whole group in the spring.

The claims are situated at the head of Hooker and Redding Creeks, about 4,500 feet above the Kootenay Lake, and are very difficult to reach in winter time. Some 26 other claims are located in this vicinity, all of which have been this year represented by the annual assessment work. The whole country rock in which these claims are located is granite.

SOUTH FORK CAMP.

Montezuma and Mexico.

These are the two oldest claims in this camp; they are now Crown-granted, and are owned by a Seattle Company. A 150-ton concentrator has been erected, which is supplied with water power from a flume about two miles long, on the north side of the South Fork of Kaslo River. These claims were located in September, 1891, by Ed. Becker, T. McLeod, Chas. Rossiter, and John Sandon. Twenty-four men are employed in development work. The ore is fine steel galena.

In previous years a quantity of ore was shipped, but this year nothing but development work has been carried on, though the ore encountered in this work was shipped out of the way.

An air compressor is being completed and the work will, in future, be carried on by air power. First class buildings for the accommodation of the miners have been constructed, and the whole is lit by electricity.

Further up the creek are the following claims:—*Briggs* Group of nineteen claims, which have recently been acquired by an American Company, and will be worked continuously from now on with a force of 10 men, to be increased as soon as the snow has left the ground and surface prospecting made possible. No ore is being shipped at present. *Black Fox, Bismark, Gold Cure, Silver Bell, Little Bell, Gibson, Palouse*, and a large number of other claims have been located there during the past year, but those mentioned above are old locations from which ore to some amount has been shipped. Some 200 men have been engaged on the various claims during the year, and it is a satisfactory feature of the camp that all claims have been worked and assessment work recorded. Bonds are now in course of preparation in various attorneys' offices for the aforementioned claims. The general character of the ore is high grade galena, lying between a slate and a granite formation. One shipment of two carloads has been made from the *Silver Bell*.

A good trail extends from the "Forks" to the *Briggs* group, and it is hoped this will be extended six miles farther in the early spring.

GENERAL REMARKS.

In conclusion, I may say that all the camps mentioned are well supplied with wood and water, but they need more trails and waggon roads. All of these camps have now passed out of the hands of the speculative prospector, who has practically left for new fields, leaving it in the hands of prospectors who are staying with their claims, and who are trying to develop their properties in a small way and prepare them for bond or sale.

As men of means are coming into the country, companies are being formed for the acquisition of such claims. They prepare for extensive exploration work prior to taking up any bonds they may enter into. If such work proves the statements of the prospector and the general surface showing, the deal is completed and the transfer of the property takes place. A small cash payment, as an earnest to do so much work in a given time, is the best arrangement for both prospector and intending purchaser. This prospectors are beginning to realize, and the general prosperity of the various camps will surely follow. In any case, the prospector reaps an advantage, because he then knows the facts, and he either has a mine to sell or he knows that he need not waste further time on his claim.

The past year, generally, has been devoted more to development work than to the shipment of ores. Some of the larger mines have shipped nothing but what was met with in development, notably *Whitewater* mine, which has been the largest shipper in this Division hitherto.

OFFICE STATISTICS—AINSWORTH DIVISION.

No. of Mineral Claims, locations, recorded	939
Certificates of work issued and recorded	1,346
Payments of $100 in lieu of assessment work	13
Bills of Sale, Bonds, etc., recorded	377
Free Miner's Certificates issued	1,053
Mining Receipts issued	2,032
No. of notices sent out on mineral tax, assessed taxes, and Crown-granted claims	2,260
No. of letters written during the year	2,035
Certificates of Improvements recorded	54

NELSON MINING DIVISION.

THE HALL MINES SMELTER.

The Hall Mines Smelter is situated on the hill just back of the City of Nelson, and, while originally built for the treatment of ores from mines belonging to the same company, has gradually taken up "custom smelting" and is prepared to buy both copper and lead ores, carrying gold and silver values.

The Superintendent of the smelter, Mr. R. R. Hedley, writes me that they "are bidding specially for ores carrying well in copper."

The price paid per pound for fine copper contained, has been about 6 to 6½ cents less than New York market price; for silver, 95 % of such market price, and $19.25 per oz. for gold, from which total is deducted a smelting charge of from $7 to $8 per ton of ore.

The smelter treated some 800 tons of lead ore last spring, and is being fitting up more especially for such ores in future.

The price paid for silver-lead ores has varied with the character of the ore, the treatment charge being from $10 to $16 per ton, with a price of $19.25 per ounce for gold, 95 % of New York price for silver, and for lead 90 % of such price, less duty, 1½ cents per pound.

Under the conditions existing last Fall, the smelter could not compete with American smelters on ores carrying over 40 % lead "for the reason, that above that percentage, the additional duty on pig-lead offsets any advantage we may gain in freights."

I am indebted to Robt. R. Hedley, Superintendent, for the following description of his smelting practice:—

"These works were established originally to treat *Silver King* ore. This ore, in the past few years, has varied but little in composition. Generally speaking, this may be figured as 37 % silica, 8 % lime, 6 % magnesia, 10 % ferrous-oxide, 10 % manganous-oxide, 3 % copper, and 3.3 % sulphur. This may be taken as an average of the output of the *Silver King* mine for the year, though it has varied all the way between 2 % and 5 % copper; and latterly the sulphur has slightly increased in proportion to the copper. Starting with such an ore, which might be considered self-fluxing, it is obvious that no preliminary roasting is required; we have to do with the straight ore. We have found it economical to use about 10 % limestone as flux, though we have demonstrated that it is possible to reduce this considerably. Originally, with the inception of smelting at Nelson, a furnace was built, with dimensions at the tuyeres of 40 inches by 100 inches, giving a capacity of, roughly, 150 tons of charge per day. During the summer of '97 a larger furnace was built, with dimensions of 44 inches by 144 inches at the tuyeres, giving a normal capacity of 280 to 300 tons of charge. The practice has been, when dealing with *Silver King* ore solely, to smelt the ore as it comes from the mine, concentrating from 16 to 30 parts into one, with a consumption of about 15 % coke, of quality such as supplied by the Coast collieries. This first smelting, until recently, has produced a matte carrying on an average about 50 % copper. Latterly, however, a matte produced from *Silver King* ore solely, will carry but 44 % copper, owing to the increased proportionate sulphur contents. During the past spring and summer, we have departed from our rule of producing a high grade first matte, owing to the handling of a considerable quantity of custom ores, notably *War Eagle*. *War Eagle* ore in its raw state has frequently formed 20 % of the charge, and the grade of matte under such conditions falls to about 25 % copper. This matte has been roasted, and after grouting with quick-lime, re-charged to produce a matte of 50 % copper, which is the minimum desirable for reverberatory work. The charge as stated, *Silver King* ore and limestone, or *Silver King* ore, *War Eagle* ore and limestone, with, occasionally, a small proportion of other custom ores, produces a slag, the composition of which, while it varies slightly in its silica, iron and lime contents, invariably carries extremely low values, varying from 0.26 to 0.4 % copper and from 1 to 2 ounces of silver, according to the grade of matte produced.

"With the installation of a reverberatory plant, consisting of two hand-work calciners, with a hearth 14 by 44 feet and two reverberatories, the shipment of matte ceased, and the practice has been to calcine about one-half of the matte produced, and charge to the first reverberatory about 8,000 pounds of calcined and 8,000 pounds of raw matte, and 1,200 to 1,500 pounds of quartz or silicious material. This, in 12 hours, will tap a good bed of white metal (about 75 % copper) and form a slag, varying between 1 and 1½ % copper, which returns to the blast furnace. This white metal is then crushed and a portion of it calcined, the second reverberatory taking a charge of about 32,000 pounds calcined and 8,000 pounds of raw white metal, with 600 to 800 pounds of silicious material. With the furnace in good condition and all things favourable, this will produce in the neighbourhood of 15 tons of copper in anode form in 24 hours. This anode copper averages between 97 and 98 % copper, and carries values from 300 to 800 oz. of silver and from 5 to 30 oz. of gold to the ton, according to the ore treated. The slag from this second reverberatory, carrying from 12 to 16 % copper and its quota of silver and gold, is charged either to the first reverberatory or to the blast furnace, being particularly desirable in the latter under certain conditions. The copper, up to the present, has been refined by the Balbach Smelting and Refining Company, of Newark, N. J.

"To return to the blast furnace: A little further detail will no doubt prove interesting. The plant is provided with ample dust chambers, and a periodical cleaning out of these chambers is made, the dust grouted with lime and charged wet into the furnace. The slag is run to waste through the granulating flume, and carried to the flats below, making excellent yards for the C. P. R.

"Last year I gave a few statistics, showing capacity of the big furnace. Unfortunately, we have rarely been in the position where we could push smelting, but during the week ending 18th of February, 1898, the tonnage smelted per day was as follows for seven days:—277, 288, 297, 301, 310, 312, 246—a total during the week of 2,030.65 tons, made up as follows:—

Silver King ore	1,677.83 tons.
Custom ore, etc	170.22 "
Limestone	182.60 "
	2,030.65 "

"In two days, the 16th and 17th, we smelted 622 tons, made up as follows:—

Silver King ore	513.94 tons.
Custom ore	52.08 "
Limestone	55.98 "

"This, I think, demonstrates what this furnace is capable of doing, and does away with the suggestion that a tonnage of over 300 may be charged into the furnace and not actually smelted.

"It will probably be of interest to state that we have made a test of coke from the Crow's Nest Pass ovens. I find that 135 pounds of this coke will, apparently, go as far as 150 pounds of that from the Coast ovens. A sample of this carload carried 8% ash. The coke is well made, and promises to aid very materially the smelting industries of this part of the Province.

"During the months of March and April of this year, we made an experimental run on a lead charge. We attempted to purchase selected ores, carrying below 40% lead, and preferably of an oxidized nature. We found, however, such ores were difficult to procure, and finally began operations with a calcined mixture, made up of mixed galena, War Eagle ores, and gold concentrates, 403 tons; of bedded ore, 176 tons; and dry ore, gold quartz carrying a little galena, zinc blende and pyrites, 75 tons, with 12 tons of low grade lead bullion bought from the Pilot Bay Smelter. This was fluxed with 245 tons of limestone and 30 tons of scrap iron, and the whole 940 tons carried: silver, 75,800 ounces; gold, 432 ounces; copper, 11,054 pounds; lead, 310,000 pounds. The bullion shipped averaged 600 ounces of silver and 4 ounces of gold per ton.

"We are now slowly accumulating, as before, lead ores of suitable character and grade, to make another similar run, and, I may say, are in the market at all times and willing to make bids as favourable as possible on ores of any description carrying copper, or on "dry ores," ores carrying a low percentage of lead. We are of the opinion that it is not economical to handle ores with a high percentage of lead, for the reason that the bullion shipped, having a higher railroad classification, pays a heavier freight than ore, and there is an additional duty of $\frac{5}{8}$ of a cent per pound."

WEST KOOTENAY POWER AND LIGHT COMPANY.

The West Kootenay Power and Light Company is a factor in the mining development of the District, of sufficient importance to merit place in this Report, its chief aim being the supplying of electricity for conversion into power and light in connection with mining operations.

The President of the Company is Mr. Oliver Durant, well known in connection with the Centre Star Mine, of Rossland, with Mr. L. A. Campbell, of the Canadian General Electric Company, as the installing expert.

The head office of the Company is at Rossland, while the power-house is situated at Bonnington Falls, on the Kootenay River some 10 miles below Nelson, and is a subject of illustration in this Report.

In the construction of the power plant advantage was taken of a large reef of rock cutting across the river, and over the lowest portion of which the river falls, while the power plant is located under the higher portion, through which a canal has been cut, bringing the water to the turbines.

The fore-bay is at present fitted with two 9-foot and one 10-foot steel penstocks, the two former only being used as yet, and convey the water to two pair of horizontal 39-inch Victor turbines, said to have a joint power of 2,900 horse power.

Connected directly with each of these pairs of turbines is a dynamo, making about 180 revolutions per minute, generating a current with voltage of 1,040.

The electricity here generated is carried to Rossland, a distance of 32 miles, over a very rough and heavily wooded country, sending a branch off to Trail and supplying power and light to the smelter there. At Rossland, this power is distributed and supplied to mines so desiring, at a price which is expected to be cheaper than the same could be developed by any private steam and engine plant.

Several of the mines are already equipped with motors for utilizing power in this form, while many others have ordered and are waiting for their machinery.

The Company has not been running long enough as yet to prove by actual work what it will do, but the complete success of similar plants elsewhere leaves but little for experiment.

I am indebted to the courtesy of Sir Charles Ross, one of the officers of the Company, for the following description of the plant:—

Power House.

"The works of the Company are situated at Bonnington Falls, Kootenay River. The Falls, under a 40-foot head, are capable of developing 267,000 h.p. at low water mark. In order to utilize a portion of this power, the Company constructed a canal, 650 feet in length, and some 26 feet in width, through country rock; it widens out into a fore-bay on the lower end, 54 feet in width, which is closed by a solid concrete dam, 32 feet high and 26 feet in width at the bottom, tapering to 6 feet at the top. At a point in the head-race, 150 feet from the concrete dam, between two high bluffs, a wooden dam is constructed sloping at an angle of 42 degrees up stream. This dam has a vertical height of 44 feet. All the timber, including the sills of this dam, are 12 by 12 inches, and are bolted solidly to the rock. The sills and timbers are spaced 5 feet; the whole is planked with a double layer of 4-inch planking. In the bottom of this dam there are five sluice ways. Its object is to break the impact of water flowing from the canal at high water. The river at this point has an extreme difference of level of 32 feet. The main concrete dam is provided with three feeders, two of 9 feet and one of 10 feet. The up-stream ends of the feeders are closed by gates, 12 feet by 13, and one

13 feet by 14, made of wood. They consist of a framing, 12 inches by 12 inches, to which is solidly bolted 8-inch planking. The two outside frames extend upwards of 38 feet, and to each pit is bolted the racks for raising and lowering the gates. Each gate is further provided with a small iron flood-gate, 12 inches by 12 inches. The gates are raised and lowered by means of head gate irons, which are solidly bolted on to the top of the dam. These head gate irons consist of a winch, and can be operated by one man. At the back of the dam, a tail-race has been constructed, which runs at right angles to it, and consists of a pit, approximately 30 feet in depth, and 25 feet in width. In the clear water this is flanked by built masonry and concrete retaining walls, from 4 to 6 feet in thickness, extending upwards to approximately the level of the power house floor.

"Bolted to the ends of the two 9-foot feeders are 13-foot castings, each of which contains one pair of 39-inch horizontal, cylinder gates, Victor turbines. To the castings are bolted the draft tubes, which are 22 feet in length, and ten feet in diameter at the lower end. The casting is supported at either end by the retaining walls of the wheel pit, and is further carried by two "I" beams. From the end of the castings project the wheel shafts, which are connected to two 725 K.W. generators, of the three-phase alternating type, each weighing, approximately, 80,000 pounds. These are bedded on rock and concrete foundations.

"The fields are excited by means of two 40 K.W. 125-volt direct current exciters, directly connected on two horizontal, 12-inch, registered-gate Victor turbines. These are contained in cast-iron flumes, supported by transverse beams bolted to the main beams of the large wheels. Bolted to the cast-iron flumes are the draft tubes and feeders. The latter are connected to the castings of the large wheels, which derive their water supply therefrom.

"From the generators the mains are led off in underground waterproof ducts to the switch-board, which consist of two exciter panels, two generator panels, and two line panels.

"The power house is fireproof, and built of brick, extending clear across the wheel-pit, and contains the transformer house, the dimensions of which are 17 feet 6 inches by 28 feet.

"In the transformer house are situated six air-cooled, 250 K.W. transformers, supplied with air by two 60-inch Buffalo blowers operated by two 2 h.p. induction motors.

Pole Lines.

"The distance from Bonnington Falls to Rossland, about 32 miles, is spanned by two separate pole lines, with poles spaced 100 feet apart, each carrying three No. 2 B. & S. copper wires, supported on porcelain insulators of the triple petticoat type, which are supported on the cross-arms by 2-inch locust pins. On one line the cross-arms are snow-shedded. At the point where the line crosses the Columbia and Kootenay Rivers, are respective spans of 1,500 and 600 feet, the current being carried on bi-metallic wires. These lines have a feeder of some four miles into Trail. The current is carried from Bonnington Falls to Trail and Rossland at a pressure of 20,100 volts, where it is transformed down to a suitable pressure for use in the mines, towns, and smelters. The sub-station at Rossland is a fireproof building, 30 feet by 44 feet dimensions, with concrete floor, and contains six air-cooled 250 K.W. transformers similar to those in the generating station, with a duplicate blowing plant. In the sub-station is situated the switch-board, which consists of two line panels, two transformer panels, and four feeder panels, and a regulator for the regulation of the voltage on the town circuit. From here the electricity is distributed to the mines and the town.

"The sub-station at Trail is fireproof, and is built of brick, containing three 250 K.W. oil-cooled transformers and the necessary switch-board and instruments for distributing the current at a pressure of 550 volts to the Trail Smelter. The voltage on the Rossland secondaries is 2,300 volts."

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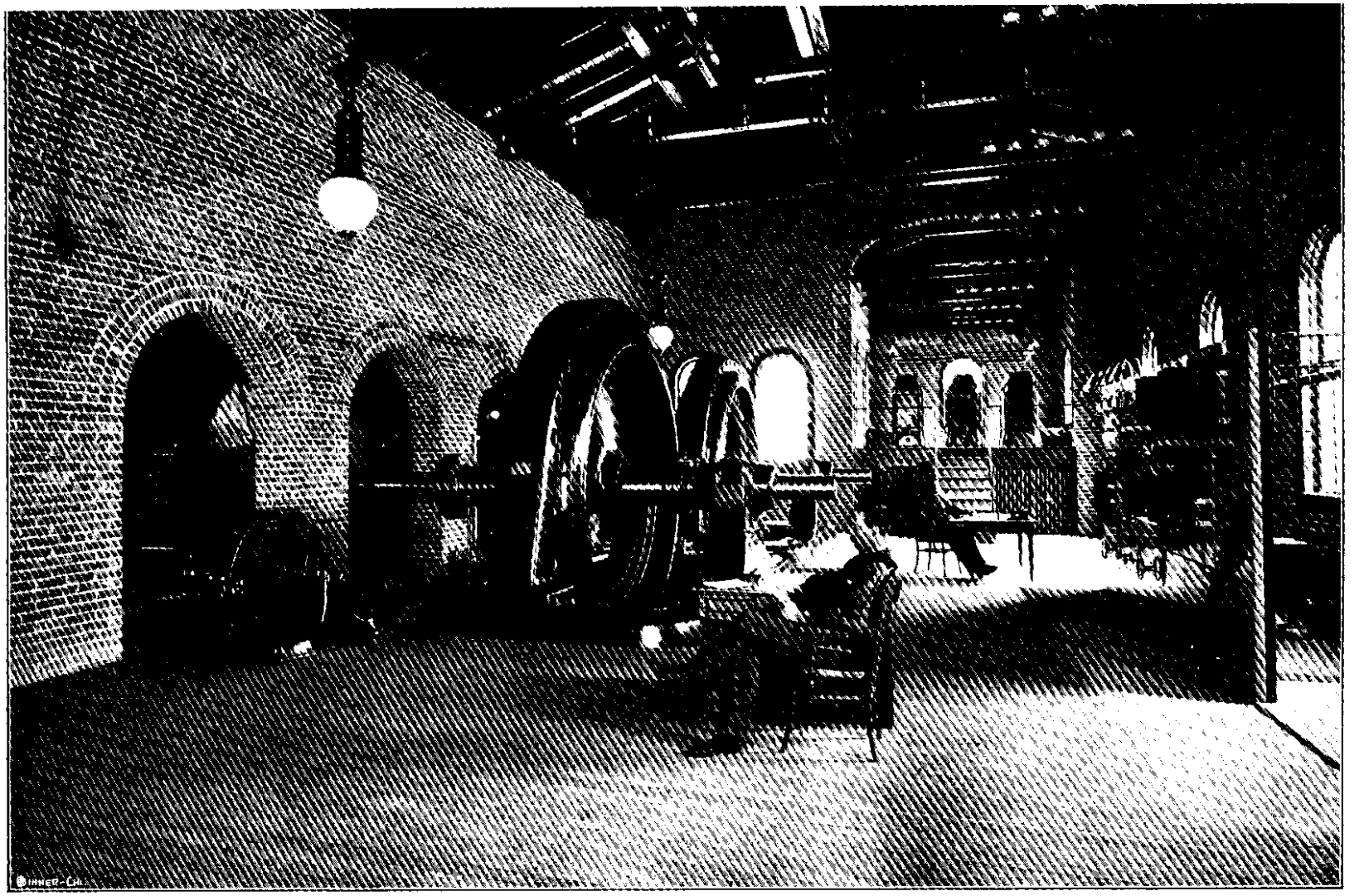


BONNINGTON FALLS—INTERIOR OF GENERATING STATION.

ARROW LAKE, GOAT RIVER, AND NELSON MINING DIVISIONS.

REPORT OF JNO. A. TURNER, GOLD COMMISSIONER.

OFFICE STATISTICS—ARROW LAKE DIVISION.

Number of Claims recorded	250
" Certificates of Work	184
" " Improvements	6
" Bills of Sale, etc	171
" Abandonments	3
" Placer Leases	4
" Placer Transfers	8
" Crown Grants	4
Free Miner's Certificates	230
Payments of $100 in lieu of Assessment Work	5

OFFICE STATISTICS—GOAT RIVER DIVISION.

Number of Claims recorded	233
" Assessments	136
" Bills of Sale	69
Free Miner's Certificates	141

OFFICE STATISTICS—NELSON DIVISION.

Bills of Sale	909
Free Miner's Certificates	2,175
Locations, Mineral Claims	1,483
Assessments (including 9 under sec. 25 of Mineral Act)	1,549
Certificates of Improvements	59
Locations of Placer Claims	62

TRAIL CREEK MINING DIVISION.

(ROSSLAND CAMP).

REPORT OF J. KIRKUP, GOLD COMMISSIONER.

I have the honour to submit herewith my annual report on the condition of the mines and mining properties in Trail Creek Mining Division.

I beg leave to state that the facts and figures which are embodied in this report have been furnished in response to my circular letter addressed to the various mine managers, superintendents, and others having mining interests within this Division. Though a number have failed to furnish direct information in reply to my inquiries, yet as will be seen from the report, nearly all of the principal mining properties have been heard from. Much of the information thus obtained has been tabulated, and comprises a very interesting record of the progress made in the mineral industry of this Division.

The statistics of ore production for the year show that about 116,367 gross tons of ore have been shipped from Rossland mines, an increase of 40,000 tons over the output for 1897 (72,000 gross tons).

The gross value of the 1898 output is, approximately, $2,210,000, showing a very gratifying increase during the year, and denoting the sure and steady progress of ore production from the Rossland mines.

The successful flotation of the new Le Roi Company with a capital of $5,000,000, and the rapid advance of its shares in England, is equal cause for congratulation with the able management of the *War Eagle* mine, as directed by its General Manager, Mr. J. B. Hastings.

This section of the Province seems to have entered on a career of great progress, and the phenomenal growth of the mining industry in this Division is especially worthy of note.

Placer mining is being carried on, on the Pend D'Oreille River and tributaries, but the results during the past season in most instances are not satisfactory.

NOTE.—In the following reports, those marked * include work done previous to 1898.

BRITISH AMERICA CORPORATION, LIMITED.

Chairman, Marquis of Dufferin and Ava.; Managing Director, Whittaker Wright; Resident Director, Hon. C. H. Mackintosh; Mining Engineer-in-charge, Wm. A. Carlyle, Ma. E.; Financial Manager, B. C., Edwin Durant.

The above Corporation now owns and is working the following properties in Rossland:—*Le Roi, Josie, Number One, Nickel Plate, Great Western,* and *Columbia and Kootenay.*

During the past year the *Le Roi* has shipped heavily, but on the others only development work has been prosecuted.

Le Roi. Superintendent, N. Tregear. Average number of men employed, 250. Shipments, 66,000 tons. Power plant—A 40-drill Rand air compressor, with three 100 h. p. boilers; a 300 h. p. two-drum, direct acting, steam hoist. Work done—150 feet shaft sinking; 2,350 feet drifts and cross-cuts; 280 feet raises and winzes.

This property passed into the control of the above Corporation, November 22nd, when shipments were temporarily cut down from 400 to 200 tons per day, to permit of more development work being done and to get well in advance of stoping or ore extraction.

The mine is worked through an incline shaft, 850 feet deep, with two hoisting compartments, and now 200, 350, 500, 600, and 700-foot levels are being extended westward. The main ore chute is over 400 feet long, and 6 to 30 feet wide, and on the 700-foot level a large body of ore, 35 to 40 feet wide, and already shown to be 200 feet long, is being worked. Here on the hanging and foot-walls are wide bands of good grade ore, while nearly all the intervening material, although of lower grade, is sent to the smelter. The present shaft is being sunk to the 900-foot level, but at the west end of the property, or 1,000 feet from the inclined shaft, it is proposed to shortly begin the sinking of a large vertical shaft, equipped with heavy hoisting plant.

This Company possesses an excellent smelter plant, situated at Northport, capacity 450 tons per day, which capacity may soon be doubled.

Columbia and Kootenay.

D. J. Macdonald, Superintendent. Number of men employed, 50. On this property about 4,700 feet of work, comprising drifts, cross-cuts, raises and winzes, has been done, of which 3,200 feet is new work this year. There are now five tunnels running into the mountain along the ledge, of which Nos. 3, 4, 5, and 6, are at present being advanced, the lower, or No. 6, being about 700 feet below the crest of the mountain and 400 feet above the bottom.

In these tunnels the vein is found to be very straight or with very few dislocations, and to vary in width from a few inches to over 30 feet of nearly solid pyrrhotite. Tunnels 3, 4, 5, and 6, are respectively 1,200, 800, 700, and 150 feet long, and are being connected by raises for ventilating and exploring purposes. Many cross-cuts are also being run, exposing large bodies of ore of varying value.

At the mine good and commodious buildings have been erected, and everything is now in excellent condition for work.

The twenty-drill Ingersoll-Sargeant air compressor supplies abundant power through a six-inch main, running up the hillside past the tunnels.

No shipments were made during the year.

Great Western and Nickel Plate.

Superintendent, W. S. Haskins. Number of men employed, 45. On the *Great Western* a two compartment shaft was sunk 230 feet, and drifting has been in progress along the vein at the 200-foot level. However, sinking has been resumed and the 300-foot level will be run out when that point is reached.

Since pumping out the *Nickel Plate* in April, work has been confined to the 200-foot level, where nearly 2,000 feet of drifting and cross-cutting has been done, disclosing two veins, 300 feet apart, 6 to 30 inches wide, of chalcopyrite-pyrrhotite ore, assaying from $2 to $22 in gold, and 3 % to 12 % copper.

A 10-drill Ingersoll-Sargeant with two 60 h. p. boilers, water jet condenser, etc., supplies compressed air for these two properties when 5 to 7 drills are working.

Josie and Number One.

Superintendent, Jno. M. Long. Number of men employed, 50. On the *Josie* work has been confined to extending the 300-foot level and its cross-cuts, and 1,250 feet of work is the result. To the east end a chute of good grade ore, as yet 50 feet long and 2 to 7 feet wide, is now being explored by a raise to the 100-foot level. In the west two veins have been found by cross-cutting, and drifts are now being run along these.

On the *Number One* only two or three shallow pits had been sunk. A tunnel was begun and driven 450 feet, disclosing one ore chute nearly 200 feet long, 2 to 7 feet wide, of quartzose ore carrying gold, silver and copper, with values varying from $6 to $25 per ton. East of this point a vertical two-compartment shaft was sunk 220 feet, and at the 200-foot level a drift has just disclosed a wide ledge running east and west, with a good width of ore near the hanging-wall. The west drift will be pushed under the ore chute found in the tunnel, and sinking will be at once resumed.

Power for these two properties is got from a four-inch main from the Le Roi compressor, and a steam hoisting plant is at each mine, where eventually electric hoists will probably be installed. Six drills have been at work, but soon ten to twelve will be running.

Total amount of work done—*Josie*, 1,250 feet; *Number One*, 700 feet; *Great Western*, 950; *Nickel Plate*, 2,400 feet; *Columbia and Kootenay*, 4,700.

THE WAR EAGLE CON. MINING AND DEVELOPMENT COMPANY.

Directors—George Gooderham, President; T. G. Blackstock, Vice-President; Hon. Geo. A. Cox, W. G. Gooderham, W. H. Beatty, A. E. Gooderham, all of Toronto.

War Eagle. J. B. Hastings, Superintendent and Engineer. Average number of men employed daily, 175. Shipments in 1898, 42,779 tons. Net value of same, $496,395.71.

Centre Star. This mine was extensively developed under its previous owners. It was purchased by Messrs. Gooderham and Blackstock from the old owners for $2,000,000, cash. The plant comprises a 7-drill compressor, with pumps, etc.

The management, since October 1st, has been in the hands of Mr. J. B. Hastings, of the *War Eagle*. A new shaft is being sunk on the south face of Red Mountain on the property. Seventy-two men were employed daily since October 1st to December 31st. The mine is to be supplied with a first-class, up-to-date plant, and thoroughly worked under Mr. Hastings' direction. About 2,600 tons of ore were shipped from the mine under the old management.

ENGLISH-CANADIAN COMPANY, LIMITED.

This Company, which has recently purchased the properties of the Fourteen Gold Mines Consolidated Company, consisting of a block of twenty-one claims, situated in the south belt, about two miles south of Rossland, has done development work to the extent of 90 feet of shafting on two of its properties, namely, the *Edna* and *J. & J.*, under the superintendency of Mr. M. A. Green.

* BIG THREE GOLD MINING COMPANY.

William Yolen Williams, Superintendent. The property of this Company comprises the *Mascot*, *Southern Belle*, and *Snow Shoe*. The *Mascot* is situated on Columbia Mountain, adjoining the *Columbia and Kootenay* mine. The *Southern Belle* and the *Snow Shoe* are situated on the north-eastern slope of Red Mountain. Development work on the *Mascot* comprises 575 feet of tunnelling and 300 feet of shafting and winzes.

The *Southern Belle* and *Snow Shoe* are being developed jointly. About 650 feet of tunnelling and 160 feet of sinking have been done. Number of men employed, 7. No ore has been shipped, though a considerable quantity has been mined. The pay streaks are small, but carry good values.

Heretofore hand power has been used. Recently, machinery has been introduced, and comprises one standard, class B. belted Ingersoll-Sargeant 7-drill air compressor, supplied by James Cooper Manufacturing Co., Montreal; one 3-chase synchronous motor, 75 K.W., 900 revolutions, with a voltage of 2,080, furnished by the Canadian General Electric Co., of Toronto. The West Kootenay Power and Light Co. furnishes the power.

Twelve men have been employed, but this is to be increased to twenty. Montreal capital is chiefly interested.

CANADIAN GOLD FIELDS, LIMITED.

J. C. Drewry, Managing Director. This group comprises the *Sunset No. 2*, *Gold Hunter*, and *Alabama*. All are Crown-granted claims. From January 1st to November 30th the average number of men employed was 21. The plant comprises a 7-drill Ingersoll-Sargeant air compressor, an 80-h.p. boiler, hoist, complement of pumps, etc.

Since the beginning of the year the development work done was tunnelling, 103 feet; sinking, 280 feet; drifting, 380 feet; cross-cutting, 300 feet; and other work making a total

of 1,268 feet of underground work, in addition to a large amount of surface work. Pay ore has been struck on the 300 and 350-foot levels, and the chute is in course of development.

MISCELLANEOUS PROPERTIES.

Iron Mask—J. F. Herrick, Manager. Number of tons of ore shipped for 1898, 3,370. Net cash received from smelters, $72,600. Power used, compressed air. Average number of daily employees, 32.

**Virginia*—The shaft is down 400 feet; drifts, 816 feet; total, 1,216 feet.

One ore-body 25 feet wide. Number of men employed, 24. Plant, comprises one 35 h.p. hoist; two No. 5 Cameron pumps. Power is supplied by *Monte Christo* compressor. No ore shipments have been made.

**Monte Christo*—Developmentwork comprises 2,160 feet of tunnelling, 300 feet of shafting, 190 feet of raising, 2,400 feet of drifting; total, 5,050 feet. One ore chute 7 feet wide.

The plant comprises one 15 h. p. hoist; one No. 6 Cameron pump; one 80 h. p. boiler, and one 7-drill compressor. Work is at present suspended.

Iron Horse—Development work consists of a double compartment shaft 4½ by 9 feet in the clear, and sunk perpendicularly to a depth of 50 feet. It is the intention of the management to sink to the 300-foot level, and a 7-drill air compressor has been installed for this purpose. A new shaft-house has been erected, 30 by 60 feet, and a blacksmith shop and powder-house; also a compressor building, 30 by 50 feet. About 24 men are on the pay roll..

**Iron Colt*—J. Ferguson McCrae, Secretary-Treasurer. Development work consists of 1 shaft, 75 feet; No. 1 tunnel, 65 feet; No. 2 tunnel, which includes the right-of-way through the *Alberta* tunnel for 354 feet; making a total of 1,068 feet. There are four open cuts, from 10 to 30 feet long, and 5 to 10 feet deep. The drifts from No. 2 tunnel are 136 feet west, 27½ east, and No. 2, west 29 feet.

Ore-body in No. 1, west drift, from 3 to 35 feet wide. Eight to ten men were employed. Power is supplied by a 5-drill air compressor plant. Shaft-house, 20 by 40, with 26 feet gallows. Work was suspended since January 15th, 1898.

Evening Star—The amount of development for the year 1898 consists of 260 feet of drifting, 85 feet in the upper tunnel and 175 feet in the lower tunnel. Two shifts, of two men each, are employed, working by hand. A new ore-body, about 4 feet wide and 20 feet long, as far as drifted on, was encountered in the upper tunnel; the ore averaged some $24 per ton in gold. After encountering this ore-body, drifting was begun in lower tunnel some 60 feet below to cut the same ore-body, which it is expected to do very shortly as the present face is nearing the calculated position of the ore-body as met with in the upper tunnel. This work is being carried on under the superintendency of Roy H. Clarke.

**Atlantic Cable*—Development work comprises 27½ feet of a shaft, well timbered; 55 feet of shaft straightened and re-timbered; total, 82½ feet. Also 122 feet of cross-cuts and drifts driven at the 100 and 200-foot levels. The power is supplied by a California horse whim. An average of 4 men has been the working force, but work was suspended at the date of the report.

Deer Park—Roy H. Clarke, Engineer-in-charge. The amount of development on this property for the year 1898 consists of 112 feet of sinking, making the vertical shaft 305 feet deep, and 300 feet of drifting, as follows:—173 feet on the 200-foot level (including a winze 22 feet deep), 97 feet on the 100-foot level, and 20 feet on the 150-foot level.

The shaft was sunk in ledge matter the entire distance, encountering in this year's development two pay-ore bodies, the first 5 feet wide and the second 2 feet wide, below the 200-foot level. Drifting on the 200-foot level showed considerable low grade ore, but was important chiefly as determining the course of the ledge.

The most important work was begun about November 1st, after the installation of a 7-drill compressor plant, 80 h.p. boiler, and two air drills, costing $6,500. The ore-body on the 100-foot level, already opened up by a cross-cut 35 feet long, was further opened up by a drift to the north, 40 feet long, and the cross-cut was continued 35 feet west. The ore-body on this level was found to be about 20 feet wide, with high grade streaks in this body 2 feet wide, and extended north about 30 feet and southerly to an extent as yet unknown, the whole averaging about $18 per ton. The same ore-body is now being encountered on the 150-foot level. The mine employs 15 men.

Good Friday—During the year 1898, the following work was done:—Tunnel No. 1, 238 feet; tunnel No. 2, 245 feet; tunnel No. 3, 98 feet; tunnel No. 4, 160 feet; tunnel No. 5, 37 feet; tunnel No. 6, 28 feet; total, 806 feet. Shaft No. 1, 18 feet; shaft No. 2, 31 feet; shaft No. 3, 35 feet; total, 84 feet.

There are 950 feet of surface cross-cuts, three-quarters of a mile of trail, and two log buildings. Number of employees, from 25 to 45. Large ore-bodies of varying grades have been encountered on the surface. Neither tunnel is far enough advanced to reach the ore-bodies or cross-cut the leads at the depth. Average cost of tunnelling, $16 per foot; sinking shaft, $22.

**Green Mountain Claims*—This property has been opened up by cross-cuts in 7 or 8 different places across the entire length of the claims. Development work comprises one tunnel, 35 feet; 1 tunnel, 65 feet; 1 shaft, 80 feet deep. A steam plant has been installed and a good machinery and shaft-house erected, also a good cook and bunk-house, 60x20.

**Giant.*—This property is situated on the west flank of Red Mountain. Development work comprises No. 1 shaft, 65 feet; No. 2 shaft, 115 feet; and tunnel, 125 feet. The ore showing is good. There are at least two distinct leads on the property. During the past summer 114 tons of ore were shipped from the *Giant*, which averaged $17.00 per ton. Up to November 30th, 15 men were employed. Operations are suspended for the winter.

**Novelty.*—This property adjoins the *Giant* on the east. The shaft is down 40 feet. Tunnel No. 1 is in 45 feet, and tunnel No. 2, 160 feet. The ledge is 35 feet wide. A shallow cross-cut has been made. Six men were at work at the date of the report.

**Abe Lincoln*—W. T. McDonald, Superintendent. The shaft is down 197½ feet, with a cross-cut of 18 feet. Five stringers of pay ore have been encountered in the workings. Number of men employed, 7. The power is supplied by a horse whim.

**Grand Prize*—Two shafts of 25 and 38 feet, respectively, have been sunk on this property. Number of men employed, 3. It is intended to use a horse whim in deepening.

Lily May—W. J. Harris, Manager. Work was begun November 1st. Up to the date of the report, the shaft was deepened 20 feet. It is now down 125 feet and in ore all the way. The report states that the bottom of the shaft is now looking better than at any time during the history of the mine. The ownership will be transferred to the new English-Canadian Company on February 1st, 1899, and the necessary capital for the steady development of the mine is being furnished.

The plant comprises an 80-h.p. boiler, a 5-drill compressor, two machine drills, a blacksmith shop, shaft-house, machine-shop, boarding and bunk-house. No. of men employed, 9. Total amount of development work, 485 feet.

**Homestake*—T. H. Bain, Superintendent. This property is situated on the east side of Trail Creek, and is contiguous to the *Sunset No. 2.* Area, 21.3 acres. The main shaft is 10 x 6, 160 feet deep. The prospecting drift, 4 x 5, is 50 feet deep. The drift which connects the shaft is 75 feet long. A number of surface cuts have been made, and the ledge is exposed for 700 feet. Number of men employed, 13. The plant comprises a 5-drill compressor, 80 h.p. boiler and hoist.

Commander—W. J. Harris, Manager. Development work was commenced in August, 1898, and since then the shaft has been sunk 100 feet without encountering solid ore. The shaft, however, runs through mixed ore, and is down 280 feet, but no shipments of ore have been made. The power is supplied by a 60 h.p. boiler, and there are one 3-drill compressor, 2 power machines, a blacksmith shop, a shaft-house, bunk-house and boarding-house, and lodging-house, etc. The total work done is 875 feet. Drifting will begin at the 300-foot level. Number of men employed, 13.

**Velvet.*—John L. Monish, Manager. Development work comprises 4 drives, 4 winzes, shaft and tunnel. The north drive, at the 100-foot level, is driven 222 feet; the south drive, at the same level, 145 feet. The north drive, at the 160-foot level, is driven 151 feet; the south is driven 160 feet at the 70-foot level. No. 1 winze, at the south of the shaft, is sunk from the surface 100 feet; No. 2 winze, north of shaft, is down from the surface 100 feet; No. 3 winze, north of shaft, is down 60 feet from the 100-foot level; No. 4 winze, north of the shaft, is sunk from the 100-foot level 60 feet. Depth of shaft, 210 feet. The distance driven in tunnel is 54 feet. The shaft was sunk through ore from the surface to the 160-foot level. Ore was also encountered in the drives and winzes. Number of men employed, 28. Plant comprises 25 h.p. boiler and hoist. No market shipments of ore have yet been made.

**Santa Rosa Group.*—Development work comprises:—1 cross-cut tunnel, 406 feet; 1 drift, 35 feet; 1 open cut, 16 feet; 1 open cut, 12 feet; 1 shaft and open cut, 20 feet; 1 open cut 4 feet; 1 open cut, 6 feet; 1 shaft and open cut, 6 feet; 1 open cut, 10 feet.

No. 1 tunnel cuts the outcrop of a considerable lead about 40 feet wide, consisting of magnetic iron and copper pyrites, and is cut through almost its entire length, and is heavily mineralized. No. 2 tunnel is driven on a lead of decomposed ore, near a syenite and porphyry contact. Tunnels Nos. 3 and 4 open on the lead at a depth of 290 feet. Tunnel No. 6 opens on quartz syenite, and is free milling. No. 7 opens up a lead of galena, with carbonates. Nos. 8 and 9 are similar to 4 and 5. No. 10 tunnel opens up a lead 4 feet wide of magnetic iron, with solid pyrites and well defined. Number of men employed, 6. No plant in use.

** Waneta and Trail Creek Gold Mining Company*—This group comprises the *Copper Bell, Copper*, and *Copper Glance.* Area, 140 acres, all Crown-granted. Development consists of one tunnel 25 feet, one winze 20 feet, one shaft 28 feet. The vein contains copper and galena. No machinery in use.

** Wallingford Group*—The group comprises the *Wallingford, Minnie, Mine No. 1, Summit*, and *Wallingford Fraction.* 100 acres Crown-granted; 60 acres not Crown-granted. The development work, so far as done, is all on the *Wallingford*, and comprises 200 feet of tunnelling; 40 feet of shafting No. 1; 14 feet of shaft No. 2; 45 feet open trench.

Ore contains gold, silver, and copper 20%. Car and track in use; also air-pipe in tunnel. Seven men were at work at the date of the report.

** White Bear*—Location adjoining Le Roi ground. Length of shaft 250 feet, well timbered. Total drift work, 400 feet. Cross-cuts at the 100 and 200-foot levels show from 7 to 10 feet of ore. The plant consists of 60 horse-power boiler, 20 horse-power hoist, 1 4-drill

compressor, 3 Rand drill machines, 1 station pump, 1 No. 5 Cameron sinking pump. Ten men are employed. J. Y. Cole is managing director.

East St. Louis—William J. Dunn, Manager. Up to December 31st, 1897, the shaft was down 32 feet. This has since been deepened to 54 feet, with 13 inches of clear ore in the bottom of the shaft. Cost of development work, $475.

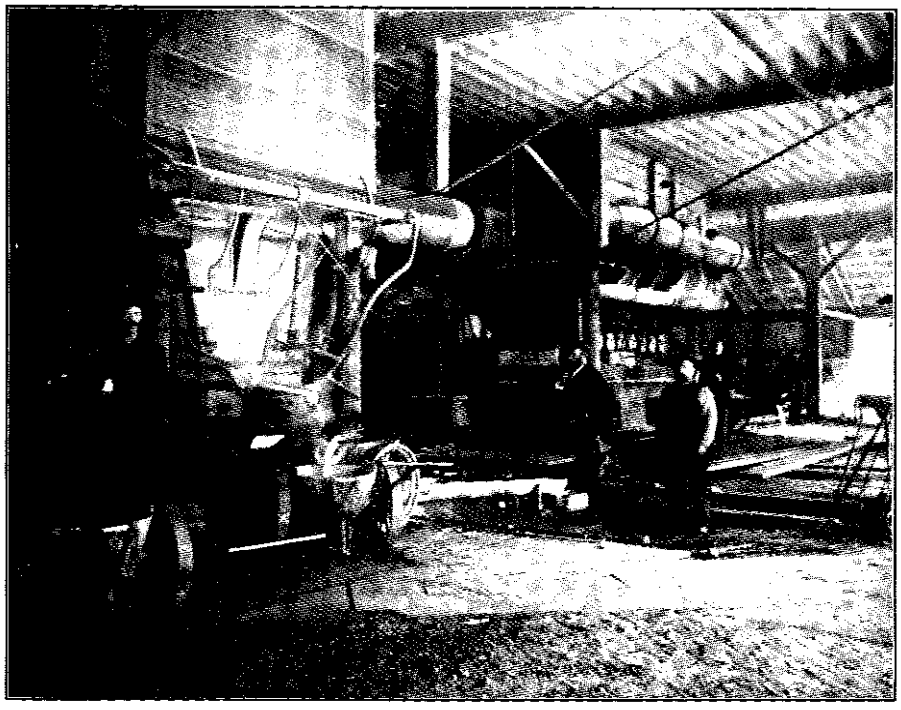
Red Mountain and Ida May Mining Company—Shafting, 14 feet, and other surface work. Cost, $250.

Royal George—The report gives 22 feet of shafting and other surface work, at a cost of $450.

Florence—The amount of work done consists of cross-cuts in the ledge, with plenty of low grade ore.

OFFICE STATISTICS—TRAIL CREEK DIVISION (to December 24th, 1898).

Number of Claims Recorded, (Mineral)	1,017
" " " (Placer)	28
Certificates of Work	1,110
Money paid in lieu of work	16
Certificates of Improvements	130
Money in lieu of Certificates of Improvements	2
Bills of Sale, Transfers, etc	660
Abandonments	66
Miscellaneous Records	21
Records of Water (granted by Nelson office)	25
Water Grants (this office)	3
Free Miner's Certificates	2,890
Substituted Certificates	22
Free Miner's Certificates (companies)	127



BLAST FURNACES—HALL MINES SMELTER, NELSON.

LADLING ANODES—HALL MINES SMELTER, NELSON.

LILLOOET DISTRICT.

REPORT BY F. SOUES, GOLD COMMISSIONER.

The total ascertained yield of gold from the District is $35,512, a decrease of $4,328 as compared with the previous year. Mr. A. W. Smith, of Lillooet, was the largest buyer, and reports to me "that he has bought, during the year $18,200. Year by year the amount is less, the quartz mining being the cause of a portion of this falling off. Had the miners paid as much attention to placer mining during the season as some have done during the past two months, the returns would have been very different, as those who were forced to resort to placer mining late in the season, to get something to winter on, made an excellent showing for the time they worked on the South Fork of Bridge River and Cadwallader Creek, showing that the large decrease in the yield, is not that there is no more gold, but is caused by miners not devoting their attention to placer mining the same as they did formerly."

Placer Mining. This class of mining throughout the District has been greatly neglected, and, as Mr. Smith points out, this is due to so much attention being paid to quartz prospecting.

Fraser River last spring, and again this Fall, was very low, giving ample opportunity to the itinerant Indian and Chinese, and I have no doubt that the greater portion of Mr. Smith's purchases were from these sources.

Quartz Mining. A large number of mineral claims (455) have been located during the year, and it is safe to say that only a small percentage of them will ever see any attempt at development. The greater portion of these have been located on Bridge River and its tributaries. Some 32 locations have been made on the base of the Marble Mountains, about 8 or 10 miles north-west from Clinton. With one exception, there has been no development work done on any of them. Assays, I am informed, have been had from surface croppings as high as $30 per ton. Samples from different ledges, which I have seen, may be described as jasper quartz, dark gray quartz with hematite and quartz with associated pyrolusite and manganite.

Nearly 200 locations have been made on Bridge River and tributaries during the season. Considerable development has been made on some of them, but repeated applications to the managers have failed to furnish me with details. I understand that machinery is spoken of for some of them, but to what extent I do not know.

McGILLIVRAY CREEK.

A discovery of gold-bearing quartz has been made on McGillivray Creek, which falls into Anderson Lake from the north. Mr. F. Brett, one of the locators, reports on it as follows:—"The ledge is well situated for economic working at an elevation of about 3,000 feet above sea level. The vein does not outcrop, being covered by vegetation and detritus. The mountain side on which it is situated is very steep, at an angle of 30°, and admits of tunnelling directly on the vein on all the claims. The vein is a true fissure, averaging about 16 feet in width, vertical, with walls of schistose matter. The vein structure is laminated, and showing 'ribbon rock,' but the chief value appears to be in a hard vitreous quartz. A tunnel is now in 150 feet, showing a continuous ore-body. Assays give good gold values. Facilities for placing machinery on the ground are excellent. The claims are situated about 2½ miles from the mouth of the creek, and at an elevation of about 2,200 feet above Anderson Lake."

The specimens from this ledge, which have been forwarded to me, may be described as a *milky-white, sub-translucent quartz, with thin veins of schistose matter and traces of iron*, showing gold freely, but not as uniformly distributed as could be wished. McGillivray Creek was worked in past years for alluvial gold.

CAYOOSH CREEK.

The failure of the *Golden Cache* group of mines on this creek has had the inevitable result, *for the time being at least, of practically putting a full stop to all mining and development* work in their vicinity. On 43 claims, sufficient development work has been done to obtain certificates of work.

BLACKWATER.

Of the numerous claims recorded at this camp two years ago, I am not aware that any work has been done during the past year, and it is practically abandoned.

BONAPARTE RIVER.

The same remarks apply to this camp with regard to the large number of claims recorded on this river two years ago. They are all abandoned, and I regret to report that the development work on the B. C. Development Co.'s group of 12 claims has also been closed down, but I am unable to state the reason.

MAHOOD LAKE AND CLEARWATER.

Nothing has been done on the locations here in the past year, and only three new locations made.

New Discoveries.

Of minerals of commercial value, I have to report the discovery, on Cadwallader Creek, of a ledge, 3½ feet wide, of sulphide of antimony. The next discovery is a ledge containing asbestos, described to me as situated on Upper Bridge River, and occurs in a well-defined, vertical ledge, from 2½ to 3 feet wide, showing on the surface for a lineal distance of 3,000 feet.

Another, and perhaps the most important, discovery is that of a soda lake, about 28 miles north from Clinton. The area of the lake is about 20 acres. The deposit varies in thickness, from 6 to 8 inches, thinning down at the edges to about 2 inches. Conservative estimates place the amount of mineral in the lake at about 20,000 tons. This Fall about 200 tons have been sawn out and brought to shore.

By request of Mr. Hoffman, Chemist and Mineralogist to the Geological Survey, I have forwarded to him, for analysis, specimens of the crystals, the water in the lake, and the subsoil on which the mineral rests.

Mr. Hoffman advises me of the following analysis:—

Sodium Carbonate	35.54
" Bicarbonate	1.34
" Sulphate	0.14
" Chloride	0.02
" Metaborate	trace.
" Hydrogen, Ammonium Phosphate	0.02
Water	62.89
	99.95

Lying in a north-east direction from the above referred to lake is another lake, also containing carbonates of soda; but the deposit is not so large, and is in separate patches, and apparently of a different composition. A sample of this deposit has been forwarded to Mr.

Hoffman for examination. Both lakes have been recorded as mineral claims, and are known as Lakes Goodenough and Last Chance, respectively.

Hydraulic Mines. The Lillooet Hydraulic Mining Company's lease, near Lillooet, has been worked during the past season, with satisfactory results.

Work has also been carried out on two of the leases on the South Fork of Bridge River. The greater number of such leases, however, have had no work done on them, although the holders are using every endeavour to enlist capital to aid them in commencing development.

Dredging. In this class of mining, the New Fraser River Gold Mines Company, at Big Bar, is the only one that has been in active operation, and it has been seriously handicapped. Caught in a rapidly falling river in November of last year, its dredger was frozen in for months, and did not commence operations until about the end of April, and was forced to stop work again, owing to high water and heavy drift, from about the end of May until the middle of August, when it continued, with successful and satisfactory results, until the 22nd of December, when severe weather again stopped it.

The Dominion Gold Dredging and Placer Mining Company has discarded its original dredging plant, and has this year constructed a powerful dredge of the dipper type, but I am unable to give full particulars. Unfortunately, the machinery was not completed in time for a test trial this fall, winter weather setting in early in December. On the other dredging leases held in the District no work has been done.

OFFICE STATISTICS—LILLOOET DISTRICT.

Recorded mineral claims	455
Conveyances of "	185
Certificates of Work, "	209
Water grants for "	4
Recorded placer claims	16
Re-recorded "	3
Dredging leases in force	18
" " applied for	4
Hydraulic leases in force	45
Free Miners' Certificates	$2,808.00
Mining Receipts General	6,355.35

YALE DISTRICT.

KAMLOOPS MINING DIVISION.

REPORT BY G. C. TUNSTALL, GOLD COMMISSIONER.

Placer Mines. The placer mines operated in this Division are with few exceptions of little importance. Placer mining is principally confined to a few Chinese on Traceyville, Scotch and Jamieson Creeks, who obtain small returns for their labour.

Mineral Claims. The dullness that prevails after mining excitements have subsided, has been dispelled by the strike in the *Pothook* mine, which has led to renewed activity in mining interests in the vicinity of Kamloops, and inspired confidence in their value and permanence.

The development of mineral claims is attended with an expenditure of time and money that few can afford. The prospector's labour ceases when he discovers deposits of a sufficiently promising character to justify expenditure, with the object of testing their value; but it remains with the capitalist to develop the hidden wealth and render it capable of being utilized for the purposes to which it is applied.

The large amounts asked for undeveloped property have, in some instances, prevented the introduction of capital, and defeated the object sought by prospectors, who were unmindful of the fact that but a comparatively small proportion of locations turn out to be mines after an expensive prosecution of work.

The Kamloops Division possesses a climate which enables prospecting to be carried on for eight months in the year. The grassy slopes of the mountains in this portion of the gold range afford an easy means of access in every direction. Wood is plentiful on the timbered summits, and water is available for domestic and other purposes. An excellent waggon road intersects the principal claims. The outlook from a mining point of view has never seemed so favourable. Cheap transportation is an important factor in mining, and this great advantage is afforded by the close proximity of the Canadian Pacific Railway.

I shall confine my observations merely to some of the most important claims to which sufficient work has been applied, to give some idea of their value.

Noonday Group.

The *Noonday* group is situated about 4½ miles due south of Kamloops. It consists of six locations, the principal ones of which are the two following:—

The *Christmas* mineral claim has a shaft 6 by 7 feet, 14 feet deep, and 2 cross-cuts about 40 feet long, 3 feet deep and over 3 feet wide, run through surface gravel to strike the lode. The rock is free-milling quartz of a width of 10 feet, and assaying in gold and copper.

The *Noonday* mineral claim has three shafts, two of which are 43 feet deep, and one 23 feet. The vein-matter is auriferous quartz of a free-milling character; width of ledge, 10 feet.

Kimberly Group.

This group embraces six claims, the principal location being—

The *Charlotte* mineral claim, which has a tunnel 200 feet long, a shaft 18 feet deep, and 40 cross-cuts and holes, exposing the lode a distance of 4,500 feet. The ore is chalcopyrite, with gold and silver values. The ledge is 35 feet wide on the surface.

The owners, Messrs. Fowler and Carter, are engaged extending the tunnel, which it is expected will strike the ledge in about 50 or 60 feet more. There are three defined lodes in this property.

Iron Mask Group.

A controlling interest in the *Python* mineral claim, of this group, has been purchased by Montreal parties. The work done last summer has proved the continuity of the vein, which has been traced east of the shaft between 700 and 800 feet. Development will be commenced shortly.

A considerable amount of work has been done on the *Iron Mask*. It has a tunnel 135 feet long following the vein. At its extremity, a winze has been sunk 30 feet deep. The lode has been exposed by a cut on the surface between 600 and 700 feet. This has confirmed the opinion that the vein extends through the whole of the location. Three car-loads were shipped last season to Swansea, viâ Vancouver. These were sampled by Mr. Pellew-Harvey, and valued at $1,537.92. The gross weight was a little over 57¾ tons. The result proved very satisfactory, as one of the cars contained second grade ore. There is every prospect of this property being acquired by a strong company in England.

Pothook Mineral Claim,

Bonded to Mr. Croft, of Victoria. Since its occupation, this mine has been steadily worked under many disadvantages. The broken-up character of the formation for a considerable depth exhibited at times very rich ore, which, later on, disappeared and was either replaced by low grade ore or became limited in extent. Notwithstanding these fluctuations, impelled by a belief that the deposit would be found intact below the point of disturbance, work was prosecuted with undiminished vigour until a cross-cut at the 160-foot level exposed a deposit of bornite copper glance and chalcopyrite.

A shaft, 4½ x 5 feet in the clear, has been sunk a depth of 226 feet through the ledge, which is between 300 and 400 feet wide. The cross-cut previously referred to is in a distance of 91 feet. The vein-matter is comparatively soft and easy to work, but, where the more solid mineral is encountered, the rock is hard and silicious. The formation of this portion of the Kamloops Mining Division exhibits but few rock exposures, and these are of igneous origin. The ore deposits are all contiguous to eruptive dykes.

The full expenditure to date has been $32,000, including bond. About 20 men have been employed, but this number has been since reduced, awaiting the erection of a 10-h.p. gasoline engine to supply proper hoisting facilities.

Erin and Jumbo Mineral Claims.

These claims lie about 6½ miles south-west of Kamloops. They are located on the western slope of Coal Hill, and are reached by an excellent waggon road.

The *Erin* is traversed by a ledge of gold and copper-bearing rock, which is well defined, and is developed by a shaft sunk on the foot-wall to a depth of 96 feet, dipping at an angle of 45 degrees. From this shaft, two cross-cuts have been driven 18 and 35 feet, respectively, but not far enough to strike the hanging wall. The vein-matter is a heavily oxidized, gossony material, with iron and copper pyrites. The shaft is not sufficiently deep to strike the solid ore where it would be free from oxidation. An adit tunnel, driven to cross-cut the ledge about 10 or 12 feet westerly from the shaft, has proved the ledge to be 60 feet wide from wall to wall.

The *Jumbo* is a fractional claim, which adjoins the *Erin* on the south. The lode found in the *Erin* apparently runs through this property.

Sugar Loaf Group.

This group lies about seven miles south-west from Kamloops, and consists of five locations. The principal location is the *Chieftain* mineral claim, which has two shafts, each 50 feet deep, and one 8 feet. On the property are six ledges, from 2 to 20 feet wide. The vein-matter is a quartz containing copper pyrites.

Cyclone Mineral Claim—Mr. L. W. Nestelle reports having found a large deposit of copper glance in the vicinity of Jacko Lake, samples of which he exhibited, said to be taken from near the surface of the *Cyclone*. A ton of this ore has been sent to the Everett Smelter to test its value.

Cherry Creek Group.

This group is situated about seventeen miles west of Kamloops, opposite William Roper's residence. The most work has been done on the *Copper King*, owned by Messrs. Hall & Morrell, who bonded it to Mr. Cotherill, of London, England, for $25,000. The richer portion of the vein varies from 2½ to 3 feet wide, and shows high values in gold and copper. The assays justified development. A shaft was sunk a considerable depth to a point where the vein-matter gave out, and the bond was allowed to lapse.

The proprietors then resumed work, being of the opinion that the disappearance was caused by the dip of the vein. They started in at the side of the shaft, and in a comparatively short time exposed the ore-body to view. Messrs. Crippen and Connerry, two experienced miners from Rossland, have since secured a bond on two-thirds of the property for $20,000, and prepared a shipment of one car load of ore.

Glen Iron Mines.

These mines have produced but 250 tons of iron ore this year, purchased by the Nelson Smelter for fluxing purposes. The Tacoma Smelter, which formerly obtained the whole out-put, ceased its demand in consequence of receiving ore for treatment which contained a quantity of iron. Next year, however, a large order is expected.

Jamieson Creek Group.

The Jamieson Creek locations are situated about four or five miles up the creek of that name, which empties into the North Thompson River sixteen miles north of Kamloops. They have attracted considerable attention in view of a favouruble report made by Dr. Dawson some years ago. The *Snowdrift*, *Osprey*, and *Razzle Dazzle* are among the principal locations. Most of the work has been expended on the last named, consisting of a shaft and open cut to intersect the vein, which is seven feet wide and exists in a slate and granite formation.

Big Shuswap Lake.

Blue Bird Mineral Claim.

Negotiations are pending for the bonding of this mine to an English company. It is situated about four miles north of Sicamous, near the edge of the lake. This property exhibits a well-defined ledge nearly 50 feet wide, assaying gold.

Kamloops Lake.

Mr. S. McCartney, of Savona, has kindly supplied the following report on the Cinnabar and Copper mines situated on the north side of the western extremity of Kamloops Lake :—

Mercury Deposits.

The past season has been a quiet one in this part of the Division, but has been marked by the discovery of some promising prospects and the inception of work upon them.

No work has been done on any of the claims of the Cinnabar Mining Company for the past season. It is a matter of regret that these properties have been so long idle, the money spent on them having been lavished on the more unpromising locations, and in building of a furnace not suited for such ore, as is shown by the fact that quicksilver can be panned anywhere in the gulch below the furnace. This loss is only a fraction of that which took place in the air as shown by the quicksilver in the flues. Mr. H. L. Lightner, the ex-superintendent of the Company's mines on Kamloops Lake, has lately made a thorough investigation of the mines and furnace, in the interests of the Cinnabar Company, with a view of making changes and commencing work at an early date on a firm business basis.

Hardie Mountain Group.—A considerable amount of work has been done this year on these claims on the mountain. Want of capital and the difficulties in contending with water have been drawbacks to development work on the high benches where most of the claims are situated. Work, as follows, has been done this season on some of the most promising prospects :—

Columbia Mineral Claim—60 feet of tunnel and 40 feet open cuts on the dykes. The cross-cut in the tunnel shows up a good body of furnace ore, assaying 1½ to 2 % quicksilver. Work will be continued during the winter driving the tunnel ahead on the dyke, developing the claim and assisting the drainage of the upper benches.

Almaden Mineral Claim—Development consists of 60 feet of shafts and open cuts. The prospect is good for a large body of furnace ore.

Idria Mineral Claim—50 feet of shaft and open cuts for this season's work, have been done on the dykes, water interfering with sinking. Further opening of the tunnel on the *Columbia* will have the effect of draining this claim so that work can be done much earlier next season.

Martell Mineral Claim—Mr. A. Hardie is at present engaged in running a tunnel to intersect the dyke from the present showing on the surface. More or less work will be done during the winter.

Work on other Cinnabar locations on the mountain this season consisted merely of superficial prospect holes, with not enough work done to warrant an opinion. In June last a very promising outcropping of cinnabar was discovered on 3-Mile Creek by H. I. Colquhoun, 15 miles south of Savona, proving the southward continuation of the quicksilver belt. Work will be done on this property in the early spring.

Assessment work has also been done on Cinnabar locations on Deadman's Creek. Particulars of work not at hand.

Copper Deposits.

As to the copper claims east of Copper Creek, 60 feet of work has been done on the *Tenderfoot*. The work on this claim is so far superficial, but seems to show a large body of concentrating ore, some small rich veins also occurring. A trial shipment of the ore is now being made from the property, and will be followed by others if the results are satisfactory.

On the same ledge on which this occurs, work is being carried on this winter by A. G. Colquhoun on the *Progresso*, and G. F. Monckton on the *Newark*, on each of which claims it is intended to run a 100-foot tunnel. On the former claim, after driving for some distance through heavy surface, the vein has been tapped, and some fine looking ore is being extracted, which appears to occur in a large deposit.

On the *Sunlight*, adjoining this claim, work will be done by eastern parties this winter. The same veins traverse these two claims.

On the *El Ultimo* claim the assessment work has been done, disclosing a large body of low grade ore. If a concentrating plant were built large shipments of ore could be made; at present it is necessary to have high grade ore to pay the cost of transportation and expenses. This is pre-eminently a district of large, low grade deposits.

MAMETTE LAKE.

Mamette Lake Mines.

I am indebted to Mr. F. Wells for the following description of the Mamette Lake mines, which are situated about 30 miles south of Savona and are connected with the waggon road that starts from that point to the Nicola Valley:—

The area which has so far been exploited and on which several locations have been made, lies some 2,600 feet above sea level. The country is mostly well timbered, and most of the rolling hills are covered with two feet or more of alluvial soil. Large exposures of the formation or country rock are the exception, but where exposed it is a green trap rock. A considerable number of small conical hills or buttes occur all through the valley; but where the formation is visible on the surface it is invariably a volcanic rock separate from the general country formation.

There are some ten claims located, and some good surface showings of copper sulphides have been found in all of them.

On a group of three locations, some four miles east of Louis Quienville's ranche, owned by Messrs. Dupont, Corning, and others, a shaft has been sunk between 60 and 70 feet, and three men are still at work sinking.

Some three miles to the N.W. of these claims are a group of claims at present under bond to the Hall Mines, Limited, of Nelson. Here again, high grade copper ores have been found, the red oxide or cuprite ore being in evidence. Some three or four men have been working on these claims for the last three months. Though the work has been more or less exploratory, it has resulted in about ten tons of high grade ore being obtained, which is to be shipped immediately.

The two groups of claims mentioned are located in a mineralized belt or dyke of volcanic origin, which, as far as exploited at present is thought to be from 800 to 1000 yards wide. The whole width is undoubtedly copper-bearing, as is evidenced by the very fine samples from the surface that can be obtained. More work will have to be done on these properties before one can speak with any certainty as to the future

ADAMS LAKE.

It is the intention of the company owning the mineral properties situated on Adams Lake to erect, next spring, a small experimental plant for the purpose of testing the value of the different veins in their mines.

NICOLA LAKE.

To Mr. Arthur Potocke, of Nicola, I am obliged for the following report on the mines situated in the vicinity of Nicola Lake:—

The work done in the vicinity of Nicola this past year has not been extensive, but the results have been satisfactory.

Peacock Mineral Claim—The *Peacock* lies about 5 miles north of Nicola. It has on the surface an outcrop of mineral measuring 105 feet by 45 feet. A shaft has been sunk through 20 feet of heavily mineralized quartz, where the foot-wall was struck. A tunnel has been started to run along the vein. The showings on this claim are exceptional, for although only $300 has been expended there is at present a large amount of copper ore in sight. The ore can be freighted to railway communication at Spence's Bridge for $15 per ton.

Boulder Cap Mineral Claim—The *Boulder Cap* is an extension of the *Peacock*. A tunnel is in 24 feet, tapping the lode exposed by last year's shaft, enclosed in well-defined walls. Some of the vein-matter consists of a soft decomposed rock containing native copper. The country rock is a diorite and porphyry, which runs N.W. and S.E., with more or less indications of copper. Higher up and in contact with the diorite lies a large extent of granite in which some well-defined veins of peacock ore have been discovered.

Culloden Mineral Claim—The *Culloden* is situated one mile north of the Town of Nicola. The ore is of a low grade character, containing copper pyrites and silver in calcspar.

Humming Bird Mineral Claim—The *Humming Bird* lies adjacent to a deposit of magnetite iron ore, contaning copper on the contact walls, below which some fine specimens of copper have been found. A tunnel is now being driven, on which work will be continued during the winter.

GILMOUR MOUNTAIN.

The Matthews Mining Company has done work on its properties. The ore found was good, but no defined vein was found. Work will be prosecuted next spring with the object of striking a permanent deposit.

QUILCHENA.

Some work has been performed in this locality on a vein of peacock ore, from which a good assay was obtained.

IRON MOUNTAIN.

The copper deposits on this mountain are again attracting attention. Assessment work has been completed on several of the locations.

GRAND PRAIRIE.

Henrietta Mineral Claim—The vein in this claim is 3 feet wide. A shaft is down 30 feet. The ore contains copper, silver, and gold.

Key Mineral Claim—Has a tunnel run in a distance of 25 feet to vein, which contains the same kind of ore as above.

Forest Queen Mineral Claim—A cross-cut, 15 feet long, and cuts made in two other places on the surface. There is a small quantity of molybdenite in the vein-matter.

SALMON RIVER.

Iron Cap Nos. 1 and 2 Mineral Claims—On No. 1 a shaft 12 feet deep. The lode is 50 feet wide. The ore contains iron pyrites carrying silver and gold On No. 2 there is a shaft 9 feet deep; has the same character of ore as the above.

Black Jack Mineral Claim—Adjoins the last-named claims. The vein is 100 feet wide. The ore is magnetic iron, carrying a little gold and silver. But little work has been done.

Deer Park Mineral Claim—Has a vein 30 feet wide, principally white quartz, containing iron pyrites and silver.

Dorothy Mineral Claim—Five veins run through this property in a parallel direction. The ore is of the same character as the above.

ASHCROFT.

Burr Group.

The *Burr* group of eight claims is situated about 5½ miles east of Ashcroft, on the C. P. Railway, which runs through the property. It has a large body of ore, carrying gold and silver, but principally copper, and lies between diorite and granite. The country rock is diorite.

About 80 feet of tunnelling has been run in on the claims, which are most favourably situated for working, as the ore can be dumped into the cars without extra handling.

Four other claims adjoin the *Burr* group on the south-east, owned by Alex. Oliver and J. C. Knight, on which no work has as yet been done.

On the north-west side of the Thompson River, about four miles above Ashcroft, several claims have been taken up, on which considerable work has been done, and which resemble the *Burr* group in the nature and values of the ore. A fine ledge has been discovered here, about four feet wide, carrying free gold. Several fine specimens of quartz, showing free gold, have been brought to Ashcroft from this property, which is owned by J. Haddock and Sons, J. C. Knight, and R. Stewart.

BONAPARTE RIVER.

On the Bonaparte River, about five miles north of Ashcroft and to the west of the Cariboo Waggon Road, Messrs. Ahearn and Campbell have opened up a ledge 8 feet wide, carrying gold and silver. On the Cornwall Range, Messrs. Bryan and Stewart have two claims on a ledge 10 feet wide, which assays well in copper and gold.

The *Cornwall* group of claims, four in number, is situated on the Cornwall Range about six miles from Ashcroft and ½ mile west of the Cariboo Waggon Road. Two ledges run through this property, one 8 feet, the other 10 feet wide, which carry gold and silver. About 40 feet of tunnelling has been done on these locations.

The claims of Messrs. Henderson, Shields, Robertson, and Van Dyke lie about 8 miles south of Ashcroft, near the Cariboo Waggon Road. A tunnel has been driven on the location owned by Mr. Robertson. On the Van Dyke claim a shaft 10 feet deep has been sunk, also an open cut which shows up a fine ledge.

An American company has taken up two claims on the Oregon Jack ranche, and is in about 50 feet on the ledge, which is a white quartz, 14 feet wide.

The *Commercial* group is situated on Langley Mountain. It contains a large deposit of quartz containing gold, silver, and copper, covered with a heavy iron capping. About 350 feet of tunnelling has been completed.

On the west side of the Thompson River, near the 89-Mile Post, Messrs. Thibadeau and Clark own two locations, on which 300 feet of tunnels have been driven.

The Ashcroft Queen Copper Mining Co. has a group of eight claims on 8-Mile Creek, on which considerable development work has been done. There are seven ledges running through the property, from 2½ to 30 feet wide.

In Highland Valley, Messrs. Kirkpatrick and Shuler have some claims on which a shaft has been sunk to a depth of 80 feet, but the water came in and further operations ceased until a pump and proper machinery can be erected. The ore carries gold and copper.

OFFICIAL STATISTICS, KAMLOOPS DIVISION (TO DECEMBER 14TH, 1898).

Free Miner's Certificates issued	353	= $1,927.00
Locations recorded	364	
Assessment Work recorded	232	
Mining Leases issued	1	
Mining Receipts, general		2,297.80
		$4,224.80

YALE MINING DIVISION.

REPORT BY G. C. TUNSTALL, GOLD COMMISSIONER.

River Dredging. The Fraser River Consolidated Gold Company, Limited, has been engaged since January last in making extensive and costly additions and alterations to its plant (purchased from the B. C. Gold Dredging Company), which lies at Ruby Creek. The Company holds practically all the river bed between Ruby Creek and Yale, under lease.

The Beatty Gold Mining and Dredging Company, at Boston Bar, a few miles west of North Bend, has not had a clean-up this Fall. It also, has been employed in improving and enlarging its plant.

Hydraulic Mining. Hydraulic mining seems to have been pretty much at a standstill during the past season.

The Ottawa Hydraulic Mining and Milling Company took out about $3,800 worth of gold from its holdings, situated about one and a half miles west of North Bend.

The Ashcroft Gold Mining Company spent the early part of the season in building a reservoir and getting water on its property, near Keefer's. The Company now finds that it cannot get enough water from the creek tapped, and is working at another, situated some three miles from the property. This property is considered one of the best of the bench claims on the Fraser River, the gold being exceptionally coarse. From a few hours' run this spring, with very little water, $380 in gold dust was procured.

Chinamen in great numbers are working, principally below high water mark, between Hope and Lytton.

Opposite Emory, on Canyon Creek, there was quite an excitement this Fall, and numerous locations have been made, which, undoubtedly, will be worked in the Spring.

Mineral Claims.

The *Queen* mine, near Yale, is at a standstill.

On Siwash Creek, the Gold Queen Mining Company and the Montrose Company has performed the yearly assessment work.

At Salmon River, the Allan-Grisby-Hannah Company is driving tunnels on its locations.

Near Foster's Bar, above Lytton, numerous locations have been made. Assessment work is being done by Messrs. Watkinson & Shannon on several claims.

Summit City, near Hope, has been very quiet this season, there having been no operations on the numerous locations near there.

Near Gladwin, the Miro Monte Mining Company has run a tunnel in over 200 feet on its claim, and expects to strike the ledge at less than 250 feet. When the ledge is reached, it is proposed to erect a stamp mill on the property.

At Thompson Siding, the Warren Company holds eight locations, on which the assessment work has been performed. Messrs. Wright and Barrick have also done the assessment work on their claims.

Near Agassiz is situated the *Empress* group of mineral claims, on which considerable development work has been performed, for which certificates of improvement have been issued.

At Boothroyd's, on the Fraser River, opposite Keefer's, R. E. Brown has seven locations, on which the annual assessment work has been performed.

About a mile west of Yale, and also near Botanic Creek, a short distance from Lytton, a few locations have been lately made, but no work has, as yet, been done.

OFFICE STATISTICS—YALE DIVISION.

Free Miner's Certificates issued, 473	$2,803 00
Mining Receipts, General	3,797 45
	$6,600 45
Mineral Claims recorded	76
Certificates of Work	71
Certificates of Improvement	7
Placer Claims recorded	43
Placer Leases recorded	14
Permits to transfer Leases	13
Permit to re-locate Mineral Claim	1
Powers of Attorney	2
Declaration	1
Transfers of Mineral Claims	23
Transfers of Placer Claims	18

Water Records, Placer	8
Notices filed	7
Water Records filed	3
Mining Leases	17

GOLD YIELD.

The gold yield for the past season is, approximately, as follows:—

Hope	$ 480 00
Yale	13,225 00
Spuzzum	1,500 00
North Bend	3,400 00
Lytton	21,900 00
Ottawa Hydraulic Mining Company	3,800 00
Ashcroft Gold Mining Company	380 00
Taken away privately (estimated)	5,315 00
Purchased by merchants at Ashcroft	6,000 00
	$56,000 00

SIMILKAMEEN MINING DIVISION.

REPORT BY G. C. TUNSTALL, GOLD COMMISSIONER.

The Similkameen Division is bounded on the north by the 50th parallel, south by the International Boundary, east by the 120th meridian and west by the Yale Mining Division. In point of natural beauty and mineral resources this portion of Yale District yields to none in the Province. It possesses an excellent climate, but though rich in natural wealth is comparatively unknown. Situated at a distance from the beaten paths of travel it has escaped that attention which more remote, but more accessible districts possessing railway and water communications, have attracted.

Until a few years ago the trail over the Hope Mountain, and that proceeding from Nicola through the Otter Valley, were the only means for the transportation of supplies by pack-trains to the population that still remained on the Similkameen, Granite Creek, and Tulameen River.

Placer Mining.

Since 1860, which dates the first discovery of gold on the Similkameen, the Division has participated in all the vicissitudes that attend a placer mining camp, accordingly as old diggings became worked out and new ones found to supply their places. Of the many who mined on the Similkameen and Tulameen, and their affluents, in those early days, but few remain who can give a history of the mining operations that were carried on and the incidents associated with the stirring scenes they brought into existence.

The streams mentioned were worked, where necessary, by means of wing-dams, and paid from $4 to $20 per day, to the man. The returns from the Similkameen were uniform and continuous for many miles, but the Tulameen was termed "spotted," although large amounts were obtained in certain localities, and some of the creeks yielded excellent returns. The Cariboo excitement attracted many of the miners to the new El Dorado, influenced by the startling reports that filled the newspapers; and eventually the Chinese monopolized the placers, and mined all the available ground for many years after.

In 1885, John Chance discovered Granite Creek, and the Similkameen Division was again populated with whites, many of whom had been employed on the Canadian Pacific Railway, which was completed that year or shortly after. A lively town, called Granite City, sprang into existance with a resident Gold Commissioner and Mining Recorder. The creek contained the usual number of blanks and prizes, and exhibited a scene of busy activity throughout its course in the deep gorge cut through the mountains by the process of erosion. The claims averaged from $5 to $30 per day to the hand, and the probable total yield from the bed of the stream, and its benches, would approximate six or seven hundred thousand dollars.

No official record has been kept of the gold obtained from this Division since its first occupation, but it must foot up to a large amount.

In addition to gold, platinum is found in all the placers in this section of the country in sufficient quantities to render it of commercial value. In 1886, it sold in Granite City for 50 cents per ounce, and as its value became known gradually increased in price to $4 per ounce. It is associated with iron, and contains a certain amount of iridium and osmium. For a number of years it was thrown aside as being worthless, and by this means many thousands of ounces have been lost.

This Division has produced some of the largest nuggets found in the Province. In 1886 two pieces were taken from Bear Creek worth $400 and $415, respectively. The following year a Chinaman working for a company on Boulder Creek unearthed a nugget of the value of $900. This was concealed and sold to Wells, Fargo & Co., bankers, Victoria, who placed it on exhibition in their window that winter.

The long period during which the placers in the beds of the streams and creeks have been worked without intermission, has naturally exhausted them of their wealth, and attention is now being devoted by capitalists to the benches which have lain idle owing to the expense incurred in obtaining water to work them. The principal companies at present engaged in preparations for mining their leaseholds on a large scale are the Slate Creek Mining Co., A. Swan, Manager; the Vermilion Forks Mining Co., W. J. Waterman, Manager, and the Golden Creek Mines Co., Capt. S. F. Scott, Manager. These properties are all deemed valuable, and employ a large number of men. The Granite Creek Mining Co., R. Stevenson, Manager, has been working ground that had been previously drifted, and the returns have been much smaller than expected, but as operations next summer will be confined to unworked gravel that will probably realize their anticipations.

The waggon road from Nicola to Granite Creek, constructed within the last few years, has been extended to Princeton, now supplies an easy means of communication. The stage from Spence's Bridge connects every week at Nicola with the Granite Creek and Princeton stage.

The following is a table of distances:—

From Spence's Bridge to Nicola	50 miles.
From Nicola to Aspen Grove	20 "
Aspen Grove to McCullough's	10 "
McCullough's to Thynne's	14 "
Thynne's to Granite Creek	16 "
Granite Creek to Princeton	12 "

Mr. Hunter, the Mining Recorder for this Division, reports a great reduction in the yield of gold and platinum, but an increase in the records of mineral claims. There have been no claims taken up by Chinese the past season, the greater number of them working for wages.

The Slate Creek Mining Co. has been prospecting its ground looking for an old channel, which report says it has found. It is at present running a tunnel through which to take a flume.

The Granite Creek Mining Co. has been working this season with about 25 men, but as the ground piped had been already worked, a large clean-up could not be expected. The Company will start on new ground next spring for the first time, and good results should be obtained as gravel in the face prospects very well.

The Similkameen Gold Gravels Exploration Co., whose property is situated on the right bank of the Similkameen River, has bonded its property to Dr. Bell-Irving, of Vancouver, who prospected the ground for a few weeks this summer, with satisfactory results.

The Vermilion Forks Mining Co., Limited, whose property is in charge of Mr. W. J. Waterman, a mining engineer of wide experience, has constructed a flume over a mile long, to convey water to the benches acquired by lease, but the cold weather suspended further operations.

The Gold Creek Co., S. F. Scott, Manager, has constructed a flume and brought water on one of the benches and washed a considerable quantity of gravel, but was unable to clean up in consequence of the ground being frozen.

Mineral Claims.

At the head-waters of the Tulameen River, a belt of limestone extends seven miles east and west and about four miles wide. This formation contains a large quantity of galena, on which locations have been made, which in some instances are remarkably rich in silver.

GRANITE CREEK.

The *Mountain View*, John Amberty, of Granite Creek, owner, has a tunnel 20 feet long, 7 feet by 7 feet.

The *Josie*, owned by C. McDonald, of Vancouver, joins the *Mountain View*. An open cut has been made through rock, 12 feet long.

The *Morning Star*, A. D. Ross, of Granite Creek, proprietor. A tunnel has been run a distance of 30 feet. The vein is 6 feet wide. The assays show silver, lead, and a trace of copper. Some thirty feet above this lode a deposit of ore shows values in gold and silver.

The Star Mining Company, of Terre Haute, Ind., has run a tunnel to tap the ledge, some 90 feet in length, on the *Sutter* mineral claim. The ore on this and the foregoing claims is galena.

TWENTY-MILE CREEK.

On Twenty-Mile Creek, a tributary of the Similkameen River, some forty mineral claims have been located and recorded this year. Some of the assays in this vicinity show $129 in gold and copper to the ton.

The *Rollo* mineral claim is situated on this creek and is owned by Peter Scott, of Fairview. The work done on this property consists of rock cuts 24 feet long, from 6 to 10 feet deep, and 4 to 5 feet wide.

The *Climax*, H. W. Yates, of Fairview, proprietor. Open cut in rock 16 feet long, 10 feet deep.

COPPER MOUNTAIN.

Copper Mountain is about 12 miles from Princeton, in a south-westerly direction. It is noted for immense deposits of copper of a rich character, which have attracted a great deal of attention.

The *Sunset* mineral claim, owned by R. A. Brown and Flora Averill, of Grand Forks. Title, Crown grant. The lead from the cropping on the surface to the bottom of the shaft is said to assay 12 % copper.

The *Copper Farm* group, includes the *Copper Farm, Helen H. Gardner, Humbolt*, and *Vancouver* mineral claims. Two thousand dollars was spent on these locations this year.

The *Copper Bluff*, Jackson and Mills, of Princeton, proprietors. Open rock cut 20 feet long, 5 feet wide and 9 feet deep. Assays show good values in gold, silver and copper.

The *Copper Reef*, *Copper King*, and *Copper Bench* are owned respectively by Messrs. Thomas, Jacobs, and McDiarmid. The *Copper Reef* has a shaft in rock 21 feet deep; the *Copper King* a shaft 12 feet deep, and the *Copper Bench* a shaft the same depth as the former.

Princess May—owned by Charles Powell, of Republic, Washington. Rock shaft 4 x 8, 4 feet deep.

Sunrise has a shaft 10 feet deep. This claim adjoins the *Sunset*.

Sultan.—This location is situated on the west bank of Similkameen River, owned by Murphy and Kennedy. A tunnel has been driven into the hill, the vein-matter being quartz.

OFFICE STATISTICS—SIMILKAMEEN DIVISION.

Free Miner's Certificates issued	153	= $ 950 00
Location Records	288	
Certificates of Work	67	
Conveyances	85	
Certificate of Improvement	1	
Mining Leases	9	
Crown Grant	1	
Mining Receipts, general		3,538 70
		$4,488 70

Before concluding, I wish to acknowledge the valuable assistance obtained from Mr. Hunter, the Mining Recorder at Granite Creek, and Mr. Dodd, who occupies a similar position at Yale. They seem to have forwarded full and accurate statements of the mining interests in their respective Divisions.

HARRISON LAKE AND VICINITY.

The following has been received from Mr. John R. Brown, of Harrison Hot Springs:—

"In answer to your request for some information relative to any new discoveries or development work on mineral locations in that part of Yale District bordering on Harrison Lake, and vicinity I beg to say:—

"As you are no doubt aware, both the Districts of Yale and New Westminster meet here, and as my operations have been principally confined to that of New Westminster, I fear I can give you but a slight idea of the importance of the many new discoveries and development work done in the past year in this portion of Yale District.

"About three miles south of Trout Lake, an English corporation owning a group of mineral claims is developing a very promising-looking vein of high grade copper pyrites, which is 4 feet in width. Some 200 feet of tunnelling has been done, and a contract for a tunnel 300 feet in length, in order to tap the vein lower down, has been given. This is a very promising-looking proposition.

"Near Trout Lake, the scene of the first mineral discoveries of recent years in this vicinity, the assessment work only has been done. The ledges here are very large, but low grade, requiring expensive machinery to put them on a paying basis. No doubt this will come in time, and there is every probability that we shall have some big permanent mines there yet.

"On Harrison River, some fairly high grade ore (gold-copper) has been uncovered, but seems to be much ribboned and with no defined walls. It is simply a prospect with an undetermined value.

"On Silver Creek, some development work is now progressing, but in a very desultory way This is a promising field for the prospector, but, so far, no capital has got in.

"The owners of the *Providence* mine, directly opposite Silver Creek, are pushing development work, and are now installing a Leffel wheel, air-compressing plant, and some other machinery. This property promises to make a very good mine. Immediately adjoining the *Providence group*, Dr. Langis and Mr. Whatley are cross-cutting to tap the leads of the *Providence*, and are well equipped for the work.

"The Fire Mountain discoveries and development of the past two years have given an impetus to the development of the country north of Harrison Lake, and some very fine discoveries have been made on John Gowan's Creek, in Yale District. Both copper-gold ores and high grade galena have been found here; in fact, a very large and rich district seems to be opening up in this vicinity, and it needs but one dividend-paying mine to send the country ahead, with very great chances of permanency.

"A great amount of placer ground seems to exist along the banks of the Lillooet River, with a good many benches fit for hydraulicing. No doubt there is a good deal of gold in this gravel, as the Indians in the different settlements along this river always sluice when the water is low and the dollars scarce, with very fair results for the amount of work they put into the business.

"The town of Tipella, the head of navigation on Harrison Lake, is now the point of departure for this interior country since the Government has put a bridge on the Lillooet, six miles above this town, and already the town does quite a business in supplying and forwarding goods for the different camps which have sprung up—in fact, it is now the easiest and shortest route to the Pemberton Meadows, Anderson Lake, and Lillooet and Bridge River, and will eventually tap these by railway as the shortest and most economical route, and opening up a great agricultural as well as a very promising mineral country. With a little over 100 miles of rail, and the all-year-round water route of the Fraser, Harrison River and Lake, this great interior country will be in a position to show its value, tapping the resources of the three great Districts, Yale, Lillooet, and New Westminster. As this entire country is developing very rapidly, no doubt the necessity for this railroad will be realised and acted upon in time.

"I trust that you will not consider these last remarks a digression from the main subject —the mines."

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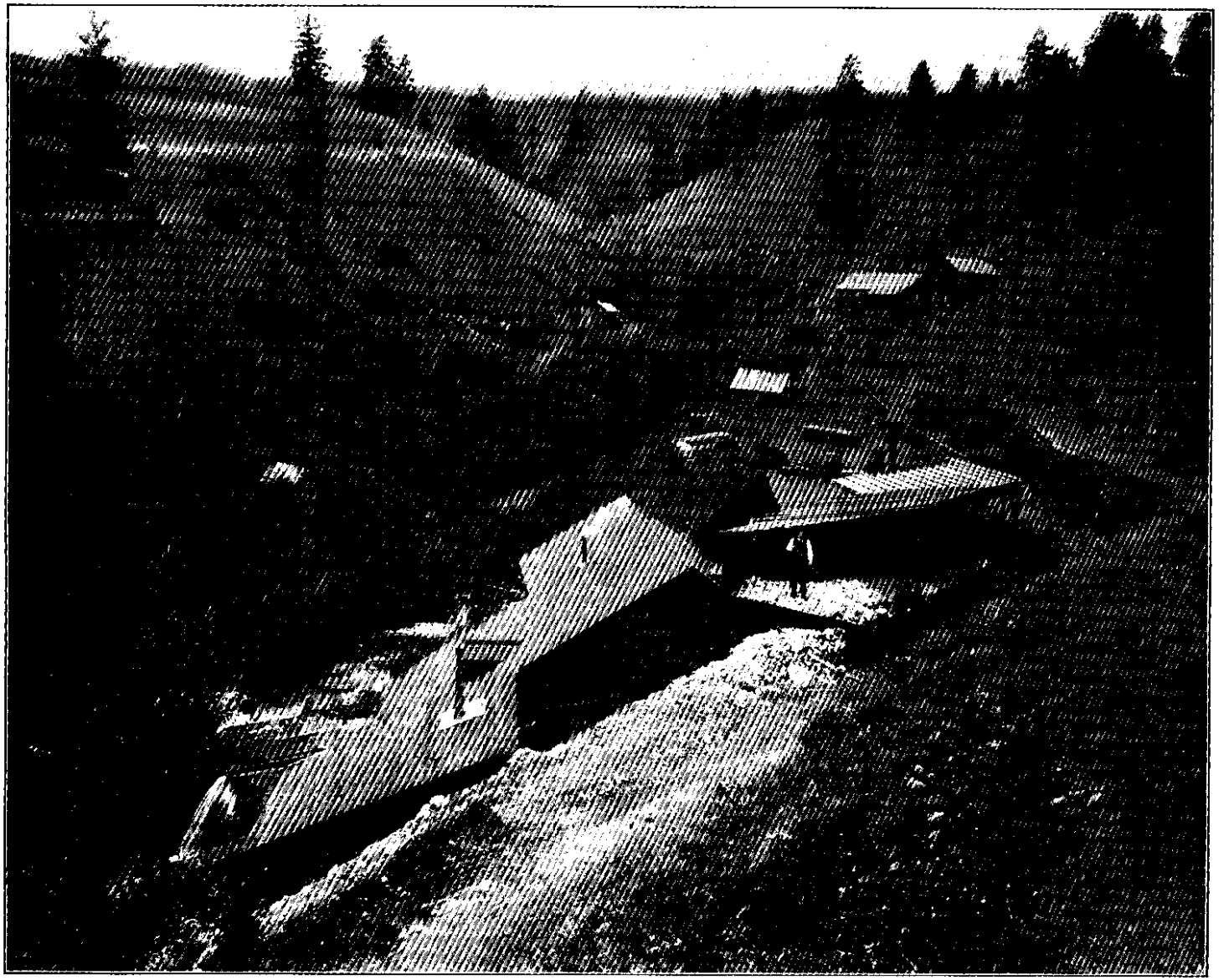

STRATHYRE QUARTZ MILL, FAIRVIEW

OSOYOOS MINING DIVISION.

C. A. R. LAMBLY, GOLD COMMISSIONER.

CAMP FAIRVIEW.

Taken from the report of Mr. Jas. R. Brown, Mining Recorder, Osoyoos.

Morning Star. Crown-granted; owners, Messrs. Mangot and McEachern. There are two veins on this claim, known as the east and west veins. The vein-matter is blue quartz carrying galena, gold, and iron pyrites. On the west vein a shaft had been sunk 60 feet, and a new whim set up, and is now being further sunk, probably to the 200-foot level. At the bottom of the shaft, at present, the vein shows very strong and is about 5 feet wide.

From the east vein at the 25-foot level 300 tons of ore were milled at the *Joe Dandy* mill, and ran about $10 to the ton.

Stemwinder. Grown-granted; owners, the Winchester Gold Mining Company, Ltd. There are three well-defined veins on this property, the widths of which on the surface vary very much, but all appear to increase as depth is obtained, the gangue being a very compact quartz. Free gold is disseminated through the ore-body, which also carries chalcopyrite, iron pyrites, and galena. The bulk of the ore is free-milling, the percentage of the concentrates being from one and a half to two per cent., average assays from the ledge running about $9 per ton. The ledges are named the Main, North, and South.

On the Main ledge the work this year was continued from the end of the drift previously driven at the 72-foot level, and the work was extended 66 feet N. 58° W. At this point an inclined shaft was sunk and is now down 170 feet.

On the North vein, the drift from the Main ledge having intersected the vein at the 84-foot level, the shaft is being further sunk at the rate of ten feet a week, the intention being to sink to 300 feet. There has also been sunk on the ledge an incline shaft of fifty feet, showing both hanging and foot-wall well defined. The vein is similar to the Main and South veins, and at the 50-foot level is 5 feet wide and very regular. A cross-cut tunnel, mentioned above, running from the Main vein, intersects this vein at 84 feet from the surface, and from the point of intersection, a drift is run in an easterly direction, for 20 feet, and an upraise of 68 feet, taps the above-mentioned shaft 44 feet from the surface. This work is all on the ledge which shows, especially in the drift, strong and regular and uniformly mineralized. The Company made a mill test of about 200 tons of ore, which was put through the *Tin Horn* mill and yielded $6.50 per ton.

Good buildings have been erected by the Company, who have in position a 4-drill compressor plant, Dow vertical sinking pump, a 30-horse-power hoisting engine, and 3 Rand rock drills.

Tin Horn. Crown-granted, owned by the Tin Horn Quartz Mining Company, Ltd. The work done this year consists of a continuation of the upper tunnel about 100 feet further.

Cascade Mining Syndicate. The properties of this Company consist of eight claims, viz.: *Empress of India, Empress of China, Empress of Japan, Empress of Russia, Dominion, Gold Kettle, Jubilee,* and *British Standard.* These properties were located by Mr. Fleming Robinson, for a Vancouver syndicate.

British Standard has a strong ledge 16 feet wide, carrying gold, silver, copper, and iron pyrites. The ledge was cross-cut and a depth gained on the hanging-wall of 12 feet. On all the claims good surface showings are to be found, but as yet little work has been done.

Oro Fino Gold Mining Company.

This company owns the *Oro Fino*, and *Independence* mineral claims on McCaig Mountain, the ore in which is free-milling gold and carries a little silver. There are three ledges running across the claims.

At the discovery post on the *Oro Fino* there is a big cropping of quartz, from 8 to 9 feet wide, which was cut through to the foot-wall and a shaft sunk 22 feet. A tunnel was then run along the ledge and a good clean wall was found, and the tunnel continued along it for 75 feet. The ledge is from 1½ to 7 feet in width. Seventy feet north-west is another ledge of similar quartz showing free gold and a little galena. An open cut was run for 30 feet, and the ledge, as exposed, varied in width from 1 to 2 feet. A tunnel was then started on the ledge as it entered the mountain, where it had now increased in thickness to 3 feet, and continued to widen as the tunnel proceeded. When in 22 feet a smooth clean wall was encountered where the ledge was fully 5 feet thick. Twenty feet below the open cut, and about 75 feet south-east from the cropping, a shaft was started and the ledge was found about 8 feet from the surface. The shaft was sunk 48 feet, and a tunnel was then started from the bottom of the shaft to strike the ledge to the north-west, and was extended a distance of 78 feet. At the upper end of the *Independence* claim a tunnel has been run for 65 feet, where the ledge varies from 2 to 6 feet in thickness. The ledge was stripped at about 70 feet from the summit and found to be 9 feet wide, of solid quartz, and a tunnel was run in on the ledge for 50 feet, when a clear smooth wall was met with, having the same dip as the *Oro Fino*, and directly in line with it. The wall was followed for 25 feet and a shaft started and sunk 9 feet. Further down the mountain some 80 feet, a second cut was made and a tunnel run in 30 feet, where quartz was found, but water coming in work was stopped. To the west of the discovery post, a third ledge was found on which a shaft was sunk to a depth of 54 feet. The ledge is well defined between walls and varies from one to four feet, the vein-matter being a bluish quartz carrying iron.

The Company has great confidence in its properties and is going to at once erect a small test mill of three stamps. There are now about 5,000 tons of ore on the different dumps, which has been estimated by Mr. Pellew-Harvey to be of an average value of $10 per ton. The mill-site is about one and a half miles distant, having an easy grade from the mines, and a road has been made from the mill to connect with the Penticton waggon-road.

Smuggler.

Crown-granted. Owned by the Smuggler Gold Mining Company. Since last report the tunnel has been driven to a length of 350 feet, which at 312 feet connects with a shaft 200 feet deep. Drifts have been run both north and south, at 50, 100, and 200 feet. There are 3,000 tons of ore on the dump and a large body is exposed in the mine. A 20-stamp mill, capable of crushing about 40 tons daily, is now in operation, and, while only just started, promises good returns. The indications are that the *Smuggler* will become a dividend payer in the near future. A competent mining engineer will take charge of the operations of the Company in January next, and further development work will be pushed right along.

CAMP MCKINNEY.

I am indebted to Mr. H. Nicholson for the following particulars regarding this camp:—

Cariboo-Amelia Mineral Claims.

These two claims formerly owned by the Cariboo Gold Mining and Milling Company, of Spokane, have now passed into the possession of the Cariboo Consolidated Gold Mining and Milling Company, of Toronto; Robert Jaffery, President; Geo. B. McAuley, Mining Director, with head offices at Camp McKinney. Capital stock, $1,250,000.00, in 1,250,000 shares of $1.00 each, now quoted at $1.25. In addition to the *Cariboo* and *Amelia*, the present company own the *Alice*, *Emma*,

and *Maple Leaf* claims to the west, and the *Saw Tooth Fraction*, and the controlling interest in the *Okanagan* claim to the east. The work of the company is at present confined to the *Cariboo* and *Amelia* claims, and Superintendent Keane gives the following as the result of the year's work: 7,530 tons of ore crushed, 11,000 ounces of bullion produced; value, $12.00 per oz., $132,000. Two hundred and sixty tons of concentrates produced, value, $80 per ton, $20,800. The mine development consisted of 950 feet of drifting in the fourth level, and two upraises, of 85 feet each, to the third level. The fourth level is 250 feet below the surface at shaft. The shaft is now being sunk to the fifth level, which will be 350 feet below the surface when completed. Up to October 1st, 10 stamps were in operation, since then, 20 stamps. The mine is equipped with steam pump and hoist and compressor drills, and the mill with a Gates rock crusher and Wilfley and Johnson concentrators. There are between 50 and 60 men on the pay-roll.

Minnie-ha-ha Mineral Claim.

This claim lies nearly 1,500 feet south of the *Cariboo*, and is owned by the Minnie-ha-ha Gold Mining Company, of Toronto; President, Professor H. Montgomery. Capital stock, $1,000,000 in 1,000,000 $1.00 shares, 525,000 of which have been set aside as treasury stock. Present price of shares, 19 cents. The work done on the claim consists of a working shaft 103 feet, with 24 feet of cross-cutting and 185 feet of drifting. The mine is furnished with a double cylinder hoist, steam pump and drills. There are good bunk-houses, a boarding-house, and an assay office, etc., on the properties. The character of the ore is free-milling and concentrating, the vein being white quartz, carrying iron pyrites and galena, with a little blende and chalcopyrite. The mine is under the superintendence of Major Ainsley Megraw.

South of the *Minnie-ha-ha* is the *Big Bug*, upon which is a 30-foot shaft.

Sailor Mineral Claim.

Title, Crown grant. This claim joins the *Minnie-ha-ha* on the north west, and is now under bond for $15,000. On it is a very strong vein, presumably the same as the *Cariboo*, which has been exposed for 700 feet. Three shafts have been sunk in this vein, the deepest being 30 feet, shewing some high grade sulphurets. The ore is free-milling and concentrating.

Adjoining the *Sailor*, and between it and the *Cariboo*, are the *Rover* and *Kamloops* claims.

Annie L. Mineral Claim.

A fractional claim, adjoining the *Sailor* on the north. This property has recently been incorporated in Spokane, and is now owned by the Little Cariboo Gold Mining Company; capital stock, $100,000, in 1,000,000 10-cent shares. A small shaft, 15 feet, has been sunk in a 4-foot vein of bluish quartz, carrying a small amount of pyrites. This shaft is being sunk 50 feet.

The *Dolphin*, lying south-west of the *Annie L.*, is one of the old locations. A tunnel 75 feet has been run to intersect one of the three veins in the claim. The vein of quartz is about 8 feet wide, showing pyrites and galena, giving a fair assay in gold.

The *Eureka*, east of the *Dolphin*, is also one of the old locations, and is owned by a New York company. A great deal of work has been done on this property in former years, but nothing lately.

Pandre and Alma Mineral Claims.

These are two claims to the north of the *Eureka*, upon which a nice, though small vein of white quartz, carrying gold, has been discovered. On the *Pandre* a working shaft has been started, now down 12 feet. The vein has also been opened up for 100 feet. On the *Alma*, two shafts have been sunk on the vein to a depth of 10 feet each, at which depth the vein would appear to be about 18 inches wide.

Waterloo Mineral Claim.

This claim is about 2,000 feet east of the *Cariboo* and is supposed to be on the same vein. It is owned by the Waterloo Gold Mining Company, of Spokane, with head offices at Camp McKinney. Capital stock, $100,000, in 1,000,000 10-cent shares, now quoted at 9 cents. The quartz is of a bluish colour, similar in character to the *Cariboo*, and bunches containing free gold have been met with in sinking No. 2 shaft. The vein is well-defined, and averages over 6 feet in width. Two shafts have been sunk on the vein, 390 feet apart, the west or No. 1 shaft is 4½ by 9 feet and is 50 feet deep; the east or No. 2 shaft is 5 by 7 feet, and 70 feet deep.

Adjoining this claim on the west, and between it and the *Cariboo*, is the *Wiarton*; title, Crown grant, owned by the Camp McKinney Development Company. Capital stock, $600,000, in $1.00 shares. No work has been done on this claim this year.

The *Fontenoy*, title, Crown grant, adjoins the *Wiarton* on the east, the side line being 60 feet from the east shaft of that claim. There is an 80-foot shaft showing 5 feet of sulphide ore, also an open trench exposing the easterly and westerly *Waterloo* vein. Adjoining this property on the south-east are the *Vernon*, title, Crown grant, and the *Islander* just surveyed for Crown grant.

Victoria Mineral Claim.

This claim is situated nearly two miles to the eastward of the *Fontenoy*, the intervening ground having been located since the strike on the *Waterloo*, and is owned by the Rock Creek Mining and Milling Company, of Victoria, but no work has been done on it this year. The old workings consist of two tunnels, 234 feet and 205 feet, incline shaft 106 feet, upraise, 245 feet, and 300 feet of drifting and stoping. The character of the ore is iron pyrites, blende and galena in bluish quartz of highgrade; a shipment of 30 tons of sorted ore giving 2.15 oz. gold, and 5.2 oz. silver, net, per ton.

The *Old England*, title, Crown grant, adjoins the *Victoria* on the same vein. The development work here consists of three tunnels, 90 feet, 50 feet, and 52 feet, and an 80-foot incline shaft, a portion of which work was done this year. The character and value of the ore is similar to that of the *Victoria*. Adjoining the *Old England* are the *Homestake* and the *Peerless*, the former with a 60-foot, and the latter with a 15-foot tunnel. These three claims called the *Old England* group, are owned by E. James and H. Nicholson.

The *Eldorado*, situated on the North Fork of Rock Creek, about three-quarters of a mile east of the *Old England* group, has a 90-foot tunnel, shewing a big body of bluish quartz, carrying pyrites and blende. In the vicinity lie the *Cooper* and *Prince of Wales* claims, where recently discoveries of small veins of rich ore have been made.

The *Gold Standard*, adjoining the *Ophir* and *Snowdon* claims, near the falls of Rock Creek, has had some work done on it this season by the present owners, the Lemon Gold Mining Company, of Omaha, Neb.

The *Le Roi* and *War Eagle*, 4½ miles from Camp McKinney, and lying between the North and South Forks of Rock Creek, show considerable development work, there being some 500 tons of sulphide ore on the dump, carrying fair gold values. Adjoining these properties are quite a number of locations upon which assessment work has been done.

The *Highland Chief* and *G. M. Bennett*, lying north of the camp, have had a considerable amount of work done on them, but not enough to determine their values, and the same observation applies to the *Cameronian* and *Picton*, in what is known as the "burnt ground," north-west of the camp.

The *Anarchist*, title, Crown grant, is situated about one mile west of the camp, in the granite formation. A well-defined ledge has been opened by two shafts, 60 feet and 50 feet, carrying pyrites, zinc-blende and galena, with good gold values. The *Dynamite* adjoining, and an extension, has had only assessment work done.

THE WEST FORK OF KETTLE RIVER.

From information furnished by Mr. W. Thompson.

Little work has been done as yet on the numerous properties in this section, as the prospectors who own the claims, as a rule, have a number of properties each, and the yearly assessment work to be done on each claim prevents them, from a lack of funds, from doing more than the work necessary to hold the ground. On the following claims, a considerable amount of development work has been done:—

Carmi Mineral Claim.

The ledge on this property has been traced, by a series of open cuts, for the whole length of the claim, 1,500 feet; thence across the *Butcher Boy* another 1,500 feet, and those having extensions beyond this claim report that the ledge is visible on their ground. This ledge has a north-west and south-east trend, clearly defined walls with gouge on both sides, and has for a gangue quartz containing copper and iron pyrites, galena and zinc blende. This is a good concentrating ore, and its proximity to the West Fork of Kettle River, which is distant about 100 yards, will render it a valuable property. The dip of the ledge is almost vertical, and on it has been sunk a shaft about 15 feet deep, and a tunnel driven in on the ledge (at the base of a terrace 40 feet high) to a distance of 15 feet, in both instances in good ore.

King Solomon Mineral Claim.

This is a very promising property situated on Beaver Creek, a tributary of the West Fork of Kettle River, and has three well-defined, parallel ledges of quartz, heavily mineralized, of an aggregate width of 12 feet, with clearly-defined walls. The veins have been traced across the claim and on to adjoining ground. The ore on this claim is concentrating, and is of somewhat similar character to that of the *Carmi*. About $1,500 worth of development work has been done, consisting of a tunnel 40 feet long, a shaft 40 feet deep, a second shaft 15 feet deep, and several open cuts and trenches.

The *Bella* is another claim of considerable promise—a silver-lead proposition. The owners are developing this claim by continuous work, following the ledge down a steep gully, intending to tunnel at the depth of about 500 feet. Good buildings have been erected, and work is being vigorously prosecuted.

Across the gulch, about half a mile, is situated the *Iron Horse* and *Atlantic Cable* groups of five claims, where an enormous outcropping of quartz, from 20 to 60 feet wide, carrying arsenical iron with high gold values, can be traced on three of the claims, the *Iron Horse*, *Yellow Rose*, and the *Atlantic Cable*. The owners of these properties are driving a tunnel to cut the ledge at a depth of 150 feet, and expect to strike it with 50 feet of work. This last described group of claims is a fair sample of numerous claims, such as the *Silver Dollar*, *O. K.*, *Highland Mary*, *Highland Chief*, *Sunrise*, *16 to 1*, *Mountain View*, *Maple Leaf*, and *Hill Top* all of which carry gold values in ledges of quartz.

OFFICIAL STATISTICS—OSOYOOS DIVISION (to 30th November, 1898).

Number of Free Miners' Certificates	344
" location records (mineral)	496
" placer records or re-records	5
" certificates of work	351
" certificates of improvements	28
" conveyances and agreements	210
" abandonments	22
" permissions to re-locate	4
" filings	97

Abstract of revenue for eleven months:—

Free Miner's Certificates	$2,806 00
Mining Receipts, General	3,023 45
Total	$5,829 45

KETTLE RIVER MINING DIVISION.

REPORT BY MR. W. G. MCMYNN, MINING RECORDER.

I have the honour to submit the statistics, taken from the records in this office, during the first eleven months of this year, accompanied by references to some of the principal mineral claims in the Division, which were kindly furnished to me by the Boundary Creek special correspondent of the Vancouver "News-Advertiser," which have, I believe, been very carefully compiled.

In regard to the development work, machinery, or values of the different mineral claims in this Division, my personal knowledge is very limited, as I have not had either the time or opportunity this year of seeing many of the claims, but I know a few of them, at least, ought to be fully mentioned in this annual report to you. For this reason, I feel very much indebted for the privilege of submitting portions of the aforementioned special correspondent's summary of progress for 1898, and also to Mr. Frederic Keffer, M.E., of Anaconda, for an article kindly contributed for publication, and now attach them hereto.

A great many of the new locations made this year are situate on Kettle River, north of the mouth of Rock Creek. The ore-bodies in this locality, especially around Deer Creek, Canyon Creek, and Cedar Creek, are reported to be very large, but as yet scarcely prospected. In some cases, a few feet in depth has been sunk, and that with good results, but this District may well be termed undeveloped. The surface values so far obtained are also reported to compare very favourably with the surface assays first obtained on Boundary Creek, consequently this locality may, in a short time, be equally as important as Boundary Creek.

The distance from Rock Creek to Deer Creek is about 49 miles. The river valley has, at least, an average width of one mile. In some portions of it, good agricultural land may yet be pre-empted; on other portions, there is a large amount of timber. For eight miles north of Rock Creek, *i. e.*, to the mouth of the West Fork of Kettle River, the agricultural land is nearly all located. A waggon road has also been built to this point, and now a bridge over the West Fork is very much needed, especially during the winter and high water seasons. A good waggon road can be built from the West Fork to Deer Creek at a cost of about $4,500.

OFFICE STATISTICS—KETTLE RIVER DIVISION (to 30th November, 1898).

Number of	Free Miners' Certificates	653
"	Location Records	563
"	Certificates of Work	528
"	Certificates of Improvement	40
"	Conveyances and Agreements	361
"	Abandonments	55
"	Permissions to Re-locate	3
"	Water Grants	5

Abstract of Revenue for eleven months:—

Free Miners' Certificates	$4,522 10
Mining Receipts	3,826 00
Total	$8348 10

For the following references to the claims of this Division I am indebted to the special correspondent of the "News-Advertiser."

DEADWOOD CAMP.

Mother Lode Mineral Claim.

"Without complete records available it is not possible to epitomize the work done and the results achieved in this District during the year 1898, yet a fair review is practicable from the data at hand. For adequacy of equipment and systematic thoroughness of development work carried out, the *Mother Lode*, in Deadwood Camp, may, without reflection upon excellent work done on other claims, be placed first. This property was recorded on May 28th, 1891, and was bonded for $14,000 in June, 1896, by Col. John Weir, of New York, who, with several associates, organised a corporation named the Boundary Mines Company, of New York. The surface showings on the *Mother Lode* may rightly be described as enormous. It is one of the most striking in the district, the outcroppings of the large ore-body standing out prominently for 1,000 feet along the hill in which it occurs, and rising to a height of nearly 300 feet. The lode has a strike approximately north 25° east, and it lies between lime and porphyry formations. Its width is naturally not so well defined on the surface as in the tunnel below, but it appears to cover a distance of nearly 200 feet. The locators of the claim did a deal of surface prospecting, and the Boundary Mines Company ran a cross-cut tunnel 245 feet into the hill, commencing at a point about 100 feet above the level of its base. For 42 feet the tunnel was through limestone, and for the remaining 203 feet to the hanging-wall, through rock mineralised with iron and copper, but in the main of very low grade. Allowing for the diagonal course of the tunnel, it is estimated that this ore-body is 185 feet in width. Then a winze was sunk 100 feet, commencing at a point 152 feet in from the mouth of the tunnel. From the bottom of this winze a cross-cut was run to the hanging-wall, and this disclosed that the ore had much increased in value in that additional depth. Next the Company bonded for $7,000 the adjoining *Primrose Fraction*, and a long cross-cut was then run from a prospecting shaft on this claim, at a depth of about 50 feet below the lower cross-cut on the *Mother Lode*. Whilst the work was in progress on the *Primrose*, early in 1898, a larger company, named the British Columbia Copper Company, Ltd., was organised in New York, with a capital of $1,000,000, in 200,000 shares at $5, 30,000 shares being treasury stock, which was at once taken up by men of ample means, so that the new company started with $150,000 available for equipment and development. A plant was at once purchased and permanent mining work was entered upon. The plant which

is now in operation on the claim, consists of two stationary boilers, each 60 h.p.; a Lidgerwood hoist with 30-inch drum; a Northey-Cameron pump, 10 x 5 x 13, for pumping water up 300 feet from the creek; a Knowles pump, 7 x 10 cylinder, for use in the shaft; and Ingersoll-Sargeant air compressor, to drive 10 machine drills, and a full complement of drills, cable, fittings, pipes, etc. An electric light plant, consisting of an Edison dynamo and a Lively engine, these having a capacity of fifty 16 c.p. lights, was also put in, provision being made to fire the blasts by electricity as well as to light the mine workings and buildings. The site chosen for the main working shaft is on the opposite side of the hill to the mouth of the tunnel already mentioned. The mouth of the shaft is at an elevation of about 25 feet above the level of the lower cross-cut, so that when the 200-foot level is reached, which will be early in January, a depth of about 175 feet below the lower level of the old workings will have been gained. Sinking will be stopped for the time at the 200-foot level, and the big lode will be extensively prospected at that depth by cross-cuts and drifts. Although the shaft has been sunk independently of whether it was in ore or not, some bunches of nice ore have been met with, and at the time of writing the bottom of the shaft is entirely in ore of good grade. The shaft is vertical and has two compartments, each four feet six inches by five feet in the clear, with provision made for adding a third compartment of similar size, should the development of the property require later such additional accommodation. The timbers are twelve inches square, and the lagging 2 x 12. All ladders are inclined with a platform every fifteen feet, so due regard is had here to the safety of the miners, which is little provided for in most cases in the District. The property is in charge of Mr. Frederic Keffer, M. E., who has his office, laboratory, and residence at Anaconda, about three miles distant. With a big lode to prospect, and having the heaviest mining plant in the district, backed by ample capital to pay for development work, to do it with, the outlook for the British Columbia Copper Company, and consequently for Deadwood Camp, is decidedly encouraging.

"Among other properties in Deadwood Camp upon which more or less development work has been done during the year are the *Buckhorn*, *Marguerite*, *Morrison*, *Sunset*, and *D. A.*, and *G. A. R.*, the last two claims being owned by the Boundary Creek Mining and Milling Company, of Greenwood. The tunnel on the *Sunset* was extended to about 400 feet, and the shaft deepened, but a suspension of work was ordered from Montreal before the body of pay ore, believed to be not far off, was reached. The big surface showing on the *Morrison* was lately further prospected and some nice ore was met with in a prospect shaft, but developments on this promising claim do not yet call for particular notice. A small steam plant, removed from the *Athelstan* claim, in Wellington Camp, is now on the ground, but it has not yet been set up. Work on the *D. A.* and *G. A. R.* claims has been in disturbed ground, so a diamond drill is being obtained to try whether the formation is less broken up at greater depth. The *Anaconda Group*, from which much was expected last year, remains undeveloped.

GREENWOOD CAMP.

"Greenwood Camp during 1898, has attracted more attention and seen more actual work in progress, in the aggregate, than any other camp in the district.

Old Ironsides, Knob Hill.

The *Old Ironsides* and *Knob Hill*, which are adjoining claims, owned nominally by different companies, but controlled by the same leading stockholders, are developing very satisfactorily. The Old Ironsides Mining Co., of Montreal, is capitalized at $1,000,000 in $1 shares, 300,000 being treasury stock. Its property is equipped with a 60 h.p. boiler, a 6 by 8¼ hoist, three pumps, a No. 5 Cameron, a No. 7 Knowles, and a No. 8 Knowles duplex, and a 10-drill air compressor, which also supplies drilling power for the *Knob Hill*. During the year the *Old Ironsides* shaft has

been deepened to 200 feet, at which level a 273-foot cross-cut has been run, passing through 240 feet of ledge matter, of which about 83 feet is stated to be pay ore. The work now in hand is an upraise of nearly 160 feet, to connect with a prospect shaft about 50 feet in depth, to ensure better ventilation. It is claimed that much of the *Old Ironsides* ore averages $25 in all values. The ore dump contains about 2,000 tons. The *Knob Hill* has been opened up by a cross-cut tunnel which, after passing through ore the whole distance at 400 feet ran into country rock, whether an intrusive 'horse,' or a wall has not yet been determined. The tunnel has been run diagonally, but it is estimated that the right angle distance across the ore-body is about 240 feet. This tunnel gives a depth of 140 feet. An upraise will be made to the surface for air, and then a station will be put in the cross-cut for a hoist, preparatory to sinking. A similar average value to that named for the *Old Ironsides* is claimed for a large proportion of the *Knob Hill* ore, of which there are, approximately, 7,000 tons on the dump. The Knob Hill Gold Mining Company is capitalised at $1,500,000 in one dollar shares, 700,000 being treasury stock.

Brooklyn, Stemwinder.

Early in the year, by the purchase of the several interests in the Boundary Creek mineral claims of Messrs. Farrell and Migeon, of Butte, Mont., Messrs. Mackenzie, Mann, and Holt, of Toronto, and others associated with them, secured a large interest in a number of claims, among them being the *Stemwinder*, *Montezuma*, *Phœnix*, and *Standard*, in Greenwood Camp. Later they obtained control of the *Brooklyn*, which adjoins the *Stemwinder*. They have since done a deal of work on these two last-named claims. On the *Stemwinder* they deepened No. 2 vertical shaft from 50 feet to 100 feet, at which latter depth they cross-cut 75 feet. After cutting the ore they went down 25 feet in it. The ore-body is said to be chalcopyrite with a gangue of lime and silica. It varies from 12 feet to 15 feet in width, and is reported to run from $30 to $40 in gold, 5 or 6 per cent. of copper, and a few ounces of silver. A tunnel, commenced some 300 feet lower down the hillside and run in 50 feet, cross-cut the vein at a depth of 60 feet from the surface. No. 3 shaft is now being sunk on the incline. It will connect, at 100 feet, with the 25-foot winze mentioned above. It is intended to put in a steam plant when this connection shall have been made. Near by on the *Brooklyn*, two 30 h.p. boilers, and a hoist have lately been installed. The incline shaft has been sunk from 25 feet to 100 feet, and now the work of deepening to the 200-foot level is in progress. The shaft is going down on the foot-wall in ore of a similar character to that on the *Stemwinder*, and said to run about $23 in gold, 5 or 6 per cent. in copper, and a little silver. The vein has not yet been cross-cut below ground, but on the surface it has an apparent width of about 70 feet.

Snow Shoe Mineral Claim.

"The *Snowshoe*, also in Greenwood Camp, bonded early in the year for $65,000 by the representatives of a British syndicate, has had a considerable amount of development work done on it, but details are not known to the writer. It is stated that the incline shaft was sunk to a depth of 185 feet, and that nearly 200 feet of drifting was done, with what result has not been made public. It is understood, though, that the promise given by the excellent surface indications has been well maintained below ground.

A contract to drive a 300-foot tunnel on the *Rawhide* will, it is expected, be about half completed by the New Year. The object of this tunnel is to cross-cut the vein at a depth of about 250 feet. The ore contains hematite, and chalcopyrite with a quartz gangue. Open cuts show the surface width of the ore to be from 60 to 70 feet.

"Among other claims in Greenwood Camp worthy of mention are the *Idaho*, *Red Rock*, *Four-Ace*, *Ætna*, *Fourth of July*, *Victoria*, *Pheasant*, *Gold Drop*, and *Monarch*.

SUMMIT CAMP.

Emma Mineral Claim.

"The Mackenzie & Mann Syndicate, which has a considerable interest in Summit Camp, is reported as about to resume work on the *Emma*, which lies between the *Oro Denero* and the *Jumbo*. The lead has been traced from the *Oro Denero* northward through the *Emma* and *Jumbo*, and thence into the *Minnie Moor*. The vein is described as being solid, 35 feet in width on the *Emma*, where there is a vertical shaft 100 feet in depth, with a 15-foot cross-cut at the 50-foot level. The ore is magnetic, with copper, and assays taken whilst sinking returned $4.50 in gold, 8 ounces silver, and 8 per cent. copper.

"There are other promising claims in Summit Camp, and among them the *Summit* and the *Cordick* (the latter owned by the Adams B. C. Company, of London) have recently had additional work done on them.

LONG LAKE CAMP.

Jewel Mineral Claim.

"Work has been resumed on the *Jewel*, in Long Lake Camp, lately acquired by the Jewel Development Syndicate, which was organised a short time ago in London, England, by Mr. Gilbert Mahon, of Vancouver. The *Jewel* had an incline shaft sunk about 170 feet prior to the suspension of work, which took place early in 1898. About 220 feet of drifting at the 120-foot level was also done at the same time. The first steam mining plant brought into the district was installed at the *Jewel* early in 1897. It consisted of a 15 h.p. boiler, 6 h.p. hoist, and a steam pump. The *Jewel* last year enjoyed the further distinction of having the best timbered and, from the miner's point of view, safest shaft in the district. Its quartz vein has been irregular in value, although maintaining well its size. It is anticipated that, under the new auspices, more settled country will be reached, and better general values be obtained.

"The *Anchor* and *Enterprise*, and the *Lakeside*, thought to be no the extension of the *Jewel* lead, also promise to well repay the cost of extensive prospecting. The *North Star* is one among several other Long Lake claims likely to come into notice.

KIMBERLY CAMP.

"Kimberly Camp has been further prospected this year, and some good finds have been reported, but development work has been too limited to determine the value of its big showings at a depth.

PROVIDENCE CAMP.

"A shipment of ore from the *Strathmore*, formerly the *San Bernard*, in Providence Camp, yielded returns that, when compared with the assay values from numerous carefully-taken samples as work progressed, were so very disappointing that intended further shipments were not made. It has lately been announced that a commencement will shortly be made to run a 300-foot tunnel on the *Combination*, also in Providence Camp.

SKYLARK CAMP.

"Skylark Camp has not made much progress during the year now closing. A two-compartment, vertical shaft was sunk 100 feet on the *Last Chance* without encountering the lead, so work was stopped for the time. The *Lake* was bonded and prospected by a New York investor, but without encouraging results. Work was also done on other claims, but no discovery of any importance was made.

SMITH'S CAMP.

"In Smith's Camp, work on the *Ruby* was discontinued, the water being too heavy to admit of satisfactory progress being made. The tunnel on the 4-foot quartz lead occurring on the *Great Hesper* is now in 60 feet. Values here are chiefly in silver, with a little gold. The *Golconda*, with a lead opened by surface cuts over a distance of 400 feet, and a 60-foot shaft sunk in ore, has been further prospected by a tunnel, which cuts the vein at 50 feet in. A drift run 17 feet showed 4 to 5 feet of quartz, carrying arsenical and iron pyrites. Nothing has been done for some time past on the *Boundary Falls*, on which, it is claimed, occurs a fine body of free-milling quartz, carrying paying gold values.

"The *Republic Group*, also in Smith's Camp, was under bond early in the year, and a lot of work was done on the *Non Such*. The most important part of this work was the extension of the upper tunnel from 140 feet to 300 feet, and the making from this of an upraise 67 feet to the surface. The tunnel was run on the vein, which, though irregular, showed a width of about 3 feet 6 inches in the face of the tunnel. The ore is iron and copper pyrites in white quartz, and it is said to return average assay values of $18 to $20. The other claims in this group, *Republic*, *Last Chance*, and *Hidden Treasure*, are practically as they were at the close of 1897.

COPPER CAMP.

"Copper Camp is once again claiming notice. In August and September last, a deposit of blue and green carbonates of copper was opened up on the *King Solomon*, owned by Mr. D. C. Corbin and other Spokane investors. This ore showed native copper freely, and, being very pretty specimen ore, was much talked of. The deposit was passed through, and lately, operations were temporarily suspended, pending the receipt of a steam hoist to expedite working. The *Copper Mine*, also known as the *Big Copper*, may soon be further tested, with the object of determining whether its big deposit of copper ore is only a blanket or a continuous lead.

"Several very likely-looking prospects have been opened up in West Copper Camp, and these will shortly be further developed.

GRAHAM'S CAMP.

"In Graham's Camp, a 250-foot tunnel was run on the *Bruce*, and similar work has been done on the *Potter-Palmer Group*, but so far without disclosing the presence of the looked-for large bodies of copper ore, as indicated by big surface showings.

CENTRAL CAMP.

Norfolk Mineral Claim.

"About $2,000 worth of work has been done on the *Norfolk*, in Central Camp, by the London and B. C. Goldfields, Ltd., and, as a result, some nice showings of ore have been exposed. Twenty or thirty tons of good grade ore were taken from the 50-foot level of the *No. 7* in doing work for the year. It seems a pity that this valuable claim, and others in the vicinity, remain practically inoperative for lack of waggon road connection, when it is known that they contain much marketable ore.

City of Paris and Lincoln.

"The *City of Paris* is the only claim in Central Camp at present displaying any activity. This and the adjoining *Lincoln* claim are being operated by the City of Paris Gold Mining Company, a Spokane organisation capitalised at $1,200,000. A 10-drill air compressor was recently installed on the property. A cross-cut tunnel is being run, to cut, at a depth of about 300 feet, the two leads known respectively as the *City of Paris* and *Lincoln* leads. This tunnel is now in 500 feet, and will, it is expected, shortly intersect the *City of Paris* lead. The *Lincoln* vein is estimated

to be about 100 feet farther ahead. Should these leads be cut, and prove equal to expectations, a 1,600-foot tunnel will be run at a lower level, to cut them at 700 feet in depth. Everything about the City of Paris Camp—work, plant, and buildings—denotes that the Company looks forward to continuous development. It is most earnestly hoped that its most sanguine expectations will be realised.

"In the foregoing summary of the camps of Boundary Creek District it is inevitable that some deserving claims should have been omitted. No attempt has been made to review every claim, of either proved or prospective merit. It must, however, be evident to all who read the foregoing details, that among so very many mineral claims apparently worthy of mention, it will indeed be strange if at least a few of them do not develop into permanent mines.

BOUNDARY CREEK DISTRICT.

Conformation and Climate.

"Boundary Creek district is the most important section of the southern portion of Kettle River Mining Division. It embraces a number of mining camps situated to the east and west of Boundary Creek which, flowing in a southerly direction, enters Kettle River at Midway. The cistrict is generally mountainous, though few of its mountains exceed 5,000 feet in height. Most of them are easily accessible to their summits. They are covered with forest trees, and their slopes generally afford good pasture. Its valleys and some of its foot-hills, especially in the immediate vicinity of Midway, are adapted for agricultural purposes, though comparatively little of the land has yet been cultivated. The snow lies on the ground during only three to four months of the year, and the winters, as well as the summers, are usually mild. The official records, from data obtained at Midway, show the mean temperature to have been last year 42.8 degrees, and the rainfall for the same period, 13.3 inches.

Geology and Ores.

"The geological features of the district are described by Mr. S. S. Fowler, A. B., E. M., of Nelson, as being 'varied and interesting.' In the report of the Provincial Minister of Mines for 1896, at pages 580-1, may be found a brief summary of the geology of Boundary Creek, contributed by Mr. Fowler.

"The following reference to the geology and ores of the district was made by Messrs. George A. Guess, M. A., and J. C. Haas, M. E., in a pamphlet compiled by them for distribution: 'Altered sedimentary and metamorphic rocks, occurring with numerous eruptive "porphyries" and "diorites," flank the basal granites which occupy the upper portion of the creek. The ores of the district * * * * * may be conveniently divided into: I. Copper ores. II. Heavy sulphide ores. III. Concentrating quartz ores. IV. Free-milling ores. V. High grade shipping ores.'

Early History.

"It is hardly possible to now obtain an authentic history of mineral discoveries in this district. Accounts vary very much, but there appears to be no doubt that placer mining was successfully carried on nearly 30 years ago along Boundary Creek, the workings extending a mile or two up from its junction with Kettle River. It seems, though, that it was not till about 1884 that the first quartz claim was staked. This was located near Boundary Falls. Other discoveries were afterwards made in what is now known as Smith's Camp. Copper Camp attracted the notice of pioneer prospectors in 1886, these men having first visited Rock Creek and what is now known as Camp McKinney, and then explored the mountains lying north-east of those places. As the years passed, locations became numerous and were spread over an increasingly wide area. Intermittent attempts were made to work some of the claims, but under so many difficulties little effective development was practicable in such an islolated locality. So prospectors did

little more than assessment work, holding only the best claims, in the hope that the country would eventually be opened up by roads and railways. Slowly the district came into notice, until four or five years ago it attracted the attention of several enterprising Americans, who, realising that the prospective value was great, acquired some of the best of the mineral claims. In one or two instances shipments of ore were made by the new holders, and notwithstanding that the charge for hauling to Marcus, which was then the only accessible railway point, was $30 per ton, they realised a profit on their venture. Since that time claims have been purchased by numbers of outsiders, the majority being American citizens resident at Spokane or Butte. Latterly, Eastern Canadian and English syndicates and companies have acquired Boundary Creek mining properties, until at last parts of the district are being extensively and systematically prospected, and the urgently needed transportation facilities will soon be provided by the Canadian Pacific Railway Company.

The Mining Camps.

"The several mining camps of the Boundary Creek District, with the general character of their ores, and their approximate distance and direction from Midway are as follows:—

"1. Graham's Camp.—Big surface showings of copper ore assaying well in gold and silver; distance, about two miles west.

"2. Smith's Camp.—Veins one foot to eight feet wide; ores carry gold and silver in silicious gangue; assays from $3 to $100 in gold, and from ten to several hundred ounces of silver; distance, about five miles north.

"3. Copper Camp.—Large bodies of cuprite and chalcocite, carrying some gold and silver, and assaying from 6 to 20 per cent. copper; distance, about 14 miles north-west.

"4. Deadwood Camp.—Large bodies of copper-gold and iron-gold ores; assays from $1 to $30 gold, and from 2 to 20 per cent. copper; distance, 10 miles north.

"5. Kimberley Camp.—Big quartz leads and iron cappings, with ores carrying gold and silver; distance, 16 miles north.

"6. Long Lake Camp.—Veins one foot to eight feet wide; silver-gold ores with some copper and silicious gangue; assays up to $500 in gold and 150 ounces in silver; distance, about 16 miles north-east.

"7. Summit Camp.—Ore bodies 10 to 50 feet wide; copper pyrites, carrying gold and silver; assays $3 to $10 in gold, up to 200 ounces of silver, and 3 to 20 per cent. copper; distance, about 17 miles north-east.

"8. Wellington Camp.—Ore bodies from 3 to 20 feet wide; copper-iron pyrites and pyrrhotite in a silicious gangue; assays up to $800 in gold; also some silver claims in this camp; distance, about 16 miles north-east.

"9. Greenwood Camp.—Ore bodies from 10 to 300 feet wide; copper pyrites carying gold; assays from $3 to $100 in gold and 3 to 15 per cent. of copper, a considerable proportion carrying from $10 to $30 in gold and 4 to 8 per cent. copper; distance about 13 miles north-east.

"10. Providence Camp.—Silver-gold ores; veins from 6 inches to 4 feet wide; assays from $5 to $100 in gold and from 50 to 500 ounces in silver; also copper-gold ores; distance, about 9 miles north.

"11. Skylark Camp.—Silver-gold and copper-gold ores; veins of former 1 foot to 3 feet wide, assaying $5 to $50 in gold and 50 to 800 ounces silver; veins of latter are larger and give $1 to $6 in gold and 3 to 20 per cent. copper; distance about 9 miles north-east.

"12. Central Camp (including Atwood's, Douglas' and White's Camps).—Veins 2 to 12 feet wide; ores copper, gold and silver-copper-gold; assays from $3 to $20 in gold, 5 to 200

ounces in silver; veins of latter are larger and give $1 to $6 in gold and 3 to 10 per cent. of copper; distance, about 8 miles east.

"There are also some promising claims with copper-gold ores at Pass Creek, about 20 miles north-east; several very good prospects having copper-gold ores at West Copper Camp; distance, about 12 miles north; and others on Wallace Creek which joins Boundary Creek about 13 miles above Midway, and on Myers Creek which enters the Kettle River four miles above Midway.

ORES OF BOUNDARY CREEK.

"The following is from an article on the ores of Boundary Creek, contributed recently for publication by Mr. Frederick Keffer, M. E., of Anaconda, Boundary Creek, manager for the British Columbia Copper Company, Limited, which Company owns the *Mother Lode* group of claims situated in Deadwood Camp:

'"So far as development work in the various camps now indicates, the following general conclusions would seem to be warranted:—

'"(*a.*) Boundary Creek will be a copper and gold camp, with copper as the main product. There will, of course, be considerable silver produced, but, taken as a whole, its position in the camp will be secondary.

'"(*b.*) To a large extent, in some properties perhaps entirely so, the gold will pay the mining and smelting charges, leaving the copper partly or wholly net profit.

'"(*c.*) As a whole the camp will be a low grade one, a camp possessing ore-bodies of unusual extent, but in the main of low grade. Various estimates have been made of the average tenor of the ore. In view of the limited amount of development so far accomplished, any estimate is hazardous, but in the writer's opinion the mean value of the smelting ores of Boundary Creek, as sorted from the mines, will not exceed $20 per ton in gold and copper, and may fall below this figure to some extent. This may seem to some enthusiastic people a low estimate, but it must be remembered that the difference between the assays made whilst development work is in progress, and those of thousands of tons of ore sampled in mechanical and unbiased samples at the mills, is certain to be great, and that not in favour of the mine.

'"(*d.*) Although some of our companies have been at work on their properties for two or three years, still it is true that as a whole the development so far done is comparatively slight, especially when the great size of the ore-bodies is taken into consideration. Half a million dollars would be quite a liberal estimate of the money spent to date in development. This sum has, in other localities, often been expended in the development of a single mine. Here, scattered among many claims of promise, the result in individual cases is bound to be small.

'"(*e.*) As a direct result of the above, it may be said with perfect truth that as yet there is not a *mine* in the District, for a property cannot be designated a *mine* until there is sufficient ore actually in sight to warrant the title. And by the expression 'ore in sight,' it is not meant that product of guess work found by sinking a shaft a hundred feet or so and drifting a bit, and then multiplying the ore seen therein by the size of the whole claim, and by a depth limited only by the modesty of the multiplier, but what is meant is pay ore actually blocked out by drifts, cross-cuts, and winzes, ready to be stoped, and in such shape as to admit of fairly accurate measurement. Until a company has such a property it has no mine, although it may have a claim of exceeding great promise.

'"That the District has a number of properties of this exceeding great promise, nobody familiar with the camp will deny. And it is this fact that warrants all that has so far been done, and which causes us to believe that Boundary Creek will, in due season, rank among the great mining camps of the west."'

GRAND FORKS MINING DIVISION.

REPORT BY MR. S. R. ALMOND, MINING RECORDER.

Herewith I have the honour to forward report of work passed through this office since the 1st day of December, 1897, to the first day of the same month, 1898. In your circular you require a statement of progress made in each camp, and on each claim in such camp. I do not see how this can be done, unless through personally visiting the camps; certainly the information is not forthcoming from the different mine-owners, for last year I got them, as much as possible, to give me reliable information, and that information not having been published, the matter seems to have been laid at my door. However, I can say that all the camps are doing considerably more work this year than last, and to some of the mines large quantities of heavy machinery have been taken. One or two new camps have opened up this season on the Forks of the North Fork of Kettle River, and in the Christina Lake country.

STATISTICS FROM 1ST DECEMBER 1897, TO 30TH NOVEMBER, 1898.

No. of Free Miners' Certificates	561
Location Records	860
Certificates of Work	791
Certificates of Improvements	17
Conveyances and Agreements	466
Permissions to Relocate	4
Abandonments	75
Filings	352

ABSTRACT OF REVENUE FOR TWELVE MONTHS.

Free Miners' Certificates	$3,687 00
Mining Receipts	6,196 10
Total	$9,883 10

HYDRAULIC LEASES.

A Company composed of Messrs. Hodgson, Barrett, and Ferguson obtained three leases of half a mile each, of abandoned placer ground on Boundary Creek, for hydraulic purposes, but, as far as I can learn, have not as yet taken any steps to open up these claims.

The following is a statement of the number of mineral claims for which Crown grants have been obtained, in the different mining divisions during the year, viz.:—

Osoyoos Mining Division	36
Kettle River "	39
Grand Forks "	7—total, 82.

VERNON MINING DIVISION.

REPORT BY L. NORRIS, GOLD COMMISSIONER.

Besides the various claims referred to in last year's report, other claims of equally great promise have been located. The *Grand Times* and *Hidden Treasure*, on 6-Mile Creek, contain a fine body of free-milling gold quartz. These claims have been recently purchased by Mr. G. W. Howe, of San Francisco, who is running a tunnel on the vein. The tunnel is now in 60 feet, and the work still going on.

The *Klondyke*, on White Man's Creek; *Polar Star*, on Short's Creek; and the *Hic Jacet*, seven miles south-west of Vernon, are all very promising claims, but little development work, however, has been done on them. It is to be regretted that development work was not prosecuted more vigorously on some of these claims, as the surface showings are very promising.

Camp Hewitt.

Arrangements have been made by the Camp Hewitt Mining and Development Company whereby development work on an extensive scale will be carried on this winter on their various claims near Camp Hewitt, including the *Gladstone*, *Lake View*, and *Dandy*.

Alma Mater Group.

The Canadian-American Mining and Development Company, of Peachland, has, within the last 18 months, located 25 claims in the vicinity of Glen Robinson, situated about 15 miles west of Peachland. The formation is chiefly granite and porphyry, and several of the ledges show croppings over 100 feet wide, and are traceable for miles. This Company has this year expended over $10,000 in developing these claims. On the *Alma Mater Group*, north of Glen Robinson, which includes the *Alma Mater*, *Golden Crown*, *Mountain Queen*, *Shiloh*, *Arthur R*, *Golden Tarry*, and *Rose Bud*, three tunnels have been driven, 218 feet, 72 feet, and 115 feet, respectively, and three shafts, 14 feet, 10 feet, and 13 feet, respectively.

Silver King Group.

On the *Silver King Group*, which includes the *Silver King*, *Mary F*, *Canadian King*, *Julia Anna*, *Lily R*, and *Doctor L*, they have sunk one shaft 15 feet, driven one tunnel 110 feet, and cross-cut 20 feet. They have also, on the main ledge on this group, a winze down 25 feet and cross-cut 40 feet. The ores are mostly free-milling. A tunnel is now being driven to cross-cut the vein on the *Silver Star Group*, from which the higher assays were obtained. On its course it encountered a 15-foot vein of gray and white quartz, bearing values in free gold, and on this ledge the winze is now down 25 feet.

Kathleen Group.

Nine miles west of Glen Robinson, on Bald Mountain, is the *Kathleen Group* of claims, owned by this company. These claims are all staked on a strong ledge of rose quartz, lying between walls of granite and porphyry. The ledge is upwards of 50 feet wide, and can be traced for miles. Work was pushed vigorously last summer, and will be resumed next spring. The tunnel driven to cross-cut a fine surface showing of quartz, distant about 300 feet, is now in 220 feet. Assays (without depth) show values of $4 and $5.30.

Mineral Hill Group.

Nine miles north of Glen Robinson lies the *Mineral Hill Group*, also owned by the same Company. These claims are all base in character. The formation is of diorite and slate, with contacts of granite and lime. The ledge is so clearly defined that the seven claims lie end to end. No development work worthy of mention has been done on them, owing to the want of transportation facilities. No ore has been shipped from any of these camps, but about 300 tons lie on the *Kathleen*, *Alma Mater*, and *Silver King* dumps ready for milling.

The following statistics, prepared by Mr. J. C. Tunstall, Mining Recorder at Vernon, show the mining transactions for the year:—

Free Miners' Certificates	255
Claims Recorded	84
Certificates of Work	128
Transfers	45
Certificate of Improvements	1

"VAN ANDA" SHAFT, TEXADA ISLAND.

MAIN SHAFT, UNDERGROUND, "SILVER KING" MINE, NELSON.

VANCOUVER ISLAND AND COAST.

ALBERNI DISTRICT.

ALBERNI MINING DIVISION.

REPORT BY THOS. FLETCHER, GOLD COMMISSIONER.

ALBERNI CANAL.

Hayes Camp.

The Nahmint Mining Company's group, consisting of four full-sized mineral claims and three fractions, is situated on the west side of the Alberni Canal, half a mile south of Nahmint Bay and about 15 miles from the Town of Alberni. Active development work was commenced on these claims last spring and was carried on under the supervision of Mr. G. H. Hayes, from whom I have the following information.

The Nahmint Mining Company was organised in 1898, with a capital of $100,000, in one-dollar shares. Development consists of 600 feet of tunnel and 150 feet of shaft work. The lower tunnel cuts the vein at a depth of 265 feet, at a point where the vein is 28 feet wide, carrying values in copper, gold, and silver. Shipments in 1898 consisted of about 120 tons of ore. Improvements at the mine comprise boarding-house to accommodate 30 men, two ore sheds, and a road from wharf to mine, about two miles long. Improvements at the water-side include a wharf, warehouse, office, manager's residence, store-room, boarding-house and stable, together with other smaller buildings.

Raven and Eagle Mineral Claims.

The *Raven* and *Eagle* mineral claims, owned by H. S. Law and others, are situated 2½ miles from the Town of Alberni, on the west bank of Alberni Canal. There are three veins on the property, outcropping at deep water and running back into the mountain. Values are in copper and gold.

Union Jack Group.—The *Union Jack Group*, owned by H. S. Law and others, is situated near lot 77, Alberni Canal. There are three veins on the property, the values being in copper.

ANDERSON LAKE, UCHUCKLESIT HARBOUR.

Mountain Treasure Group.

Composed of six claims owned by the Forfarshire Mines Company. Situated about 1½ miles from the mouth of the lake, on the west side. Three of the claims, the *Mountain Treasure*, *Pacific* and *Pheasant*, have very extensive showings of sulphide copper ore and pyrrhotite. The property, under the management of Mr. J. Cameron, has been thoroughly prospected during the past summer, by open cuts and tunnels, proving the existence of an extensive ore zone containing large chutes of ore. Several bodies of good grade ore have been exposed on this property by the past season's work.

Marmot Group.

Adjoining the Forfarshire mines is the *Marmot Group* of six claims, owned by Messrs. Pemberton and Luxton. This property has fine surface showings, which on the *Marmot* claim has been stripped in various places with good results.

Lake Shore Group.

Opposite the *Marmot Group*, on the east side of Anderson Lake, is the *Lake Shore Group* of three claims, owned by Messrs. McKinnon, Shafer, and Jackson, who are now developing a very strong showing of pyrrhotite ore close to the water front. The values of the body of ore at the present stage of development are low, but increasing as depth is gained.

Florence Group.

Adjoining the *Lake Shore Group* is the *Florence Group* of four claims, owned by Messrs. Young, Johnson, Langley, and Avery. Development work is being done on a lead of high grade copper ore running through the property.

MINERAL HILL.

Consolidated Alberni.

Work on this mine was carried on during the past season. An 8-stamp mill was erected on the property, with a capacity of ten tons per day. Two clean-ups have been made and both were very favourable. The work done has shown up several veins carrying free gold. Several new discoveries were made on the property the past season.

HEAD OF CHINA CREEK.

Work on the *Golden Eagle* mine, consisting of tunnels, has been steadily carried on during the whole year.

GRANITE CREEK.

Near the head of this creek a very rich strike was made last June by Messrs. Wilson, Wilson, and White, on the mineral claims *W. W. W. Nos. 1* and *2*. The ledge is 20 inches wide, with gold freely distributed in the white quartz. Further development will have to be done to prove the continuance of the vein.

In addition to the above properties a number of claims have been recorded in the Division a large proportion of which have good surface prospects, but not sufficiently developed to say anything definite about them.

OFFICE STATISTICS—ALBERNI DIVISION.

Free Miners' Certificates issued	239
Mineral Claims Recorded	441
Certificates of Work recorded	294
Certificates of Improvements recorded	12
Bills of Sale recorded	187

REVENUE COLLECTED.

Free Miners' Certificates	$1,430 00
Mining Receipts, general	2,829 20
	$4,259 20

WEST COAST OF VANCOUVER ISLAND MINING DIVISION.

REPORT BY WALTER T. DAWLEY, MINING RECORDER.

Since the opening, last July, at Clayoquot, of a Mining Recorder's office for the West Coast of Vancouver Island Mining Division, prospectors have worked hard and well on the hills along the water front and creeks, with the result that one hundred and fourteen mining claims have been recorded, of which four are placer.

Many of the owners of mineral properties are now doing further development work, sinking shafts and driving tunnels.

Very little ore has, up to the present, been shipped from this Division, although the returns have been very satisfactory from the shipments made.

A great drawback to the Division is the lack of suitable trails and roads. Prospectors are doing a good deal of work on their properties, but are unable, financially, to build good roads.

DEER CREEK.

Crow Group.—This group was among the first to be recorded in the Division. The ore on dump, of which there is about 200 tons, is copper ore of good quality, carrying gold. Claims adjoining are the *Lady R.*, *Lady S.*, and *Two Sisters.*

Star.—Considerable work has been done on this claim, about 200 tons of gray copper ore being on the dump.

Jumbo.—This is a very recently recorded claim in the same section of the Division. The ore is bornite.

Hetty Green Group.—A group of seven claims on which considerable work has been done. Two assessments have been recorded.

HESQUOIT.

Considerable work has been done in this section of the Division, the claims proving very satisfactory; copper ore predominating. The *Guldemar* and *Thelma Groups* look well for the amount of work done.

TRANQUIL CREEK.

The properties here are looking well. Ten or twelve claims have been surveyed, and comfortable cabins and good trails made. It is reported that work will be resumed in the spring, when a wharf will be built for shipping.

BEAR RIVER.

Copper ore and gold-bearing quartz of good quality are found in this section. *King Richard, Castle* and *Seattle Groups* have had a lot of work expended on them, with good results. A considerable number of tons of ore are on the dump.

Placer claims on this river have been recorded by experienced placer miners who report favourably on their finds.

TROUT RIVER.

Copper ore and gold-bearing quartz have been found here. The *Helga Group* is reported as having 45 to 50 tons of ore on the dump.

CATFACE MOUNTAIN.

Work has been done on the properties on this mountain, a 20-foot tunnel having just been completed on one claim. The ore carries a considerable percentage of copper.

DISAPPOINTMENT INLET.

The *Iron Cap Group* situated on this Inlet has had a lot of work done. About 20 tons of ore have been shipped, the proceeds of which more than paid for the work done on the group. The owners are now working with a view to making regular shipments.

SYDNEY INLET.

A large amount of work has been done in this neighbourhood. The *Indian Chief Group*, on Peacock Mountain, has a 250-foot tunnel in, with some tons of bornite ore on the dump, which is now being sacked ready for immediate shipment.

The *Anaconda Group* has had a lot of work done on it, showing it to be an exceptionally good prospect.

This section is one of the most promising in the Division.

ELK RIVER.

A camp was started here last May since which time work has been uninterrupedly carried on. Ore has been shipped from time to time for mill tests.

CLAYOQUOT RIVER AND KENNEDY LAKE.

There are quite a number of good claims in these sections, and a proportionate share of work done on them.

OFFICE STATISTICS—WEST COAST OF V. I. DIVISION.

Number of Full Mineral Claims Recorded	106
" Fractional " "	4
" Placer Claims "	4
Total	114
Number of Assessments Recorded	64

FEES COLLECTED.

Free Miners' Certificates	$140 00
Mining Receipts	549 25
	$689 25

NANAIMO DISTRICT.

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TEXADA ISLAND.

During the last week of October, the Provincial Mineralogist made a trip to Texada Island, being taken over from Union Bay, V. I., on the "City of Nanaimo," which, through the courtesy of Mr. James Dunsmuir, made a special trip for that purpose.

VAN ANDA AND MARBLE BAYS.

The time available only permitted of a hurried examination of the properties in the immediate neighbourhood of Van Anda Bay, the best known of which are the properties held by the Van Anda Copper and Gold Co., of which Company Ed. Blewett, Vancouver, is President and Manager; H. W. Treat, 68, Wall St., New York, Secretary-Treasurer; and Thos. Kiddie, Superintendent at Van Anda.

Van Anda Mine.

From what examination I was able to make of this immediate locality, I was of the opinion that the ore found occurred either in, or intimately associated with, a series of dykes, apparently of felsite, which cut through the very highly altered and crystalline limestones which form the country rock in this locality.

The old *Van Anda* shaft, a somewhat irregular incline, down 92 feet, following the dyke and having a level at 60 feet down, driven some 94 feet; while at 92 feet down, levels have been set off on either side 50 and 134 feet respectively, from which levels drifts have been run amounting in all to some 100 feet. Between these two levels a considerable amount of stoping has been done and a large amount of the ore-bearing matter taken to the surface, from which some 500 tons of shipping ore has been sorted out, and sold for shipment to Swansea. This sorted ore is reported to me as carrying from 10 % to 15 % copper, 7 ounces silver, and $7.00 in gold.

The new *Van Anda* shaft is vertical, sunk from the surface to a depth of 230 feet, and cutting one of the levels from the old shaft at a depth of 92 feet, while at a depth of 175 feet, and also from the bottom of the shaft, levels were being started off, but at the time of my visit had only progressed a few feet.

I am since informed by the surveyor that the 175-foot levels have now reached a distance from the shaft of 25 and 30 feet, while the levels from the bottom of the shaft are now off about 75 feet. The new shaft seems to have been in or near the ore-bearing body all the way down, and at the lower levels the body seems to be increasing in size.

The ore-body carries, scattered through it in irregular masses, bornite and chalcopyrite, carrying certain values in silver and gold. The ore is of such character that the No. 1, or shipping ore, can be easily hand-sorted, but the percentage of such shipping ore is rather uncertain.

Above the 92-foot level, that is in the workings from the old shaft, little or no work has been done this past year. The ore chute above this level would not appear to have exceeded 100 feet in length, and would seem to have been practically stoped out as far as it is known to exist, and no new ore-bodies have been here shown up by development.

The work in the new levels, the 175-foot and the 230-foot, had not progressed far enough, at the time of my visit, for me to form an accurate opinion of the ore chute at that depth. The ore-bearing body in these lower levels appeared to be wider, but the quantity of ore therein did not seem to have increased.

The property must still be classed as a prospect, even though so much development work has been done, as there is no "ore in sight," as the term is understood by mining men, nor has the size of the ore chute been determined.

Plant—The hoisting plant consists of a small boiler and hoist, in a temporary building. A small pump is also in use, and it is apparently sufficient for the requirements.

An ore shed had been constructed near the mine, in which was stored a certain amount of ore already sold, but which had not been removed.

Preparations were being made for the erection of a substantial shaft-house and sorting-shed, with bins, etc. It was also expected that a new and suitable hoisting plant and an air compressor would be erected this winter, to facilitate the development.

Cornell Mineral Claim.

A location held by the same company, and situated some half-mile from the *Van Anda* shaft. On the hill side an outcropping of apparently a felsite dyke in contact with a whitish crystalline limestone, had been stripped for a few feet on the surface, the line of contact running nearly east and west, the dip being about 80°.

In the felsite near the contact there appeared a deposit of bornite and yellow copper, which looked very promising, but the size of which was still to be determined, as, on October 27th, nothing more than a few feet at the surface was in sight.

An open cut, through soft wash, was being run in some 20 feet below, but had not at that time reached solid formation.

Mr. Going, P.L.S., who made survey of the claim on December 15th, reports to me that at that date the open cut had reached solid rock, and that a 28-foot tunnel had been run in, cutting at the face the white lime at a depth of 30 feet from the surface, while the felsite in the last 8 feet of tunnel was strongly mineralized with copper sulphides.

Little Billie Mineral Claim.

A location, also held by the same company, is situated about half a mile from the *Van Anda* shaft and some 100 yards from the beach on the east shore of the Island. At the time of my visit no work had been done on this claim since it was reported upon last year, but preparations were being made to further prospect the property.

The rock formation would appear to be a crystalline limestone underlayed by an intrusive granite of probably later origin, the whole being cut by more recent igneous dykes, probably diorite and felsite. The felsitic dykes, at and near the contact with the granite, are more or less heavily mineralized in places with chalcopyrite and iron pyrites, carrying some gold and silver.

The work done consists of a 60-foot tunnel, from which some short drifts have been run, and on which an irregular chamber has been stoped out, said to have contained a body of good ore. Near the mouth of the tunnel a shaft or winze has been sunk, said to be 40 feet deep, with a 40-foot drift from the bottom to the contact, but these were full of water and I could not personally inspect them.

Some 50 tons of ore had been sacked and lay in an ore shed on the property, having been sold to Mr. Pellew-Harvey, as agent for a Swansea concern.

Townsite—The Van Anda Company has platted a townsite at Van Anda Bay, on which some clearing has been done. A manager's house has been erected on the shore, while further back, and on the way to the mine, there are three or four buildings—consisting of a boarding-house for the men, store, laboratory, etc. Preparations were being made for the erection on the town site of a 50-ton water jacket smelter, the plant for which was awaiting transhipment in Vancouver, ready for erection. This, I understand, is now in progress, under the superintendency of Mr. Kiddie, late assistant superintendent of the Orford Copper Company, of New York. A concentrator was also in contemplation, but, as far as I have heard, no actual move has been made in that direction.

Marble Bay Mineral Claim.

Superintendent, F. W. McCready; situated about one-quarter mile to the north of the *Van Anda* shaft, and about the same distance from the shore of Marble Bay.

The development, in addition to a lot of surface stripping and shallow cuts, consists of a well-timbered, double-compartment shaft, 100 feet deep, from the bottom of which two drifts, respectively 40 and 50 feet long, had been set off at right angles, but had converged in their courses until they were within a few feet of meeting at the ends.

The conditions here are very similar to those in the Van Anda, the ore, somewhat irregularly distributed through an igenous dyke, consisting of copper pyrites and white iron, carrying gold values, while some good bornite ore was obtained in sinking the shaft.

No ore in quantity was visible in the drifts, though the dyke-matter was more or less mineralized, while in the shaft, being timbered, the rock could not there be seen.

On the dump was some 50 to 60 tons of ore—classed as second grade—while a lot of first grade ore, said to amount to 100 tons, was sacked ready for shipment, and was reported to me as having assayed 8 % copper, 12 oz. silver, and $25 in gold. This ore was, it is said, practically all taken from the shaft in the sinking.

I was unable to distinguish any defined ore-body in the drifts, while on the surface the dyke, though strong and well mineralized in places, could not be traced in any one direction for any great distance.

Plant.—The plant consists of a steam boiler, hoist, pumps, etc., which were, on October 27th, then being erected, together with a well-planned and commodious shaft-house, a subject of illustration in this Report.

A blacksmith and carpenter shop, together with suitable accommodations for the men, have also been erected.

Townsite.—In connection with this mine a townsite has also been platted, situated on Marble Bay. So far, the buildings on the townsite consist of a large and well-equipped hotel, and a few small houses.

Dock.—A small but substantial pile wharf was built on one of the inner arms of the Bay, and here the steamers of the Union S.S. Co. make landings on their semi-weekly trips along the Coast to and from Vancouver.

Lime and Marble Quarries.

Within a few yards of the shores of Marble Bay there are large deposits of highly crystalline limestone, in some places of such a quality as to be suitable for use as ornamental marble, large blocks of which have recently been taken down to Vancouver to be worked, so as to practically test its quality, and I am since informed that the tests have been highly satisfactory.

The limestones, in the immediate vicinity, have already been worked for lime making, and have turned out a product of exceptional purity, but at present the kilns are not in operation.

PHILIPPS ARM AND SHOAL BAY.

On leaving Texada Island, the Provincial Mineralogist made a brief visit to Philipps Arm and the surrounding Bays, staying in Shoal Bay over one trip of the steamer, some four days.

Location. This district is situated on the West Coast of the Mainland, about 120 miles north-west from Vancouver, and is reached by the Union S.S. Co.'s line of steamers from that city, running twice a week. This whole section of the Coast is included in the Nanaimo Mining Recording Division.

Shoal Bay is the only attempt at a town in the district, and consists of a store, an assay office, two hotels with moderate accommodations, and a few houses, and is the centre of supply for the mining and lumber camps for many miles around. The hotels were full to over-flowing at the time of my visit, and I would have been at a loss to find accommodation but for the kindness of Mr. E. Pooke, agent of the Gold Fields of British Columbia, who kindly placed at my disposal an unoccupied furnished house belonging to his company.

Topography. The whole Coast line is much indented by deep waterways, and the head-lands and islands are high and rocky, with steep sides, covered with heavy timber to the water's edge. The waterways are so numerous that they form the natural roadways or lines of communication between all points, the great depth of water, maintained to within a few feet of the shores, enabling the largest steamers to deliver supplies or machinery at any camp. Local communication is maintained by boats and canoes, while at Shoal Bay there are two steam launches, the "Sea Lion," Capt. J. H. Murray, and another, which can be hired at very reasonable terms, either for the day or trip.

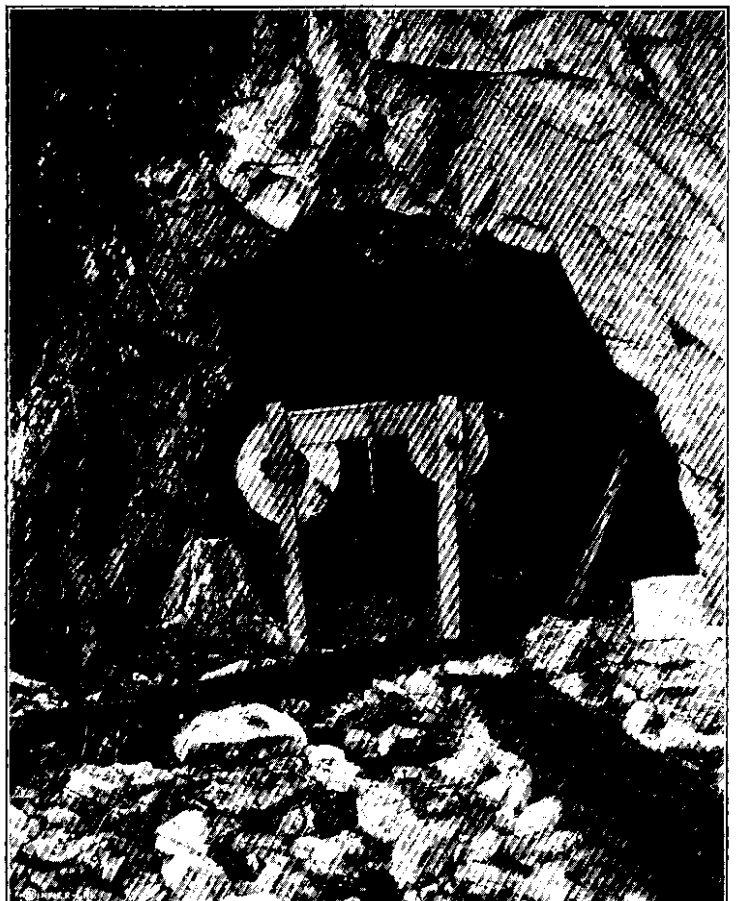
Geology. The country rock, generally, is composed of bluish shales and masses of igneous rocks, granites and porphyries, cut by more recent igneous dykes, the general features of the district being composed of igneous rocks.

The country would appear to be traversed by a series of immense quartz ledges, running in a general N.W. and S.E. direction, and, in places, mineralized with iron sulphides, carrying gold, with possibly some free gold in the quartz.

The ledge best known from development work is that upon which the *Doratha Morton*, *Alexandria*, and other claims are located. This is first met with on the west side of Philipps Arm, and presumably crosses under Cordero Channel, re-appearing at Channe Island, and again on Valdes Island. It is over 100 feet across and is mineralized very considerably in places, though not throughout, with iron sulphides carrying gold, as described elsewhere in detail.

DORATHA MORTON MINE.

This is a Crown-granted claim, situated on the hill, directly west of Fanny Bay—a branch of Philipps Arm—at an elevation of 2,600 feet, and about 1¼ miles from the mill-site on Fanny Bay. This claim is one of some twelve claims owned by, and four claims bonded to, the Fairfield Exploration Syndicate, of London, of which Mr. J. J. Lang, of Vancouver, is the local manager. These claims are all on the same quartz ledge, and have all been explored and prospected sufficiently to show that the ledge runs through all of them, either on the surface or, presumably, at a depth. Important development has, however, been confined to



VENTILATING FAN, MADE FROM CEDAR SPLIT WITH AXE, "ALL UP" MINE, PHILIPP'S ARM.

"DORATHA MORTON" CYANIDE PLANT, FANNY BAY, PHILIPP'S ARM.

the *Doratha Morton*. In this claim the ledge runs about N. 80° E. (mag.), or nearly with the range of hills, with a dip of about 70° to S., and upon the outcrop some test shafts, etc., were sunk. Satisfied with the results here obtained, the management started a cross-cut tunnel, about 100 feet vertically down the steep hillside, and known as No. 1 tunnel. This tunnel, having a general southerly course, was run about 44 feet through the country rock, when it cut the hanging-wall of the ledge. Continuing in the same direction, the tunnel cut through the solid quartz ledge for 100 feet, when the hanging-wall of the ledge was reached—a dark granite or porphyry. In thus cross-cutting the ledge, it was found by assay that while the whole ledge was gold-bearing, certain portions of it were much richer than others, the richest rock occurring near the hanging-wall, and forming a well-defined "pay streak." Following this "pay streak," drifts were driven to the east and west, along the line of the ledge.

The *East Drift* was in from the tunnel about 300 feet, with cross-cuts occasionally, and at the face was about 200 feet below the surface. This drift, about half-way on its course, cuts a 50-foot dyke, which appears to have faulted the lead some 20 feet, but has not affected it otherwise, as the "pay streak" was found on the other side and easily followed.

The *West Drift*, similarly following the "pay streak," has been run 220 feet to the west, on the ledge, when it came to the surface. A smaller diorite dyke was encountered in this, but it was cut and the lead found on the other side, only slightly faulted.

The "pay streak" is visible in these drifts throughout their length, and has a banded structure, due to darker layers of quartz and bands of iron pyrites. The width of this "streak" is averaged at 4 feet 6 inches, and the average assay, as given me by Mr. Lang, is $25 in gold—the result of assays of samples cut right across the "pay streak" at regular intervals of about 12 feet. Lying next to the "pay streak," and farther from the hanging wall, is a band of white quartz about 6 feet wide, which has been similarly sampled, and is said by Mr. Lang to carry $10 in gold to the ton. Next to this again is a zone 15 feet wide, which is similarly reported as carrying $5. These values are said to be maintained with remarkable regularity throughout the entire 520 feet of drifts.

The "backs" rendered available by this tunnel and drifts will average over 100 feet in height, and there is no reason to think that the length is limited by the 520 feet of drifts now driven. The ore taken from these drifts is now on the dump, and will be used for the first few months' run of the new Cyanide plant described later.

Regarding No. 1 Tunnel and its drifts as "development work" only, and feeling justified by the development, Mr. Lang has started a Main or Working Tunnel some 200 feet vertically below No. 1 Tunnel, and slightly to the west. It is calculated that this will have to be driven about 520 feet before it cuts the ledge. This work is being pushed ahead with all possible speed, two air drills being used, supplied with air from the mill-site at sea level.

Ore Bins. Just below the Main Tunnel, large ore bins were being constructed, from which the ore was fed by gravity into the buckets of the Bleichert wire rope tramway, over which the ore is to be conveyed to the Cyanide Plant on Fanny Bay. The ore now on the dump at No. 1 Tunnel will be carried into these ore bins by a short, surface, "back balance" tramway, about completed, and should be sufficient to run the plant until the main tunnel is in operation.

Bleichert Tramway. The length of the tramway is about 1¼ miles, the fall in that distance being about 2,100 feet, with a comparatively uniform grade. The buckets, carrying 600 lbs. of ore each, are to be run at intervals of 600 feet, and at the rate of 334 feet per minute, thus delivering about 10 tons per hour. The right of way for the tram has been cleared about 100 feet on either side of the line—no easy matter when trees from 4 to 7 feet in diameter were encountered.

Cyanide Plant.

Crusher.—The ore is delivered by the tramway on to a "grizzly," the "fines" going directly into bins, while the "roughs" pass through a Blake crusher, and then into the bins, which are capable of holding about 100 tons of ore.

Stamp Mill—The ore is fed from the bins, by Challenge feeders, to two 5-stamp Morison High Speed Mills, of which a more detailed account will be given farther on, as they are a novelty in this country.

Settling Tanks—The crushed ore from the stamps is conveyed direct to settling tanks, of which there are three, 20 feet in diameter and 7½ feet deep, provided with distributors to ensure mixing of fine and coarse ore.

Treatment Tanks—The ore is discharged from the settling tanks, by bottom-discharge openings, into cars, and delivered to any of the 6 treatment tanks (also 20 x 7½ feet) situated just below. The ore is here leached by the cyanide solutions, run on for from 6 to 8 days.

Solution Tanks—The solutions flow over to the 3 solution tanks (20 feet diam. by 10 feet deep) just below, while the tailings are sluiced away through the bottom of tank to the sea. The gold is precipitated from the cyanide solutions in two boxes provided for the purpose.

The plant is run by a 12 x 18-inch engine, supplied with steam from three 50 horse-power locomotive boilers, which also supply the Rand compressor which feeds the drills at the mine.

A very good general idea of the arrangement of the plant can be had from the accompanying cut, made from a photograph taken by me at the time of my visit.

Morison Stamp Mill.

The mill at the *Doratha Morton* is the first of its kind to be erected in Canada, if not in America, and, in view of the claims made as to what it has done elsewhere, a short description of the mill seems in place, and for such description I am indebted to the manufacturers, as I also am for cuts illustrating same.

"The crushing power of a gravity mill depends on the weight of the heads, the height of the drop, and the number of drops per minute.

"Modern weights range from 700 to 1,200 lbs., falling through a distance of 6 to 9 inches, at a rate of 90 to 100 drops per minute.

"How to obtain an increased output per stamp head is a problem of great commercial importance. The limit has been reached with the cam stamp, as the mechanical properties of the cam will not admit of an increase in the number of drops per minute, or in weight of head, but with this block to progress removed the modern stamp battery is capable of great development.

"The problem of increasing the output of a gravity stamp mill has been dealt with by Mr. D. B. Morison, on the principle of 'leaving well alone,' as he retains almost every detail of a modern mill except the cam and tappet.

"The principal features of the Morison High Speed Stamp Mill may be summarised as follows:—

"The stamps, whilst following under the influence of gravity, can be operated at speeds ranging from 130 to 150 drops per minute, according to the length of drop, as compared with the 90 to 100 drops per minute attainable in the most modern cam stamp batteries.

"The mechanical properties of the mechanism are such that stamps of far greater weight than the heaviest which it is practicable to use in cam stamp batteries can be operated with ease, certainty, and absence of destructive shocks.

"A Morison mill, with any weight of stamps up to 1,500 lbs., can be readily substituted for an existing light cam stamp mill in a few hours, as the machine has been specially designed to fit the frame of any ordinary standard cam stamp battery.

"In such a case of substitution, the existing battery and bin framing, platforms, mortar box, head shoes, dies, and line shafting would be retained in use exactly as they stood.

"The important advantages accruing to these features are briefly as follows:—

"A practically realizable increase of crushing capacity per stamp, of about 40 % due to the increased number of drops per minute, and 25 % due to increased weights of stamp-head, or a total increase of 65 % achievable by the substitution of Morison High Speed Mills for the heaviest and most modern cam stamp mills. Expressed in another way, this means a reduction of about 40 % in the number of stamps required for a given daily crushing capacity.

"The number of stamps being thus reduced, a very great saving is consequently effected in the heavy items of transport, foundations, framing, buildings, line shafting, etc.

"On the top of the king posts is a crank shaft with cranks at equal angles, each of which is provided with a connecting rod jointed to a cylinder, so that, as the crank revolves, the cylinder moves up and down. Within the cylinder is a deep, solid plug or piston, the rod of which passes through the cylinder bottom, and constitutes the stem to which the stamp head is attached. A jacket surrounds the cylinder, and at a few inches from the bottom is a port or opening, communicating with the jacket space. The cylinder, below the piston, is filled with liquid, for which both piston and the water level in the jacket are air spaces, with free communication between them.

"The head strikes the rock on the die before the cylinder has completed its downward stroke, so that, at the end of the stroke of the cylinder, the bottom of the piston is above the port in the side of the cylinder, and the liquid flows in.

"As the cylinder returns on its upward stroke, the liquid is squeezed through the port from the cylinder into the jacket space, which has the effect of gradually and smoothly over coming the resistance of the weight, until, when the bottom of the piston closes the port, no more liquid can escape, and any further upward movement of the cylinder will raise the stamp head on an incompressible liquid buffer.

"The blow causes a rebound of the head, and while still rising therefrom the liquid 'pick-up,' catches the weight, and the energy required to move a body from rest is thus saved, causing a very considerable economy in power required to work the battery. So gradual and smooth is the effect that, whether the weight be 100 lbs. or 1,500 lbs. or more, there is not the slightest shock on the mechanism, and in this respect it constitutes a very great improvement on the sledge-hammer upward blow delivered by a cam.

"When the cylinder and the stamp head have completed the up-stroke, the cylinder descends, under the control of the crank, at a velocity exceeding that at which the stamp head would fall under the influence of gravity, so that there is no retarding friction. It will thus be seen that, while the lifting of the stamp is controlled by the crank, the falling and the crushing effect are due to gravity.

"The wearing away of the shoes and dies is very simply compensated for in the following manner:—

"The piston rod and the stem which fits into the stamp head are connected together by means of a long cast-steel sleeve, into the top end of which the tapered end of the piston rod is fitted, and in a parallel hole, in the other end of which the end of the stem is rigidly held by means of a gib and three keys, exactly similar to the holding device which has withstood the test of time in the familiar cam-stamp tappet.

"When the lowering of the stamp and piston, due to wear of shoes and dies, renders it necessary to re-establish the original relative positions of the piston and cylinder port by restoring the normal lengths from piston to die, the sleeve keys are slacked back, the sleeve and piston rod raised the required amount, and the keys driven in again. The operation is so simple and speedy that there is no reason why the adjustment should not be made for every three-eighths of an inch of wear.

"By means of a drain plug provided in the cylinder, the stamps comprising a battery can readily be stopped individually, and the above adjustment effected on one at a time.

"In order to test the reliability of the mechanism, the Morison mill has been run for lengthy periods, in England, during the past two years, and stamps of 1,600 lbs. weight have been successfully worked at 132 7½-inch effective drops per minute, the drops being measured to the point at which the stamp came to rest, and not to the bare die.

"A series of exhaustive tests of 'cam' and Morison mills are now approaching completion, and as soon as the data obtained are ready, in a collective form, for publication, the mining public will have the information placed within its reach through the medium of the technical press."

MISCELLANEOUS PROPERTIES.

Alexandria Mineral Claim. Is located on Picton Point, on Philipps Arm, and is in all probability on an extension of the *Doratha Morton* lead. The claim is a mineral location and is owned by the Philipps Arm Gold Mining Co., and extends from the shore inland.

There is an outcropping of a very large quartz ledge near the shore, the strike of the lead being N. 65° W. Upon this ledge a tunnel has been run in about 180 feet parallel with the strike. At a point 90 feet from the mouth of the tunnel, drifts have been driven to the right and left for 45 feet in each direction, neither of which has reached the wall of the ledge. Near the face of the tunnel a 15-foot porphyry dyke cuts across, apparently faulting the ledge slightly.

Above this tunnel some 50 feet, is another tunnel, which I could not get into, as it was caved in.

There does not appear to be in this property the defined paystreak, noted in the *Doratha Morton*, and the ledge does not appear to be as highly mineralized.

A trial shipment of ore is said to have been made to a smelter, and an assay of $28 in gold received.

All Up Mineral Claim. Is near the *Alexandria*, and has a tunnel in about 110 feet, running about magnetic west, some 6 feet above water level, and following an irregular quartz vein, about 24 inches wide, which contains a small amount of white iron sulphides.

Yuctaw Mineral Claim. Situated on the north end of Channe Island. On the property there is an out-cropping at the water's edge, of white quartz, as exposed 30 to 35 feet wide, very similar in character to the *Doratha Morton* ledge, and very possibly a continuation of the same. The mineralization, however, is slight, consisting of iron sulphides. No work has been done on this out-crop. About 100 feet to the east of this is a pit 10 feet deep, showing 6 feet of quartz lying alongside of a diorite dyke, and showing rather heavy mineralization with fine-grained iron pyrites, more marked near the dyke. The ledge runs about with the length of the island, and is more or less stratified.

Blue Bells Mineral Claim. Owned by the Frederick Arm Mining Company, of which R. D. Fetherston is Superintendent. The claim is situated to the north-west of Frederick Arm, about one mile, and at an elevation of about 1,800 feet above the sea.

A tunnel has been driven in over 200 feet on a large quartz ledge. At 75 feet in, a drift has been set off to the left 50 feet, at the end of which a winze is down 25 feet, but was full of water. From the same point a drift was run 30 feet to right, and a 40-foot winze sunk, also flooded at the time of my visit. Some 25 feet further in, two small cross-cuts had been driven for about 15 feet in what was apparently a cross-course ledge of white quartz.

The rock is very much cut up by igneous dykes, and the mineralization, iron sulphides, seems to be more marked in and near these dykes.

I was informed that it was the intention of the Company to immediately start a tunnel some 150 feet lower down the hill, and if this proves as satisfactory, a stamp mill would be erected on the property.

Annie Laurie Mineral Claim. Situated on the west shore of Philipps Arm. A large quartz ledge, from 50 to 60 feet wide, is exposed on the property, and a cross-cut tunnel is being driven, in order to cut this, and was in about 25 feet on November 1st.

Ingersoll Mineral Claim. On the west shore of Philipps Arm, a claim held by The Gold Fields of B. C., Ltd. The lower tunnel, driven in S. 70° E. for 75 feet, is in felsite and trap dykes, and is very wet. The mineralization is slight and consists of iron pyrites in large cubes, occurring in the dykes. Another tunnel has been driven about 50 feet above and 40 feet to the left of the lower tunnel, and was in some 30 feet, while near the face a winze had been sunk for about 10 feet.

There are over 200 claims recorded in the immediate neighbourhood of Shoal Bay, but I was unable to visit any others of importance in my flying trip, as the weather was so bad as to seriously retard progress from point to point.

Some of the claims above Shoal Bay, on Thurlow Island, give considerable promise, but so far lack sufficient development to prove their values.

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NANAIMO MINING DIVISION.

REPORT BY M. BRAY, GOLD COMMISSIONER.

I have the honour to submit my third annual report for the Nanaimo Mining Division, for the year ending 31st December, 1898. The Yukon excitement has acted as a set-back to development work in this district for the past year, and the recording has fallen off greatly from what it was in 1897.

OFFICE STATISTICS—NANAIMO DIVISION.

Free Miners' Certificates issued	381
Mineral Claims recorded	566
Placer "	4
Certificates of Work recorded	475
Paid $100 each in lieu of work, recorded	5

Certificates of Improvements recorded	20
Bills of Sale recorded	204
Abandonments recorded	18
Grants of Water Rights recorded	6
Mill-site Leases issued	2

The total revenue from the above, for the year ending 31st December, 1898, has been $6,463.60, to which must be added $26.49, Mineral Taxes paid for the year.

One thousand six hundred and fifty-four records of mineral claims lapsed during the year 1898, the work not having been recorded, and I have 1,000 records in good standing on the 31st December, 1898. Nearly all of these mineral claims are along the coast line, or within easy reach of the coast.

The mineral claims in the Dunsmuir and Cameron Lake districts have good waggon roads and trails leading to them.

Considerable development work has been done on Texada Island during the past season, with very encouraging results.

The Van Anda Copper and Gold Company has sunk a shaft on the *Copper Queen* 210 feet deep, and has opened up a good body of ore. It has a steam hoist on the claim and is now clearing a site for the erection of a smelter for the reduction of its ores.

The latest strike on the *Cornell*, belonging to the Van Anda Company, from present appearances promises to be the richest in minerals of any claim on Texada Island.

On the *Little Billey*, also belonging to the Van Anda Company, a shaft has been sunk 50 additional feet during the past year.

The *Raven*, owned by the Spratt Copper and Gold Company, has some good ore. The shaft, operated by steam hoist, is down 100 feet, but is now in a fault which seems to have thrown the vein over.

On the *Peto* mine a shaft is being sunk and good ore is showing. This mine has been purchased by Rockefeller.

The *Marble Bay* mine, owned by J. J. Palmer, has a steam hoist and the shaft has been sunk 100 feet during the past year.

The *Jack North* is owned by the Puget Sound Iron Company, has a steam hoist and the shaft has been sunk 200 feet and about 100 feet of tunnels from the shaft have been driven during the past year. The Company has opened up a fine body of copper ore, and is preparing to put up smelters on the ground. It has contracted to ship 5,000 tons of iron ores to the Everett smelters, to be used as a flux in smelting other ores.

The Texada Island Mining and Land Company, Limited, has two shafts, down 30 and 50 feet respectively, showing ore of good value. There are several other shafts on the property, from 20 to 40 feet deep, also showing pay ore.

At the *Surprise* mine the shaft has been sunk about 200 feet during the past year, and is now about 400 feet deep, being the deepest shaft on Texada Island. The ore body in this claim is large and of good value the entire depth.

The *Copper King* has been sunk on 20 feet, and the ore looks well.

The *Silver Tip* mine has a steam hoist, and has been sunk on 200 feet during the past year, showing good copper and gold ores.

The Victoria Texada Company has a shaft down 75 feet, and the ore is of good value.

The Texada Kirk Lake Gold Mining Company, Limited, has a shaft down 105 feet, with tunnels, and three new shafts have been started, all in ore of good value. This Company has not done much during the past year, but expects to start up again at an early date.

The *Lorindale* has two shafts, down 50 and 70 feet each, with good ore in sight.

The *Nutcracker* is down with a shaft 30 feet, with good ore in sight.

The *Island Queen* shaft is 25 feet deep, with 70 feet of tunnelling, on good ore.

The *Lion* and *Tiger* claims have shafts sunk to a depth of 60 and 40 feet, showing good ore.

The *Comet*, *Woodpecker*, *Susie*, and *Josie* have had prospecting shafts sunk on each of the claims to about 20 feet, and they all show good ore.

The *Chemainus*, *Mabel*, and *Texada* group of claims has a steam hoist, and a shaft has been sunk 55 feet deep, showing good ore.

The *Black Prince* claim has a shaft sunk about 40 feet deep, showing good ore.

The Duluth, Minnesota and Texada Company has sunk a shaft 80 feet deep on its property, showing good ore.

There are numerous other claims than those above mentioned on which work is being done, and which have good showings of ore, and no doubt the coming year will see new and valuable mines opened up on Texada Island.

There are about three hundred people residing on the Island now. They have a hotel, general store, butcher shop, and a post office at Sturt Bay and at Van Anda Bay. A large lot of lumber, doors, windows, etc., has been landed at Sturt Bay for building a new hotel and a number of private residences, and the coming season promises to be lively at Texada Island.

On the coast, from Texada Island to the northern end of Vancouver Island, taking in Jarvis Inlet, Powell Lake, Malaspina Inlet, Toba Inlet, Frederick Arm, Philipps Arm, Loughborough Inlet, Knight's Inlet, and all the islands lying between Vancouver Island and the Mainland, a great number of mineral claims have been recorded, and wherever development work has been done the results have been satisfactory. Many of these places are known to possess real mines, and their active operation is a certainty. One of these mines is the *Doratha Morton*, situated at Philipps Arm, owned by the Fairfield Exploration Syndicate, who also own fourteen other claims adjoining and on the extension of the *Doratha Morton* ledge. The Company has driven 1,200 feet of tunnels, which tap the ledge 90 feet from the surface. The width of the ledge is 100 feet, but they only intend at present to work 10 feet of the ledge which contains the best paying ore, and which is well defined. The Company is driving another tunnel to tap the ledge at 300 feet from the surface. The driving is done with machine drills, the power for which is supplied from the mill-site on the beach, the compressed air being carried up through a 4-inch pipe. The compressor was supplied by the Rand Drill Company, and is capable of running four drills. The ore is conveyed from the mine by an aerial tramway, 1¼ miles long, to the chute and ore bins, where it passes through a grizzly and a Blake-Marsden-Stern Crusher, thence to the 10-stamp Morison High Speed Mill, the ore afterwards being treated by the cyanide process to extract the gold. The whole plant is driven by an engine, the steam for which is provided by three 50-h.p. locomotive boilers. The Company expects to make its first clean-up shortly, and, judging from the nature and assays of the rock, should earn handsome dividends.

The *Douglas Pine* mineral claim at Shoal Bay, Thurlow Island, is being developed by a tunnel, which will tap the ledge at 200 feet from the surface.

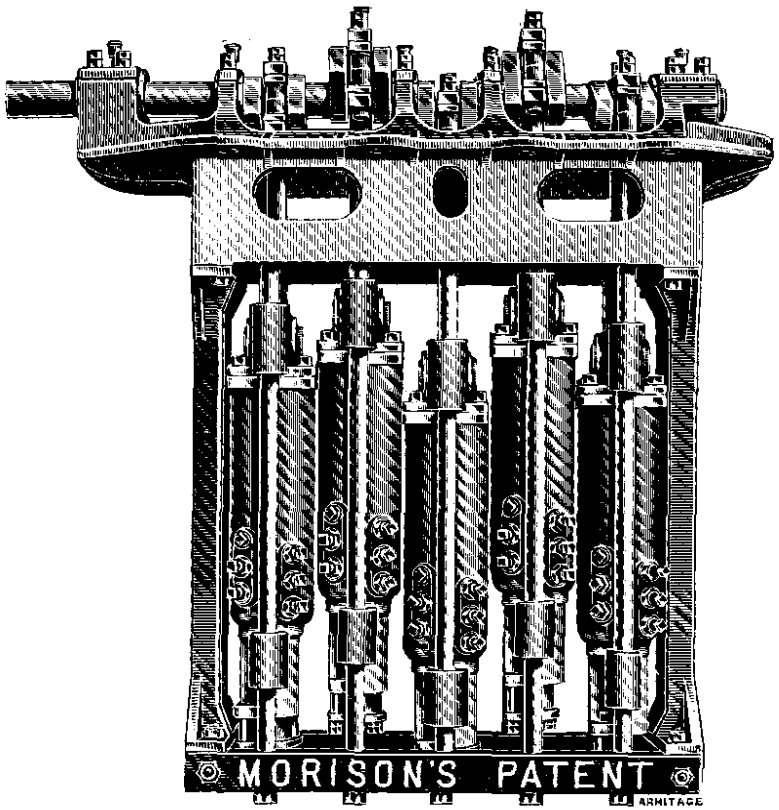
At Frederick Arm, a good deal of development work has been done during the year on the *Blue Bells* and other mineral claims, with good results. The owners of mineral claims all along the coast line are preparing to make extensive developments during the year 1899.

Considerable development work has been done in Dunsmuir District, out beyond the Nanaimo Lakes, with very promising results, notably on the *Pittston Group* of eight claims, owned by the Jubilee Partnership Company, which has run a tunnel 240 feet, which, it is expected will strike the ledge about 50 feet ahead.

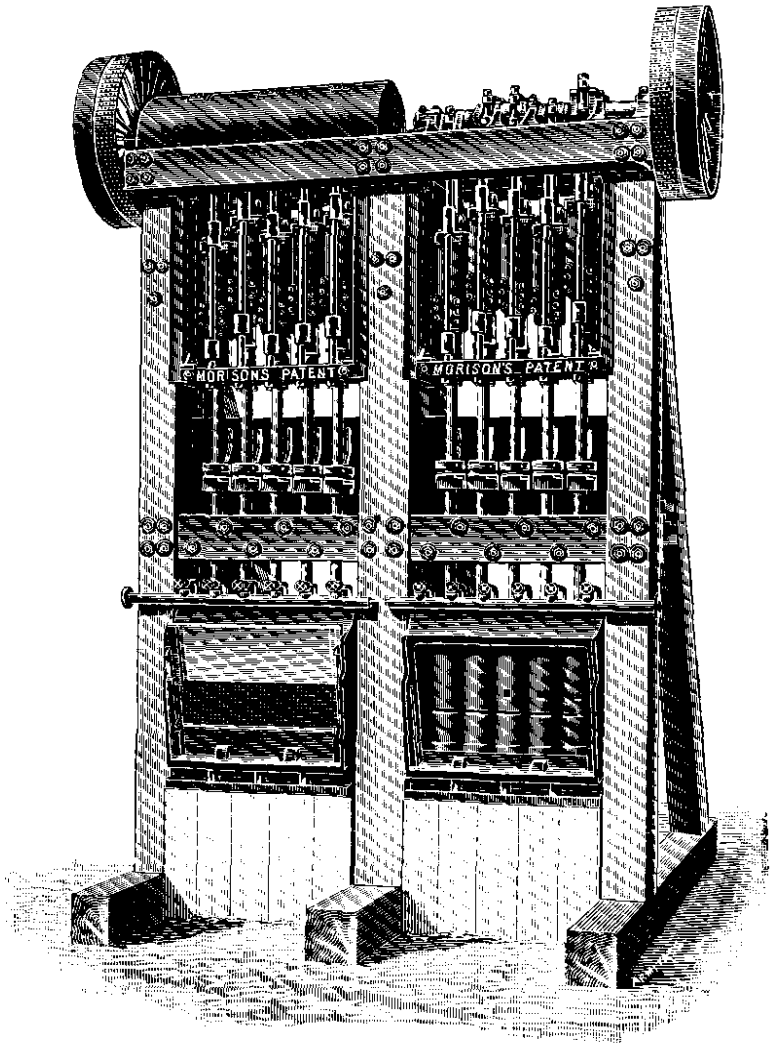
The *Copper King* and other claims owned by the Cameron Lake Mining Company, Limited, situated at Cameron Lake, have had considerable work done. One tunnel has been run 150 feet, and two winzes 20 feet each. A second tunnel was run 303 feet to tap the ledge at 300 feet from the surface, but there is between 30 and 60 feet yet to run. If as good ore is found in the lower tunnel as in the upper one, they should have a paying property.

The mineral claims recorded during the year ending 31st December, 1898, are situated in the following places throughout the Nanaimo Mining Division, viz.:—

Texada Island	162
Lasqueti "	5
Valdes "	33
Thurlow "	15
Channe "	2
Rodonda "	5
Cortes "	17
Cracraft "	7
Harbledon and Hanson Islands	7
Stuart and Camp Islands	5
Gillford, Lorte, and Hardy Islands	5
Bartlett, Broughton, Bell, and Pearse Islands	5
Quatsino Sound	8
Barnard Passage	1
Dunsmuir District	28
Cameron Lake	10
Horne Lake	2
Nanoose District	1
Philipps Arm	92
Frederick Arm	22
Loughborough Inlet	22
Bute Inlet	4
Knight's Inlet	9
Jarvis Inlet	6
Theodosia Arm and Malaspina Inlet	29
Wellington District	3
Powell Lake	17
Ramsay Arm	8
Klaanch River	4
Seymour Narrows	12
Toba Inlet	2
Thompson Sound	15
Call Creek	3
Total	566



DETAIL OF PISTONS.



MORISON STAMP MILL—"DORATHA MORTON" MINE, PHILIPP'S ARM.

VICTORIA DISTRICT.

VICTORIA MINING DIVISION

MOUNT SICKER.

During November, the Provincial Mineralogist visited Mount Sicker for the purpose of investigating certain properties upon which it was reported important development work had been done.

Lenora Mineral Claim.

The *Lenora* mine, owned by Hy. Smith, et al., is situated on Mount Sicker, on the south slope of the valley of the Chemainus River, and distant from Westholme, on the E. & N. Ry., some eight miles over a very fair waggon road built during this past year by the owners, with the assistance of the Government. The road, being new, is a little soft in places, but is down grade all the way from the mine to the railway and heavy teams were hauling over it with apparent ease.

As this property was reported on last year I shall confine myself to the actual development at the date of my visit.

On the surface, in a small ravine, there is a large outcropping of solid sulphide ore—iron and copper pyrites—as wide as 20 to 30 feet in one place, lying in a country rock of schist and shale cut by numerous dykes. This outcropping has been traced up the ravine and found to continue, more or less interruptedly, for several hundred feet, and enters into *Tyee* ground.

A tunnel has been run in to cut this outcropping ore-body at a depth, and was in some 370 feet, with various cross-cuts, etc. The mineral seems to be chiefly associated with two dykes, or possibly in two zones, about parallel, and running N. and S. with seemingly a dip to the east.

At a point in the tunnel, about 192 feet in from the mouth, a drift had been started off to the east for a few feet, and in this a winze had been sunk 100 feet, from which point a drift was being run to the west to cut at this lower level the ore-body found in the tunnel. This drift had been run some 100 feet, but though it cut through rock having the same characteristics as that enclosing the ore above, the continuation of the ore-body had not been found.

The ore met with in the tunnel was irregularly distributed through a greenish dyke, and assays, from samples taken from the dump, gave 5 to 10 % copper, 5 to 10 oz. in silver, and from $5 to $10 in gold. A trial shipment of some 20 or more tons was made this fall to one of the American smelters, but the returns have not yet been received.

The development, although considerable, has not as yet proved the size of the ore-body, nor has it been such as would warrant the prediction that the property will develop into a mine. At the same time, the large surface croppings and the ore met with in the workings give strong hope that further development will be satisfactory.

Steel rails have been laid in the tunnel and iron dump-cars were in use. About 8 men were employed in the mine.

Tyee Mineral Claim.

A claim lying immediately above the *Lenora* and owned by Clermont Livingstone, et al., of Duncan's. As already stated, the ore-body found on the surface of the *Lenora* has been traced into this claim, and on this out-crop a shaft has been sunk at a point a few feet from the *Lenora* boundary. This shaft was so full of water that I could not examine it, but it is said to be down 50 feet.

A second shaft was sunk a few yards further up the hill with the evident intention of proving the continuation of the outcrop, but I am informed it was not successful.

The development on the *Tyee* amounts to very little, and any importance the claim may have is derived from the somewhat successful development in the *Lenora*.

It is reported that a company has been formed to float this property in England for a large sum. The scheme should be brought before the public as an undeveloped prospect with some promise—anything else would be premature.

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VICTORIA MINING DIVISION.

REPORT BY W. S. GORE, GOLD COMMISSIONER.

The excitement consequent upon the discovery of the great northern gold-fields, and our position as a starting point therefor, has, during the past season, retarded the advancement of the mining interests of this Division, the majority of claim owners doing no more than the necessary annual assessment work.

MOUNT SICKER.

Attention is being drawn to Mount Sicker, situated about 50 miles from Victoria on the E. and N. Ry. This mountain is of a diorite and schist formation, running nearly east and west, and very little broken as proved by tracing the bands of rock almost the entire length of the mountain. A great number of claims have been located in this section, and considerable assessment work has been recorded, some good prospects having been opened up, notably the *Tyee*, *Richard III*, *Copper Canyon*, *Fortuna*, *Queen Bee*, and *Lenora*.

Tyee—On this claim a shaft has been sunk a depth of 45 feet on a very promising looking reef of rock, carrying copper, gold, and silver.

Richard III.—This claim is situated on the same lead as the *Tyee*, and adjoins that claim on the east. A shaft has been sunk to a depth of 70 feet, through a small quantity of the same ore all the way down, but, as yet, the permanent ore-body has not been reached.

Fortuna—On this claim a tunnel has been run in a distance of some 130 feet and it is now reported to have cross-cut six or seven feet of copper ore.

Queen Bee—A tunnel has been driven on this property directly into the reef a distance of 65 feet. The ore is said to carry free-milling gold.

Copper Canyon—On this claim a tunnel has been run 100 feet alongside of a quartz reef, highly mineralized with copper pyrites. The width of the reef is 18 inches.

Lenora.

Considerable work has been done on this claim, consisting of a tunnel driven 100 feet and cross-cutting two ore-bodies, one 12 feet, the other 6 feet, in width. On the north ore-body a drift has been run 300 feet. Two cross-cuts have been made, proving the parallel ore-body to the same distance. A shaft, now being sunk, has reached a depth of 70 feet below the tunnel, making in all about 600 feet of

work. A waggon road has been built, new buildings for men's quarters completed, an ore shed, 16 x 50 feet, finished, and a steel tramway laid the entire length of the drift, passing out through the ore shed. The rock from the mine is taken out in iron cars of the Truax pattern, of which two are now in operation.

A good deal of development work has been recorded on some of the claims in the vicinity of Goldstream, and the same might be said of claims situated on the San Juan and Gordon Rivers, in Renfrew district.

Placer mining has been carried on on the Sooke and Leach Rivers, and those interested think that with a further expenditure satisfactory results may be obtained.

OFFICE STATISTICS—VICTORIA DIVISION.

	1897.	1898.
Free Miners' Certificates issued	1,204	1,242
Mineral Claims recorded	772	392
Placer "	15	12
Certificates of Work issued	67	195
" Improvements issued	6	17
Grants of Water Rights for Mining	11	2
Lay overs	6	18
Placer Leases	34	..
Conveyances	130	115
Abandonments	..	8
Mill-site Leases	1	..

REVENUE DERIVED.

	1897.	1898.
Free Miners' Certificates	$11,402 00	$13,836 00
Mining Receipts, general	4,359 60	4,037 90
Total	$15,761 60	$17,873 90

NEW WESTMINSTER MINING DIVISION.

REPORT BY D. ROBSON, MINING RECORDER.

I have the honour to report as follows on mining operations in the New Westminster Division during the year 1898. As this report is required before the end of the year, the statistics of mining business transacted at this office are made to cover only eleven months, and, for the purpose of proper comparison, the figures for 1897 cover only the first eleven months of that year:—

	1897.	1898.
Free Miners' Certificates issued	2,704	1,865
Mineral Claims recorded	1,878	316
Certificates of Work recorded	174	359
Conveyances recorded	295	98

Revenue from Free Miners' Certificates	$21,889	$15,367
Other mining revenues	5,957	2,762
Total mining revenues	$27,846	$18,129

(In the above amounts are included the Free Miners' Certificates issued at Vancouver.)

It will be seen that there has been a considerable falling off in every department of mining revenue, except in the fees for assessment work, and that a great many of the claims located in 1897 have been allowed to lapse. This was to be expected. The mining boom of 1897 influenced men without experience to locate claims where there was very little prospect of finding a paying mine. In many cases these locations were made in the hope of making a sale of the claim without the expenditure of any money thereon.

Among the claims in good standing, there are quite a number where the indications are entirely encouraging, but only on a small number has development work been done to any considerable extent. It is difficult to ascertain with any exactness the expenditure actually made on many of these claims, but from the best information at hand I estimate that there has been expended in development work in the Division during the year about $75,000. On the following claims, the following sums (approximately) have been expended:—*Providence* (Harrison Lake), $8,000; *Golden Crown* (Harrison Lake), $1,500; *Money Spinner* (Fire Mountain), $10,000; *White Star Group* (Douglas-Lillooet Road), $4,000; *Fairplay* and *St. Alice* (near Agassiz), $3,000; *Pitt Lake Group* (Pitt Lake), $8,000.

Providence. Mine.

The *Providence* mine has been purchased by the Providence Mining and Developing Company, the purchase price being stated as 1,200,000 shares at 25 cents, representing $300,000. There are three veins on the claim, and considerable work has been done in developing it. This year a tunnel has been made in No. 1 vein, 31 feet, as well as a 92-foot shaft and a cross-cut of 37 feet. In No. 2 vein, an adit of 45 feet has been made. The amount expended on the mine this year is about $8,000, exclusive of an expenditure of $5,500 in new plant which is now on the ground. This includes a 4-drill Rand compressor. Three shipments of ore have been sent to the smelters at Tacoma and Everett, which gave returns of from $20 to $34 in gold and silver to the ton. There are about 165 tons of ore on the dump.

In a report on this mine, dated 14th October last, Mr. Fritz Cirkel, M.E., says of No. 1 vein: "It has all the characteristics of a fissure vein. It crosses the formation, and presents two well-defined walls." Mr. Cirkel concludes as follows: "In conclusion, I may say that, looking at the property just examined as a whole, the results so far obtained are of a very satisfactory nature, and should encourage further extensive development work."

Golden Crown Mineral Claim.

The *Golden Crown* is an extension of the *Providence* claim, and is owned by Messrs. Trethewey, Fullbrook and Monteith. This claim has been bonded to the Golden Crown Syndicate for $20,000. There are four veins on the claim, almost parallel to each other, within a distance of 400 feet. The syndicate has driven a tunnel, with the intention of cross-cutting these veins. This tunnel is 55 feet in length, and has reached the first vein. Assays of the ore have gone as high as $32 to the ton in gold and silver. It is the intention of the syndicate to continue the tunnel until all the veins have been cut. The sum expended since the 8th of October, when the mine was bonded, is $1,500.

Pitt Lake Group.

The *Pitt Lake Group* consists of the *Champion*, *Cromwell*, *Rocket*, and *O. K.* claims. These four have been bonded this year to the Dominion Mining, Development, and Agency Company for $65,000, and the Company

has expended on the mines about $8,000. Only one vein has yet been defined on the property. It runs through the four claims, and has a width of about 6 feet, with well-defined walls. A tunnel, 300 feet, and a shaft, 140 feet, have been made this year. The total length of tunnelling done on the property to date is 450 feet, and of shafting 165 feet. Bin samples of the ore give assays of from 3% to 21% of copper, and $3 to $5 in gold and silver. There are now about 1,400 tons of ore on the dump. The owners of this property are very sanguine of results, and expect to continue work next year on a more extensive scale.

Fire Mountain Group.

The *Fire Mountain Group*, owned by the Fire Mountain Gold Mining Company, consists of a number of claims, but the principal work has been done on the *Money Spinner*. Late last season a Huntington quartz mill was erected on this property, but the rock was found to be so extremely hard that it could not be crushed successfully by this machine without the aid of a crusher. The mill has not been operated during the past season. About 300 feet of tunnelling has been done this year, and the whole length of shafts and tunnels at the present date is about 600 feet. A horizontal tunnel has been run 450 feet into the mountain, and the ore is said to improve as the distance increases. The vein is about 4 feet in width, and is enclosed in serpentine walls. Assays are said to be quite satisfactory. The mouth of the tunnel is 5,100 feet above sea-level, and the property is covered with snow during six months of the year. About $10,000 has been expended this year in development work, and if sufficient capital can be had next year it is the intention of the company to erect a large plant for treatment of the ore.

White Star Group.

The *White Star Group* consists of five claims situated near the Douglas-Lillooet Road, about 27 miles from Port Douglas. This property is owned by a company to be known as the White Star Company. A shaft, 40 feet, with cross-cuts, has been made this year, at a cost of about $4,000, and assays have ranged from $3 to $70 per ton in gold and silver.

Fairplay and St. Alice Claims.

The *Fairplay* and *St. Alice* claims are situated on the C. P. R., near Agassiz. These claims were formerly known as the *Fat Man* and *Nancy Jane*. This year, a tunnel, 180 feet, has been made, and two cross-cuts of 40 and 70 feet, respectively. The total length of tunnelling and cross-cutting on this property to date is about 400 feet. The expenditure this year has been $3,000. The ore is chiefly copper, and is very refractory on account of the presence of a large percentage of zinc.

It is reported that a very large body of ore has been exposed on Seymour Creek, near Burrard Inlet, but particulars are not obtainable at the present date. Very rich samples of gold-bearing quartz have been taken out of the new mines located near the international boundary line, south of Chilliwhack. Free gold is quite visible to the naked eye, but it is not possible now to determine the extent of the paying ore, as very little development has been done. A road is being constructed from Chilliwhack to these mines.

It may be said, generally, that none of the mineral claims located in this Division have yet been proven, although there are several where the indications are most encouraging. The claims are mostly held by persons of small capital, and there is great need for additional capital for their development. The circumstances are such, I think, as to encourage the investment of capital in mining enterprises in this Division.

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SKEENA MINING DIVISION.

(A Division of Cassiar District under the jurisdiction of Victoria Gold Commissioner.)

REPORT BY JNO. FLEWIN, MINING RECORDER.

This Division, in common with the whole northern section, has, during the past year, witnessed a great rush of prospectors in search of both placer and mineral claims. Unfortunately, during the early part of the year, several expeditions were piloted into the district, notably into the Naas and Portland Inlet sections, in search of placer gold, by unprincipled parties, who had grossly misrepresented the possibilities of the country. The consequence, of course, was much individual hardship, and many injurious reports carried to the outside world by persons who had been led to believe that large fortunes awaited every one who chose to come here for them, and who, being disappointed in their expectations, went away disgusted with the whole country. Some individual members of the ill-fated Grider, Bridges and Abbot expeditions did some prospecting for placers in these sections, with little or no success. It was not to be expected that the result would be otherwise, as amongst upwards of one hundred and eighty men in these parties, there were not half a dozen practical miners.

The whole of the coast section of this district has been prospected by placer miners from the Omineca and Cassiar mines, and all came to the conclusion, long since, that no placer ground existed on the coast where gold might be found in paying quantities. In the interior section of the district, as far as known, there is no placer ground, which can, by any possibility be considered "poor men's diggings." On Lorne, and other creeks emptying into Skeena River above the canyon, as also on the Upper Naas River, there are several propositions which, it is believed by experienced men, will eventually pay well to hydraulic, as well as some very good dredging ground.

Last month the representative of a syndicate of Victorians located some abandoned ground on Lorne Creek for hydraulic purposes, for which they are applying for a lease. It is also the intention of the same parties, if they obtain their lease, to purchase the *Dry Hill* placer claim on the same creek. This ground has been worked for years with indifferent success, the great difficulty apparently being for a company of miners with very limited means to get water on the claim in sufficient quantity to make it pay.

A great deal of prospecting for mineral claims in this hitherto neglected section has been carried on, and the outlook for a lot of development work during the coming year is very promising.

Early in the year two or three parties went in to Kish-ga-gas, which is situated on the Upper Skeena, sixty miles north of Hazelton, on the Bear Lake trail. They succeeded in locating some very good looking ledges, carrying gold, silver and copper, assay values running as high as two hundred dollars per ton. Twelve claims were recorded for that section in this office, and I believe some more with Deputy Recorder Sargent, at Hazelton, from whom I have received no report as yet. It is the intention of the locators, who represent New York capitalists, to take in a party of sixty men early in the spring to do the necessary development work. I anticipate, from the reports I have heard from these men, that this will be a very important camp in the near future.

On the Buckley River, which is the main tributary of the Skeena, emptying into it near Hazelton, some prospecting has been done and a few locations made. The ore found here is copper-gold, the formation being diorite and slate, and the country being an unusually easy one to traverse. The valley of this river is well adapted for farming and stock-raising.

For upwards of one hundred miles south from Hazelton there is a beautiful valley from one to four miles wide, the soil of which, a rich black loam, averaging five feet in depth, is covered with a rank growth of wild grasses, raspberries and strawberries. The Indians here never feed their horses in winter; they are turned out to shift for themselves, and come out in good condition in the spring. The Hudson Bay Company are wintering some of their pack animals from Omineca in this valley this winter. On the smaller tributaries of the Buckley there are several very promising-looking seams of coal.

Descending the Skeena to the Kitsalas Canyon, eighty miles from the mouth of the river, several good ledges carrying copper, gold and silver have been discovered. C. W. D. Clifford, M.P.P., was the first locator here in 1893. He located three claims, now owned by the Skeena River Gold Mining Company, on which the assessment work has been completed and the Crown grants issued. On these claims—the *Emma*, *I.X.L.*, and *Bootjack*—the company have run a tunnel one hundred and sixty-five feet, all in good ore, and have also sunk a shaft forty-five feet. During the past season twelve claims have been recorded in this camp, the assays showing very well, one which I was shown, made by Mr. J. R. Cowell, giving sixty dollars in gold, thirty dollars in silver and ninety dollars in copper per ton. From information which I have received, I quite expect there will be from two to three hundred men in this camp next season.

The greatest drawback to the Skeena section is the want of proper communication and transportation facilities with the Coast. The only means of access to the country, at the present time, is by the Hudson Bay Company's steamer which makes four or five trips per season up the Skeena River at irregular intervals, or by canoe, both being expensive ways of travelling. A very easy route to the whole of this section, and also to the Omineca country, offers by way of the magnificent Kitamaat Valley; a road which can be very easily built, and which, for a comparatively small outlay, will open up a country rich in mineral, agricultural and grazing resources.

The only other discoveries which have been made during the season are some of low grade copper-gold ores in very large bodies immediately on deep water and of easy access on the Hastings Arm of Observatory Inlet, on which five locations were made this Fall, but on which no assessment work has been done. In this camp, also, one ledge was discovered which showed, in addition to gold and silver values, twenty-two ounces of molybdenite per ton, the first of this mineral to be discovered in this section.

OFFICE STATISTICS—SKEENA DIVISION.

Free Miners' Certificates	92
Mineral Claims Recorded	31
Certificates of Work	9
Conveyances Recorded	22
Revenue from Free Miners' Certificates	$460 00
Revenue from other sources	155 00
Total	$615 00

This does not include Hazelton sub-division, from which I have received no report, but which will probably produce about two hundred dollars more.

REPORT OF INSPECTOR OF METALLIFEROUS MINES.

The following reports for the year 1898, have been received from the Inspectors of Metalliferous Mines, Messrs. Macdonald and McGregor. Mr. McGregor's appointment dates only from the month of July, his report covering the period following his predecessor's retirement.

REPORT OF D. J. MACDONALD, INSPECTOR.

I have the honour to submit the following brief report on the condition in which I found the mines examined by me in the Nelson and Slocan Districts.

Hall Mine (Silver King).

This mine, situated on Toad Mountain, nine miles from Nelson, B. C., is worked by means of tunnels. These are four in number, all connected by winzes and upraises providing ample ventilation. The lower tunnel, No. 4, taps the ledge at a depth of about 600 feet. The present workings lie between tunnels No. 2 and No. 4, and upon examination I found them to be in a good, safe and workmanlike condition, well timbered throughout with square sets of timbers 12 inches by 12 inches. The stopes and passage ways have all been well timbered and, upon removal of the ore, have been well filled in with refuse, providing a safe precaution against caving. The ladder-ways also are in a safe condition.

The powder magazine is situated several hundred feet, a safe distance, from the mine, and is in charge of one man. Only sufficient powder is admitted into the mine to last for one day's supply.

There are employed in and around the mine 160 men, under the management of M. S. Davis. The quarters provided for the employees, as regards comfort and health, are of the very best, comprising a very large and comfortable boarding-house with all conveniences. The management of the mine is excellent, and the workings such that ordinary care used by the individual employees should prevent accidents of a serious nature.

Fern Mine,

Situated ten miles from Nelson and three miles from Hall's Siding, on the Nelson and Fort Sheppard Railway. It is worked by means of two tunnels, the lower tapping the ledge at a depth of about 200 feet.

The opening of the mine has been done in rather a rough manner, but the workings are not as yet very extensive, and the character of the ledge is such—the walls being of solid and firm material—that it is reasonably safe.

The powder was being kept in a drift in the mine, but the manager promised in the future to keep it stored in a safer place and at a proper distance.

There are 16 men employed. The ore is conveyed to the mill by a surface gravity tramway. The mill is operated by steam power and is provided with the necessary appliances for prevention of fire. The whole is under the management of J. A. Veach.

Whitewater Mine,

Situated 1½ miles north of Whitewater, on the Kaslo and Slocan Railway. This mine is worked through tunnels, five in number, the lowest tapping the ore at about 480 feet from the surface.

The ledge on this mine is very large, containing very soft material surrounded by heavy ground. The workings are timbered with squared sets, 12 inches by 12 inches, and while up to the present everything appeared in a good and safe condition, great care should be exercised

"MARBLE BAY" SHAFT HOUSE—TEXADA ISLAND.

175 Ft. LEVEL IN "VAN ANDA" MINE—TEXADA ISLAND.

in properly refilling the stopes and seeing that every portion is properly supported as the work progresses. Upon attention being called to this, the management promised that it should be carefully attended to. Proper connections have been made between the various levels to supply ventilation.

Very little powder has to be used on account of the softness of the ledge matter, and the magazine is situated at a safe distance from the workings.

The quarters for the employees are well provided and comfortable. There are 108 men employed, under the management of I. C. Eaton.

Payne Mine, Situated on Payne Mountain, 4 miles by road from Sandon. This mine is also worked by means of five tunnels, the three upper being driven on the ledge, well timbered, and so connected as to give ample ventilation. The size of the ledge is such that it is necessary in stoping to remove a good portion of the wall matter, which is immediately filled in to replace the vacancy caused by the removal of the ore. This does away with much timbering, and there is never at any one time any large open chamber which would give cause for fear of a cave-in. Very little powder is necessary in the mining.

There are 85 men employed, under the management of Mr. Scott McDonald, and the boarding-house and quarters are very comfortable.

Ruth Mine, Situated near Sandon. This mine is worked by means of tunnels, well timbered with square sets, and so connected as to provide thorough ventilation. The stopes are safely supported by stulls. The powder magazine is situated at a safe distance from the mine, and the whole management good and thorough and in compliance with the Act. There are 55 men employed, under the management of Mr. H. B. Alexander.

Slocan Star, Situated near Sandon. This mine is operated by means of five tunnels. The ledge is very large and the workings have been very imperfectly timbered, so much so that they have had a "cave in" between tunnels No. 2 and No. 3, necessitating a complete suspension of work above the latter.

All the stopes have been timbered with stulls merely and no filling done at all, making the workings actually dangerous if continued under the present system. Work had been commenced in re-timbering the mine below No. 3 tunnel with square sets, and I impressed upon the Superintendent the necessity of thoroughly filling in behind the sets as the work progressed.

During my visit the operations were merely re-timbering and developing, the mill having been closed down. There were about thirty men employed, under the management of Mr. Bruce White. The ventilation is good and the powder magazine safely situated. Much cannot be said as to the comfort or conveniences provided for the men, as they are not of the best.

Idaho Mine, Situated about 6 miles south-west of Three Forks. This was a very hard mine to get at, on account of the numerous snow slides. It is being worked by means of tunnels, five in number Under the former management, the work had been very carelessly done, but the present management is filling in the old stopes and timbering with square sets, and should in a short while have it in a safe condition. The ventilation is good, through proper connections.

The powder magazine is situated in a safe place, and kept in accordance with the requirements of the Act.

New and commodious quarters have lately been built for the employees, 70 in number, under the management of Mr. Geo. Hughes, under whom all requirements as to the safety of the employees are being attended to.

Queen Bess. Situate about 4 miles from Three Forks. It is worked by means of tunnels, three in number, well timbered. Very little stoping has been done as yet, but the character of the ledge is such that great care will have to be taken as the work progresses. So far, it is in a safe condition.

There are 65 men employed, and their quarters are only temporary. The mine is under the management of Mr. R. W. Rathbone.

Vancouver. Situated on Four-Mile Creek, 6 miles by waggon road from the town of Silverton. This mine is under development. There are two tunnels, well timbered where necessary, very little stoping done, but all the work is being conducted in a safe and workmanlike manner. There are 25 men employed, under the foremanship of Wm. Lewis.

Galena Farm. Situate 2 miles from the town of Silverton. This mine is being worked by means of two perpendicular shafts, one being 50 feet in depth, and the other 212 feet. The latter is the working shaft, in two compartments, well timbered, one being a man-way with ladders from top to bottom, and the other the working compartment. The hoist is worked by water-power, and the cage is equipped with the proper "safeties," all in accordance with the requirements of the Act. Connections have been made between the two shafts, affording ample ventilation. Cross-cuts and drifts have been driven from the 100-foot and 200-foot levels, and the rock is of such a hard character that very little timbering is necessary.

The quarters provided for the employees are very commodious and excellent. There are employed about 25 men, under the management of Mr. G. R. Fraser.

The above comprise the principal mines inspected by me in the Nelson and Slocan Divisions. A few of the smaller ones were likewise visited, but, as very little work had been done, nothing definite can be said as yet. Several of the other large mines should have been visited, such as the *Reco*, *Last Chance*, *Goodenough*, *Cariboo-Rambler*, and many others, but the snow and condition of the weather was such as to make it actually dangerous to get to them at the time of my visit to the locality.

REPORT OF JAS. MCGREGOR, INSPECTOR.

I have the honour to submit my first report as Inspector of Mines for the Province of British Columbia. I was appointed on the 8th of July last, and, pursuant to instructions, proceeded to Rossland on the 12th day of July following. Subsequently, I paid official visits to a number of mines in the Kootenay District, Texada Island and Alberni.

Iron Mask. The first mine visited was the *Iron Mask* at Rossland, on the 20th of July. Here I found 22 men at work. The main tunnel is 100 feet in depth and connected with the *War Eagle* mine, and by winze with the *Centre Star*. From the main tunnel, a shaft 176 feet has been sunk. From the lower levels there is a tunnel to the east of 35 feet, and to the west 150 feet. The output of this mine is about 300 tons per month. The ladder-ways and shafts I found without landings in contravention of the Act. This defect the manager promised to remedy without delay. The motive power of this mine is furnished by the War Eagle Company.

Centre Star. I visited this mine on July 22nd, and found 30 men at work. The output is about 1,500 tons per month. The mine is connected with the surface by three shafts and two tunnels, and is also connected with the *Le Roi* mine. I found the ventilation in the mine about 6,780 cubic feet per minute. I also

ascertained that no powder was being stored in the mine. The motive power is compressed air. There is about 6,000 feet of tunneling in all.

Nickel Plate Mine. I visited this mine on July 21st and found 15 men employed underground. Depth of shaft 200 feet. I found the ladder-ways and shafts in good condition. The mine is connected with the surface at the 100-foot level. Workings I found well timbered wherever necessary.

Great Western Mine. I visited this mine on July 24th. Fourteen men employed underground. Shaft down 200 feet. Pumps run by steam and the drills by compressed air. The tunnel has been driven to connect with the surface at 100 feet from the main shaft. The timbering in the mine, where necessary, was well done, and the ladder-ways were found in good condition.

War Eagle Mine. I visited this mine on July 23rd and found 225 men employed, and the ventilation to be 7,200 cubic feet per minute. The output is about 180 tons daily. The mine is open to the surface in seven different places. The motive power is compressed air. I regret to say that the last lift, the "travelling-way," in my opinion, is unsafe. I drew the attention of the management to this fact, and it was promised that the defect would be remedied immediately. I also visited the open shaft on the hillside, and this the manager promised to put in safe condition for travelling and as a means of exit.

Columbia and Kootenay Mine. I visited this mine on July 25th. I found 20 men employed and the mine worked by three tunnels. I found the mine in splendid condition, and the ventilation to be 12,250 cubic feet per minute. The main tunnel was in about 300 feet. The timbering, where necessary, was well done.

Josie Mine. I visited this mine on July 25th. I found there an inclined shaft with ladder-ways, but without landings the full distance; the ladders were very substantial. I ascertained from the manager that the ladder-ways were not at any time used by the workmen as a means of communication with the surface. No powder is stored in the mine and only the exact amount required is sent down at any one time. The shaft is well timbered and the ladder-ways well protected from the shaft. There is an outlet at 100 feet by a tunnel to the surface. There are tunnels from the bottom of the main shaft 200 and 300 feet to the right and left respectively. Thirty-five men are employed.

White Bear Mine. On July 26th I visited this mine. Here I found a vertical shaft of 195 feet without levels. I found this shaft well timbered. I noticed that when the bucket arrived at the surface the doors closed over the shaft while the bucket was being discharged. The ladder-ways I found without landings, such as the Act calls for, owing to the shaft being too small for ventilation purposes, if the travelling compartments are closed in and it is worked by compressed air. All shots are fired by a battery from the surface.

Sunset No. 2. I visited this mine on July 28th. The shaft is 340 feet in depth. At 108 feet from the surface there is a tunnel of 310 feet to the surface for ventilation purposes. Only 6 men were working. In this shaft the miners always ride on the bucket. I found the shaft well timbered and well protected.

Deer Park Mine. I visited this mine on July 28th. The shaft is vertical and down 270 feet. There are compartments for air and ladder-ways. The first 100 feet of the ladder-way was without landings. I drew the attention of the management to the fact that they were not complying with the Act, and they promised to immediately remedy the defect. The miners here also ride on the bucket entirely and do not

use the ladder-way. I also drew the manager's attention to the fact that according to the Act it was necessary to connect with the surface. This he promised to do immediately. I received no complaints from the miners in this mine.

Athabasca Mine. I visited this mine on August 4th. I found 45 men employed and the tunnel driven in 400 feet. Ventilation is good, the ventilating power being a steam jet in the shaft. The shaft is very well timbered and well protected from the travelling way.

Silver King Mine. I visited this mine on August 5th. There are here 180 men employed, of which 130 are underground. The lower tunnel is the working tunnel, the length of which is 1,800 feet. No. 4 tunnel is being driven to connect with a shaft on the *Kootenay Bonanza* claim at 300 feet depth. I learned it was their intention to connect with the surface at 100 feet for ventilation purposes. I found a great amount of work has been done by stoping. The ventilation in this mine is natural except in close drifts where the ventilation is by fan. The timbering was in good condition and well done, and the ladder-ways perfectly safe.

Poorman Mine. I visited this mine on August the 8th. It is operated by tunnels. A large amount of development work has been done, and the management considered it expedient to drive a tunnel at a lower depth; this depth I found to be about 500 feet.

Ymir Mine. I visited this mine on August 9th, and found 21 men employed. The mine is worked by three tunnels, Nos. 1, 2 and 3, of which No. 1 is in 500 feet; No. 2, 800 feet; and No. 3, 375 feet. The ventilation is natural, but at times a compressed air blast is used in No. 3 tunnel. Work is at present confined to tunnels No. 2 and No. 3. The latter I found down 66 feet, which leaves 34 feet yet to go before connecting. I found here, that the powder was stored in the mine. I drew the attention of the manager to this fact, and he stated that the matter would be remedied at once.

Whitewater Mine. I visited this mine on August 11th, and found about 60 men at work. The mine is principally worked by tunnels, and the ventilating is done by furnace and air pipes; the amount of ventilation being 13,800 cubic feet per minute. I found in this mine that it was very difficult to keep the main tunnel in good shape owing to side pressure, due to the presence of lime in the ore. Of late they have changed the system of driving tunnels, and are now carrying them to the foot-wall, since then there is no pressure noticeable. The management have been constantly moving timbers, replacing them by new ones, and still continue to do so—a method of procedure which keeps the tunnel safe.

Slocan Star Mine. I visited this mine on August 14th, and found about 100 men employed. The mine is worked by five tunnels connected by winzes and ladder-ways leading from one tunnel to the other, and these are not used by the workmen as travelling-ways. The motive power is compressed air.

Ruth Mine. I visited this mine on August 15th, and found 60 men employed. The mine is worked by six tunnels. All of these are working, and four of them are connected together by winzes. No. 1 tunnel is 600 feet in length; No. 2, 1,500 feet; No. 3, 100 feet, and No. 4, 600 feet, the last-mentioned being ventilated by water blast. The number of men employed underground is 40. I found powder stored in the mine, and called the attention of the management to the provisions of the Act in this regard. This mine is worked by compressed air power. I found the natural ventilation to be 13,440 cubic feet per minute. The shaft is well timbered.

Slocan Sovereign. I visited this mine on August 17th. Mine is worked by three tunnels. No. 1, I found in 600 feet, No. 2, 800 feet, and No. 3, 120 feet. Nos. 1 and 2 are connected by shaft, and No. 1 is connected with the surface, making an outlet from No. 2. In this mine, 9 men are employed, and the ventilation is natural, amounting to 6,000 cubic feet per minute. The timbering in this mine is well done, and in a very safe condition.

Noble Five. I visited this mine on the 18th of August. I found 22 men employed. Ventilation, 16,200 cubic feet per minute. The mine is worked by nine tunnels, and connected with the surface by upraises. There is about 120 feet between tunnels. The mine is worked by compressed air. Where necessary, the timbering is well done, and no danger exists for the workmen.

Last Chance Mine. I visited this mine on August 18th, and found 20 men employed. The mine is worked by four tunnels, of which No. 3 is connected to No. 4 level by winzes, in which the air travels from the surface through stopes, which are overhead, and returns by No. 4 tunnel. I found the ladder-ways in this mine unused by the workmen, and in very good condition.

Treasury Vault Mine. I visited this mine August 20th, and found it worked by one tunnel, with 7 men employed. The shaft was only down 7 feet, but they intend, for ventilating purposes, to sink 250 feet.

Ajax Mine. I visited this mine on 20th of August, and found it worked by four tunnels, with 25 men employed underground. Ventilation by water blasts. Owing to the peculiar nature of the ground, it has required considerable timbering. I found this well done where necessary. This mine is connected from No. 1 tunnel to No. 3 to the surface, and from No. 3 tunnel to No. 4 tunnel it is connected by the main tunnel for ventilation purposes.

American Boy. I visited this mine on August 21st, and found it closed down. Would be worked through tunnels if in operation.

Reco Mine. I visited this mine on the 22nd of August, and found 18 men employed. The mine was worked by seven tunnels. Ventilation, 2,250 cubic feet per minute, was effected by water blast.

Queen Bess Mine. I examined this mine on August 23rd, and found 60 men working and ventilation 5,760 cubic feet per minute. The mine is worked by eight tunnels. No. 1 is driven in 120 feet; No. 2, 400 feet; No. 3, 500 feet; No. 4, 700 feet; No. 5, 400 feet; No. 6, 120 feet; No. 7, 450 feet; and No. 8, 120 feet. All the tunnels connect one with the other at no greater distance than 120 feet apart. At no time do the management intend to go over 150 feet before making a connection. The timbering of this mine, where necessary, I found very well done.

Idaho Mine. I visited this mine on August 24th, and found 14 men employed. The mine is worked by three tunnels: No. 1 tunnel, 880 feet; No. 2, 1,000 feet; No. 3, 750 feet. Ventilation is natural. Considerable stoping has been done. After moving the material, the stopes are filled in, the timbers not being removed. The timbering, where required, was well done.

Alamo Mine. I visited this mine on the 24th of August, and found 12 men employed. Ventilation was natural, and amounted to 8,400 cubic feet per minute. The mine is worked by four tunnels, which connect with the *Idaho* mine. They are also filling stopes. I found the timbering, where such was necessary, quite safe.

Galena Mine. I visited this mine on the 25th of August, and found the mine worked by a vertical shaft, which was in good condition and well protected throughout. There were only 4 men working. The amount of ventilation was 1,170 cubic feet. The mine was connected with the surface at 100 feet by an air shaft provided with a ladder-way, also a ladder-way and hoisting shaft. The presence of carbonic acid gas was to be detected in this mine, which renders necessary a greater amount of ventilation than there is at present. The full depth of the shaft was 200 feet, but the workings were not in progress of development when I was there.

Alberni Consolidated. I visited this mine on September 17th, and found 16 men employed underground. The mine is operated by an inclined shaft of a depth of 65 feet, and worked by hand drilling, Hoisting is done by a windlass, there being no machinery for the purpose. I found the ventilation good.

Marble Bay Mine. I visited this mine September 29th, and found it was worked by a shaft 100 feet in depth. Ladder-ways throughout, protected from hoisting shaft, and landings, in conformity with the Act, every 20 feet. I found 9 men employed underground in this shaft. No provision of the Act contravened.

Van Anda Mine. I visited this mine on September 30th, and found 25 men employed underground. The mine is worked by hand drilling. I found here a vertical shaft, 250 feet deep, timbered throughout, and the ladder-ways well protected from the hoisting compartment. There were two outlets to this mine, which I inspected, and found the ladder-ways in good condition.

In October, 1898, I visited Bridge River and Kamloops Divisions. There are a number of mining properties in these Divisions, but no development work of any description is being done.

Porto Rico, Ymir. I visited this property, November 12th. Three tunnels have been driven, none of which were working at the time of my visit. No. 1 extended a distance of 280 feet; No. 2, 250 feet, and No. 3, 530 feet. The company were preparing to start stopes, 75 feet from the surface. The up-raise from No. 3 to No. 2 drifts was up 70 feet. I found the mine well timbered and in fairly good condition.

Miro Monte. Six miles from Lytton. The tunnel on this property has been driven a distance of 200 feet. It has been well and securely timbered a distance of 100 feet. The balance of the tunnel was through hard rock which did not require timbering. At the time of my visit six men were employed.

CASUALTIES.

The casualties (for the number of men employed) in the metalliferous mines have been comparatively light. From July 14th until this date, December 28th, there have been six fatal cases and one other reported accident, resulting in injuries to one man. Following are the details:—

On June 5th, 1898, Victor Engstein was killed at the *Cariboo* mine, Camp McKinney. The deceased was employed in running a car in the lower drift, at a depth of 275 feet, and had given the usual signals, meaning "man aboard," he bringing with him a number of drills. The hoisting was done slowly and it is presumed that in ascending the shaft the drills had over-lapped and caught on a projection at the 80-foot station, upsetting the car and precipitating Engstein to the bottom of the shaft, where his dead body was subsequently found. This was not reported to me until July 18th, and no inquest was held.

July 18th, 1898.—An accident in the *Snow Shoe* mine, Greenwood, resulted fatally to Hugh O. Thomas. While hoisting steel from the drift station the bucket became detached and fell to the bottom of the shaft, striking deceased, who was engaged in sinking, causing his death. No inquest was held, the Coroner, who arrived on the ground a few minutes after the accident, not deeming it necessary.

September 21st, 1898.—Edward Johnson, foreman of the *Kootenay-Bonanza* shaft, the property of the Hall Mines, Limited, was killed in the shaft by falling off the ascending bucket, a distance of only six feet. An inquest was held, and a verdict of accidental death returned.

On November 1st, 1898, at *Sunset No. II.* mine, Rossland, Joseph Cain and Patrick Nolan died from the effects of gas poisoning. An inquest was held, and from the evidence given before the Coroner and the circumstances of the case, I deemed it necessary to issue instructions for closing down the mine until it could be put in a safe condition.

November 10th, 1898.—At *Porto Rico*, A. Knowlton met with his death under somewhat peculiar circumstances. Deceased was engaged with another workman in driving a raise from No. 3 to No. 2 tunnels; after blasting, the two men returned to the face and were overcome by gas; both descended, heading for the mouth of the tunnel. Deceased, in his dazed condition, walked in and was found dead at the bottom, his face in the water.

On September 1st, 1898, Fred Snyder sustained a fracture of his leg in the *Enterprise* mine, Slocan Lake. He undertook to bring down some loose ore after a blast, against the wish of his partner, when the mass fell on him and caused the injury mentioned. He was removed to the hospital and recovered in due course.

COAL MINING IN THE PROVINCE.

While coal mining as a practical commercial operation has as yet been confined to the various collieries operating on the east coast of Vancouver Island, and to the Crow's Nest collieries on the western slope of the Rockies, workable coal has been already discovered, and has received more or less development, in various other sections of the Province, its occurence being widely distributed.

In most instances, these isolated discoveries have been made at points so far removed from railway accommodation—present or prospective—that little encouragement has been offered for serious development, and they are here referred to simply to demonstrate the possibilities of the various sections of the country when opened up by lines of transportation.

Rocky Mountains. Starting at the Rocky Mountains, the eastern boundary of the Province. This range from the U.S. boundary, northward, has been for miles proven to be coal-bearing, and enormous areas of the known coal fields have already been sufficiently developed to establish their value. While a large part of the known and more accessible portions of this area are now held by the Crow's Nest Pass Coal Company, there remain portions of it still unclaimed, and there is every reason to believe that future prospecting will prove the possibly productive area to be practically of unlimited extent.

An account of this coal field was given by Dr. Selwyn in the Report of the Dominion Geological Survey for 1891, written at a time when little more than prospecting and no development had been done. A somewhat detailed account of that portion of the field operated by the Crow's Nest Collieries will have been found in previous pages of this Report.

That the coal in the Rockies extends still further northward, for a considerable distance, is evidenced by the now producing mines near Banff, on the C. P. Ry., though these are on the eastern slope, and consequently not in this Province.

Peace River. Seams of "good bright coal," varying in thickness from 6 inches to 2 feet, were observed by Dr. Selwyn at various points in the Peace River basin, near the eastern boundary of Cariboo District, more especially at the head of the canyon on Peace River, Hudson's Hope, and on Pine River, near Table Mountain. Concerning these observations, Dr. Selwyn says, "only one of these can be considered of any economic value, but it is quite likely that there are others in the region which were not observed by us."

Omenica. Continuing still further northward, and to the west, coal is again met with in the Omenica District, but so far from a market as to be at present of little commercial value. I am informed by Mr. F. W. Valleau, the Gold Commissioner of this District, that coal has been recently found some 8 or 10 miles south of the Omenica River where it flows into the Peace River, and to quote from his description "it breaks with a conchoidal fracture; I have lit pieces of it in the flame of a candle and it continues to burn with a smoky flame, leaving little ash."

This would indicate a cannel coal or some other of the hydro-carbons high in volatile matter.

Mr. Valleau also informs me that workable seams of coal occur in the Buckley and Babine River valleys and intervening country, several of which seams he has personally seen. Some practical coal miners prospecting in this region took some of the coal found there down to Nanaimo, where it was reported as having good caking properties.

Skeena. Proceeding westward, coal has been found in the valley of the Skeena River in various places, and is said to have been found in workable seams. But little development has been done, and the accounts are not very definite as to the results obtained.

Queen Charlotte Islands. Again proceeding westward from the mouth of the Skeena River to Graham Island, one of the Queen Charlotte Group. Here anthracite, as well as bituminous coal, has been for many years known to occur in considerable quantity, which deposits have been the subject of Reports by the Geological Survey in 1872-3 by Mr. Richardson, and again in 1878-9 by Dr. G. M. Dawson.

The Queen Charlotte Coal Mining Company, Limited, spent a large sum of money in the development of their property near Skidegate Inlet, but abandoned the enterprise in 1872.

According to the best information obtainable, the coal, when first opened up, was from 2 to 3 feet thick, of good clean anthracite, and as the tunnel progressed the seam widened to 6 feet, but further in decreased again until it was 1 foot 6 inches at the face, at which point work was stopped.

In 1892, Mr. H. E. Parrish, C.E. and M. E., late of the staff of the Geological Survey of the State of Pennsylvania, acting on behalf of Messrs. W. A. Robertson, Wm. Wilson, and others, of Victoria, made an examination of certain coal areas on this Island, held by these gentlemen, and situated to the westward over the mountain range from the property of the

TOWN OF FERNIE—NEAR CROW'S NEST COLLIERIES, S. E. K.

previously mentioned company. From Mr. Parrish's report of his season's work I have taken the following information :—

Camp Robertson.—Section 20, township 5, on a creek off the Yakoun River. Bed No. 1, Yakoun, 19 feet thick, bed dips vertically at surface; shaft sunk 23 feet, at foot of shaft dip was only about 5° to E., strike N. and S. "This coal is, in my opinion, as fine a caking coal as the Connelsville bed in Pennsylvania."

About 60 feet east of No. 1, and overlaying it, is the outcropping of seam No. 2; shaft sunk 14 feet; drift to N., 9 feet; thickness of bed, 14 feet 8 inches.

No. 3 seam, overlaying No. 2, 7½ feet clean coal more bituminous than the two preceding seams.

Camp Anthracite.—Section 17, township 5. Shaft sunk 39 feet; thickness at bottom of shaft, 10 feet; strike regular, dip vertical at surface, changing to 45° to E. at bottom of shaft.

Camp Wilson.—Section 36, township 9, about 9 miles from Camp Robertson. Dip of bed at surface is vertical, but changes in depth attained to 60° to E. Shaft down 17 feet, with drift 23 feet to S. At the face the bed is 17 feet 8 inches thick, with one bench of 14 feet clean coal. This coal is of a later formation than that found at Camp Robertson. It is a very free burning bituminous coal, leaving little ash.

Mr. Parrish mentions other seams and their development, but these I have noted are quite sufficient to show the importance of the deposits in question.

I shall further quote a portion of his remarks as to the condition of the measures and coal outcrops :—

"From exposures and working it is evident that once we get below the surface the formation is regular and broken at no point. It flattens off with depth and takes a moderate dip to the east and north-east.

"Your property is well to the east of the volcanic eruptions which have broken up the measures on the south-west shore of Skidegate Inlet and the West Coast of the Island.

"One of the strongest indications I could find of the measures flattening as we get under cover, is on the creek about one mile south of Camp Robertson, and one-half mile east of the trail. At this point there is a water-fall with a drop of about 80 feet, over a fine-grained blue sandstone formation, lying in seams about 2 feet in thickness. The upper seams have a heavy dip, which gradually lightens off until at the bottom the dip is very slight towards the east. This is the largest exposure I could find on the property. Another strong indication is the tunnel I drove at Camp Robertson. You will notice on the plan that this starts on a level with the Yakoun River, and is driven towards the east into the hill a distance of 89 feet. The face is underneath the plateau upon which Camp Robertson is situated. The measures cut dip about 5° east, and at all the openings that were made show the dip to be heavy at the surface and gradually flattening as they got under cover. All the exposures I could find show there are no serious eruptions east of the mountains of the West Coast, and certainly none on the property I explored.

* * * * * *

"Conclusion—With the knowledge I have of the coal regions of Pennsylvania, acquired there as a Mining Engineer, and on the Geological Staff of that State, it must gratify you to know that in my judgment you have the best coal field I have seen. Until I visited it, I had no conception such a valuable field existed on the Pacific Coast. You possess a number of beds of unusual thickness, containing coals of superior quality, suitable for all requirements. You have anthracite, first-class steam, gas and caking coals, and a bed over 15 feet thick, excellent for domestic purposes."

Vancouver Island.

The East Coast of the Island has so many producing collieries, having a joint yearly output of over a million tons, that mention of the district here is scarcely necessary, further than to refer the reader to the Report by the Inspector of Coal Mines, on the working collieries, which follows.

On the North-West Coast, near Quatsino Sound, coal has for years been known to exist, this area having been reported on by the geological survey in 1868, and again by Dr. G. M. Dawson, in the Survey Report for 1886.

Seams of coal, 4 feet thick, were then reported and some little development work done, but this was later discontinued.

In 1897, the West Vancouver Commercial Company began development of certain areas in this district and is reported as having met with considerable success, and to be now sinking a shaft on a 5-foot seam, with some hundreds of tons of coal on the dump. Some 12 men are employed in this development work, and a steam hoist and other machinery have been erected.

The coal measures also occur and have been somewhat prospected at Alert Bay on the North-East Coast, at Sooke on the southern end of the Island, and at several points on the West Coast of the Mainland opposite the Island, but so far none of the discoveries have received development sufficient to show their value.

At Sahquash, between Port McNeill and Alert Bay, some boring has been done and a 5-foot seam is reported as having been struck. The property is now under bond to an English company.

Fraser Valley.

Discoveries of coal have been made in the Valley of the Fraser River. The seams so far reported have been too small for profitable working, but sufficient to stimulate prospecting of a serious character.

Nicola Valley.

Coal also occurs in the Valley of the Nicola River, a tributary of the Thompson, and seams up to 2 feet thick have been exposed. At Vermillion Cliff, lignite has been found in seams of from 2 to 4 feet, and a few tons of the surface coal taken out. (*See* Report of Geological Survey 1887-8, by Dr. G. M. Dawson.)

Boundary Creek District.

Still further to the south, coal has been exposed and somewhat developed in the Valley of the Kettle River, seams of 4 feet of good coal being reported; an account of which coal measures, by S. S. Fowler, A.B. & E.M., was included in the Report of this Department for 1896.

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REPORT ON THE INSPECTION OF COAL MINES.

BY THOMAS MORGAN, INSPECTOR.

I have the honour, as Inspector of Coal Mines, to respectfully present, in accordance with the "Coal Mines Regulation Act" of the Province, my report for the year ending 31st December, 1898. My appointment as Inspector dating only from the 1st of November, my examinations have been confined to the mines of the Nanaimo and Comox Districts.

The Colliery Returns from Vancouver Island, in the aggregate, are indicative of a substantial progress in the coal mining industry of the Province during the past twelve months, and the increased output of the mines, together with larger sales, both domestic and foreign, evidence the fact that our collieries are more than holding their own, notwithstanding the keen competition for trade.

Coal mining operations have been carried on during the year by the following companies and firms:—

Nanaimo Colliery. The New Vancouver Coal Mining and Land Company, Limited, has worked the Nanaimo Colliery, consisting of No. 1 Shaft, Esplanade, in the City of Nanaimo; Protection Island Shaft, No. 5 Shaft, Southfield, near Nanaimo River; and in the Wellington District has done some pumping in the Northfield Shaft.

Wellington Colliery. Messrs. R. Dunsmuir and Sons have operated their Wellington colliery, consisting of No. 1 Shaft, near Departure Bay; and shafts Nos. 3, 4, 5, and 6 in Wellington.

Union Colliery. The Union Colliery Company of B. C., Limited, has operated its No. 2 and No. 4 slopes and No. 5 shaft, in the Comox District, in addition to sinking in shaft No. 6, and has also carried on its coke ovens and coal working plant at Union Bay. In the Douglas District, on the south foot-hills of Mt. Benson, this company has operated the Wellington Colliery known as the "Extension Mine," in which work has been carried on in the No. 2 slope and in a rock tunnel outlet, while in the Cranberry District it has operated the Alexandria Mine.

Quatsino Coal. At Quatsino, on the North-West Coast of Vancouver Island, the West Vancouver Island Commercial Company has opened up a number of coal seams, but has not, as yet, become a shipper.

Crow's Nest Pass Collieries. The Crow's Nest Pass Coal Company, Limited, has opened up and started to work several seams of fine bituminous coal on Coal Creek, a tributary of the Elk River in East Kootenay, at a point about 6 miles up from Fernie, and has, in addition, built and is now operating coke ovens at the latter point.

AGGREGATE SUMMARY OF RETURNS FOR THE YEAR 1898, FROM THE VANCOUVER ISLAND COLLIERIES.

	Tons. (2,240 lbs.)	Cwt.	Tons. (2,240 lbs.)	Cwt.
Sold for consumption in Canada	365,506	11		
" export to other countries	752,826	—		
Total Sales			1,118,332	11
Stocks on hand first of year	30,230	11		
" last of year	38,429	10		
Difference added to stock during year			8,198	19
Output of Collieries for year 1898			1,126,531	10

NUMBER OF MEN EMPLOYED.

Character of Labour.	Number employed.		Total number employed.
	Underground.	Above ground.	
Whites—Miners	1,176		1,176
Labourers	578	139	717
Mechanics	36	220	256
Boys	114	17	131
Japanese	125	37	162
Chinese	*None* (*in Nov. & Dec.*)	399	399
Indians	*None.*	*None.*	*None.*
Totals	2,029	812	2,841

In the above table, under the head of coal "sold for consumption in Canada," is included the coal used by the collieries themselves under boilers, etc., which, with the exception of that used by the locomotives or in sinking the shafts, consists mostly of dross or fine coal.

According to the Act (section 53), publication of the detailed returns of a colliery can only be made with the consent of the owners thereof, and as certain owners have refused such consent, I am unable to give a detailed account of the out-put, etc., of each mine from official returns as has been possible in previous years, but must confine myself to an aggregate summary as above.

I have, however, compiled the following tables from the monthly statements as published in the press, the resultant total differing somewhat, as will be seen, from that of the preceding official table.

OUTPUT OF COAL, 1897 AND 1898.

	1897.	1898.
	Tons.	Tons.
New Vancouver Coal Mining & Land Co., Ltd	319,277	520,222
R. Dunsmuir & Sons	232,255	315,738 – old Well
*Union Colliery Co. of B. C., Ltd. (Union Colliery)	246,926	236,395 –
" " (Alexandria Colliery)	.....	45,560 –
Total Tons	798,458	1,117,915

*Output of "Extension Mine" not given separately.

FOREIGN SHIPMENTS OF COAL, 1898.

	New Vancouver Coal Mining & Land Co., Ltd.	R. Dunsmuir & Sons.	Union Colliery Co. of B. C. Ltd.
	Tons.	Tons.	Tons.
January	28,061	22,037	14,948
February	25,556	25,071	11,008
March	34,765	18,111	11,873
April	30,074	13,870	12,500
May	38,650	23,541	10,363
June	35,540	27,434	21,670
July	32,638	15,961	9,703
August	43,827	18,520	13,207
September	38,627	15,843	.....
October	36,689	15,399	4,522
November	27,907	16,026	2,882
December	31,201	20,829	17,008
Total Tons	403,535	232,642	129,684

SUMMARY OF FOREIGN SHIPMENTS, 1897 AND 1898.

	1897.	1898.
	Tons.	Tons.
New Vancouver Coal Co	233,349	403,535
Wellington	188,139	232,642
Union	180,282	129,684
Total Tons	601,770	765,861

Of the above foreign shipments for 1898, 752,686 tons were, according to Customs returns, exported to ports of the United States.

San Francisco and the southern ports of California have been the chief markets for Vancouver Island coal, with Alaska, the Hawaiian Islands and steamships engaged in the China and Australian shipping trade, important and steadily increasing secondary consumers.

The following analysis of the source of the coal supply of California for 1898, is interesting as showing our relative importance in that market.

TABLE SHOWING SOURCE OF CALIFORNIA'S COAL SUPPLY FOR 1898.

British Columbia	651,208 tons.
Australia	201,931 "
England and Wales	75,115 "
Scotland	5,056 "
Eastern (Cumberland anthracite)	37,560 "
Seattle (Franklin, Green River, etc.)	283,963 "
Carbon Hill, South Prairie, etc.	348,474 "
Mount Diablo, Coos Bay and Coral Hollow	172,506 "
Japan and Rocky Mountains (by rail)	26,560 "
Total coal	1,802,373 "

In the matter of coke imports California is credited with 41,630 tons for 1898, as against 30,320 tons in 1897, of which over one-half was derived from England and the remainder from British Columbia, Belgium and Australia.

The above considerations taken as a whole seem to indicate an abundant market for the yearly output of our mines, and the indications are that 1899 will not only prove a very prosperous year for the coal trade of the Pacific Coast, but that the collieries of the Province will be called upon to increase their present output.

ANALYSES OF COAL.

From samples of coal delivered to me by the managers of the collieries named, analyses were made by the Provincial Assayer by "fast caking" process, with the following results:—

No. 1.—Lower seam, Union Mine.
No. 2.—Top seam, "
No. 3.—Lower seam, Extension Mine.
No. 4.—Alexandria Mine.
No. 5.—Wellington Coal.
No. 6.—Top seam, Extension Mine.
No. 7.—Union coke.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.
Moisture	1.43	.80	1.00	1.15	1.90	.75	.60
Volatile matter	25.57	28.00	32.80	31.85	32.10	33.25	2.60
Fixed carbon	65.00	57.60	60.80	58.70	56.40	58.04	80.00
Ash	8.00	13.60	5.40	8.30	9.60	7.96	16.80
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Caking quality	Very fair.	Very fair.	Medium.	Medium.	Partial.	Partial.	.....

NANAIMO COLLIERY.

This extensive colliery is the oldest of those now working in the Province. The original charter of the Old Vancouver Island Coal Company dates from 1862, when that company took over the coal mines at Nanaimo, then owned by the Hudson's Bay Company, and a large area of the surrounding coal lands.

These areas have since been added to, until now the New Vancouver Coal Mining and Land Co., Ltd., holds about 30,000 acres of coal lands.

The following are the Official Returns for the year from this colliery:—

COAL MINES REGULATION ACT.

Returns for the year ending December 31st, 1898, from Nanaimo Colliery, Nanaimo Town and District.

Operated by New Vancouver Coal Mining and Land Company, Limited; head office at London, England.

OFFICERS.	ADDRESS.
J. Galsworthy, President or Chairman,	12, Old Jewry Chambers, Old Jewry, E.C., London.
Joseph Ramsden, Secretary,	12, Old Jewry Chambers, Old Jewry, E.C., London.
Samuel M. Robins, Superintendent,	Esplanade, Nanaimo, B.C.

Share capital of Company, $1,075,000. Debenture capital of company, $250,000.
Value of Plant, $350,000.

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	45,161	14						
" export to U. S.	372,164	—						
" " to other Countries	31,357	—						
Total Sales			448,682	14				
Used in making Coke								
" under Colliery Boilers, &c	69,481	17						
Total for Colliery Use			69,481	17				
Stocks on hand first of year	4,740	11						
" last of year	6,850	10						
Difference added to Stock during year			2,109	19				
Output of Colliery for year			520,274	10				

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	10		14			
Whites—Miners	449	$3 to $4.50				
Miners' Helpers						
Labourers (Pushers and Drivers)	382	$2.50 to $3	41	$2.50		
Mechanics and Skilled Labour			97	$3 to $4		
Boys	28	$1 to $2	4	$1 to $1.50		
Japanese						
Chinese			161	$1.12½ to $1.25		
Indians						
Totals	869		317			

Name of Seams or Pits—Southfield No. 2, Southfield No. 5, No. 1 Esplanade Shaft, No. 1 Northfield Shaft, Protection Island Shaft.

Description of seams, tunnels, levels, shafts, &c., and number of same—Southfield No. 2, worked by slope, seam 6 to 10 feet; Southfield No. 5, worked by shaft, seam 5 to 10 feet; No. 1 Northfield Shaft, worked by shaft, seam 2 feet to 3 feet 6 inches; Protection Island Shaft, worked by shaft, lower seam 4 feet, upper seam 6 feet; No. 1 Esplanade Shaft, worked by shaft, seam 5 to 12 feet.

Description and length of tramway, plant, &c.—Railway to Southfield, 6 miles, with sidings; railway to No. 1 Shaft, 1 mile, with sidings; railway from Northfield Mine to wharf at Departure Bay, 4½ miles; rails are of steel, 56 lbs. per yard, of standard gauge, viz., 4 feet 8½ inches; 10 hauling and pumping engines, 19 steam pumps, 6 locomotives, 240 coal cars (6 tons), besides lumber and ballast cars; bunkers with capacity of 10,000 tons; fitting shops for machinery repairs, with turning lathes, boring, drilling, screw-cutting machines, hydraulic press, steam hammer, &c., &c.; diamond boring machinery for exploratory work (bores to 4,000 feet); 150 horse-power electric plant, engines, boilers, dynamos; 4 30 horse-power, 8-ton locomotives, and 1 15 horse-power locomotive; hauling and lighting equipment; wharves, 2,000 feet frontage, at which vessels of the largest tonnage can load at all stages of the tide.

SAMUEL M. ROBINS,
Superintendent.

The Minister of Mines is hereby authorised to publish these Returns.

SAMUEL M. ROBINS.
Superintendent.

No. 1 SHAFT, ESPLANADE.

Joseph Randall, Overman.

At a point on the Esplanade to the east and to the dip of the site of the old Douglas Pit, still to be seen between Nicol Street and Victoria Road, Nanaimo, a bore hole was put down in 1881, by the New Vancouver Coal Mining and Land Company. At a depth of 650 feet coal was reached and a seam 8 feet 6 inches thick was bored through.

Upon this showing, together with other data obtained by diamond drilling, the Company, on the advice of an eminent engineer, put down two circular shafts, respectively 18 and 16 feet in diameter, installed powerful hoisting and ventilating plants and commenced shipments on a large scale. These shipments have since been continuous, and the annexed returns show what has been done during the past year. The proximity of the shaft to the shipping docks has been of great advantage in facilitating the loading of vessels whether by night or day.

The main slope runs east from the bottom of No. 2 shaft—the 16-foot upcast shaft—for some 2,200 yards, from which levels Nos. 1, 2, and 3, north, have been run. The present workings are off the Nos. 2 and 3 levels, north, and off inclines driven westerly for from 1,000 to 1,400 yards from points on No. 1 level, north, distant some 2 or 3 miles from the shaft.

Haulage. Hauling is done in two parts, along No. 1 level for 2½ miles, and down in No. 3 level for about 1½ miles. The motive power employed is provided by electric motors, which haul as many as 96 loaded mine cars at a trip, each car having a capacity of 15 tons of coal. Tracks and rolling stock are kept in good order and the system is operated with the greatest care, as shown by the very few accidents which have occurred notwithstanding the high speed of travel maintained. From points farther in

than is reached by the electric haulage system mules are used, 15 to each shift in the upper levels and inclines, and 9 in the workings off No. 3 level. The coal from No. 3 level is hauled up the main slope to the shaft, a distance of 600 yards, by a 16 x 36 inch steam winding engine placed at the head of the slope.

System of Working.

Mining is carried on by the "pillar and stall panel system." Pillars are being taken out from No. 2 and No. 3 levels and also from the panels of the inclines running from No. 1 level.

The seam is from 3 to 8 feet thick and is well bedded with good roof and floor. Little trouble has been caused by water. Dust is not met with in any quantity in the working parts of the mine, and any accumulations are removed or dampened to avert any danger from this source.

The mine workings are in charge of an overseer, and there are six firemen or mine examiners, two on each of the three shifts, every precaution being taken to ensure the safety of the miners. The "shot-lighters" and timbermen are experienced miners and can be relied upon in any emergency.

Ventilation.

Air-ways and levels are well constructed, of sufficient sectional area for ample ventilation, and are kept in first-rate repair. Connection has been made by way of the No. 1 and No. 3 north levels, with the Protection Island shaft, which is used as an air "intake" for the ventilation of the workings on these levels, No. 2 shaft, Esplanade (16 feet diameter), being the "upcast." No. 1 shaft (18 feet diameter) is the hoisting shaft and serves also as the air "intake" for the ventilation of that portion of the mine in its vicinity, as well as for the mule stables, etc.

Ventilation is effected through No. 2 shaft by a 36-foot by 12-foot Guibal fan, built by Black, Hawthorne & Co, of Gateshead-on-Tyne, England, to which is directly connected a suitable engine, making from 40 to 46 revolutions per minute. The fan is assisted by the exhaust of the steam hoisting engine, which is at the head of the main slope.

The volume of air drawn by these agencies through and around the faces and workings amounts to from 150,000 to 165,000 cubic feet per minute and is in my opinion ample for all requirements.

I measured the air derived from Protection Island shaft for the ventilation of the workings from No. 1 level, and found it amounted to some 44,800 cubic feet per minute. Of this amount some 18,500 cubic feet went up No. 1 incline, supplying 50 men and 9 mules; 9,600 cubic feet went up No. 2 incline, supplying 51 men and 9 mules; while a leakage of some 16,700 cubic feet kept the level and the old workings clear.

For the ventilation of No. 2 and No. 3 levels and the main slope, some 16,600 cubic feet of air was in circulation, taken from the same source, and supplying 62 men and boys and 9 mules.

About 50,100 cubic feet of air per minute is taken down the No. 1 or hoisting shaft, supplying some 50 men employed around the bottom of the shaft and about the machinery, afterwards ventilating the stables in which some 50 mules are kept.

No. 2 shaft, as before stated, is the "upcast" not only for this mine but also for the Protection Island workings, from which some 52,500 cubic feet of air per minute are drawn, making a total volume of air of 164,000 cubic feet going up the "upcast" at the time I tested it.

Drainage.

Such water as is found to the dip, is pumped by small pumps driven by compressed air, up to the sump at the bottom of No. 1 shaft, from which it is lifted to the surface by means of a force pump.

Underlaying Seam.

The No. 2 or upcast shaft, which had in 1884 been sunk to the Douglas seam, a depth of 650 feet, was in 1887 deepened by about 71 feet, and at which additional depth it cut another and lower seam of coal some 6 feet in thickness.

On this lower seam, drifts were run from the shaft for short distances north and south, "on the strike of the metals," but exploratory work was not further prosecuted here.

A number of bore holes have been put down by hand-power diamond drills, from various points on the Douglas seam, till they cut the lower seam. In most places these bore holes found workable coal, not of great thickness but of first-class quality. The thickness of the measures between these two seams was found, over the area tested, to vary only slightly, being between 60 and 70 feet.

While the upper seam is under full operation, it would scarcely be prudent to work the lower seam, but when the Douglas seam is exhausted the lower one will undoubtedly be worked by the company.

Pit Head.

The pit head is built of 16 x 16-inch timbers, the platform being 25 feet above the surface, while the shaft-head frame and gear rises 50 feet higher. The arrangement of the bank-head is good, and provides for weighing the mine cars, dumping on to the screens for railway shipment, or into the chute for town trade, proper facilities being provided for the disposal of any and all refuse matter sent up from below.

As a matter of fact, the arrangements have to be good and well worked, for when a motor with a train of 90 cars arrives at the pit bottom, it has to be attended to promptly and not delayed, as it has to return with its empties and pass the next loaded train at the regular siding.

There is always an ample supply of timber for props and lagging—for the use of the miners—kept alongside of the track leading to the Landing of the shaft, on the ground level, from which point both timber and other mine supplies are sent down below.

Coal Washer.

A large percentage of the screenings from the coal are passed through a coal-washing plant, and a cheaper grade of clean, small coal produced. This plant consists of two jigs, with fixed screens, the plungers being operated by eccentrics, and is said to have a capacity of 10 tons per hour.

Hoisting Plant.

A short distance from the shaft, and covered by a good engine-house, is the hoisting plant, consisting of a pair of 30 x 60-inch, Cornish valve, direct acting, high pressure engines, operating a 15-foot drum, provided with a 10-inch cylinder steam brake, etc., and capable of hoisting 6 tons 30 feet per second on a steam pressure of 50 lbs.

The steam for the hoisting engines is generated by a rather old plant, consisting of four 2-flue Lancashire boilers and four "egg-ended" boilers, which give an ample supply under a pressure of 60 lbs., using as fuel only slack or waste coal.

In the ante-room off the engine room are kept a barometer and the record books, for the use of the mine examiners.

No. 1 Shaft and the engine houses above and below ground are lighted by incandescent electric lights, while an additional gas service is provided at the surface.

Electric Plant.

The electric power house is situated across the road from the pit head. The plant consists of two 2-flue boilers, two 150 h.p. Ball engines (Erie, Pa.) each running a separate dynamo, generating a current of 275 volts.

There are suitable switchboards and such instruments as are needed to regulate and control the current.

The plant supplies power for three electric motors and an electric winch underground, and provides all the electric lighting that is required.

Telephones. The various parts of the works are in communication, and are connected with the Superintendent's office by telephone, while a wire goes down No. 1 Shaft, along No. 1 Level, and up Protection Island Shaft to a telephone in the engine room there, thus making a submarine telephone connection.

Railway. The coal from the screens goes into cars of the hopper type, carrying about 5 tons each, which are pulled by 40-ton locomotives over a standard gauge railway to the Nanaimo wharves—belonging to the company—a short distance away, where the coal is loaded into vessels.

PROTECTION ISLAND SHAFT.

Thomas Mills, Overman.

This shaft was sunk by the Company in 1891, at Execution Point, on Protection Island, across the Harbour from the Nanaimo wharves.

The coal was reached at 670 feet down and a hoisting plant was at once erected, consisting of a lofty shaft-head, hoisting engine, 21 x 42 inches, with boilers, boiler house, coal bunkers, coal washers, and a fine wharf running out to deep water and not over 400 feet from the shaft.

Workings. From the bottom of the shaft two slopes were driven, east and north-east, each in nearly a mile, but little further work has been done on them since. A diagonal slope was driven about 1,400 yards, and from a point about 600 feet down this slope a slant was driven S. 81° E. for some 780 yards, for the purpose of taking out the area of coal lying between the main (east) slope and the diagonal slope just mentioned. From this area the greater part of the present output is being taken.

The coal was worked by the "pillar and stall" system; and the Company is now drawing the pillars. The coal is easily worked and is from 3 to 8 feet thick.

Haulage. The hauling on the slopes is accomplished by endless wire ropes connected with 5-foot drums below, which are in turn operated by an engine at the surface. The system works well and fulfils all the requirements, but the friction and consequent wear and tear are very considerable.

This shaft was shut down for some time and only started up again in February, 1898; since then it has been a steady and large producer.

Underlaying Seam. In 1892 the shaft was sunk an additional 62 feet cutting the lower seam, already mentioned as underlaying in the No. 1 shaft workings. On this lower seam a slope was put away and run for 350 yards, from which slope levels were started, simply to prove the seam, which is held in reserve for future working. The thickness of the seam at the face of the slope was found to be about 4 feet.

Ventilation. The Protection Island shaft, 18 x 12 feet, serves as the air "intake," not only for the ventilation of its own workings but also for the greater part of the workings from No. 1 shaft, as has already been described. For the ventilation of the workings at present under consideration, some 52,500 cubic feet of air per minute is being utilized, of which 36,000 cubic feet goes to the diagonal slope, supplying 50

men and 1 mule, while 16,500 cubic feet goes to the main slope, supplying 49 men and 2 mules. The return air is drawn over to and up the No. 2 Nanaimo shaft. A common downtake and upcast is thus used by these two mines.

The workmen employed here live in Nanaimo and are conveyed to and from their work by the Company's steamer "Mermaid."

No. 5 SHAFT, SOUTHFIELD.

Richard Gibson, Overman.

This mine is in the south coal field, a portion of the Company's estate, which was worked a few years ago under the name of the "Southfield Mines." The property is connected by the Company's railway with their No. 1 shaft and the docks, a distance of four miles.

The shaft is down some 508 feet to the coal, which varies in thickness from 5 to 22 feet, having distinctive characteristics, and is known locally as "Southfield coal." It is a good steam coal, low in ash and makes good coke.

Workings. From the bottom of the shaft a slope has been driven from which have been set off to the east a level and an incline. The "pillar and" stall system is employed in working, but the principal extraction at present is from robbing the pillars.

Ventilation. No. 5 shaft is divided in two by a partition, one part serving as an "upcast," while the other, in conjunction with the old No. 4 shaft, serves as an "intake." A Murphy fan serves as a ventilator and caused a circulation of 62,400 cubic feet of air per minute, which amply serves for the 80 men and 10 mules employed. This current is split into two about equal parts, which go respectively to the workings in the levels and off the incline.

Hoisting Plant. The pit head is substantial, well arranged, and capable of handling a large output. The hoisting engine is 16 x 36 inches, with a full complement of boilers of the Lancashire type.

The workmen live in Nanaimo, and are conveyed to and from work by the railway.

NORTHFIELD MINE.

This mine is not at present being worked, although the mine plant, railway, and wharves are maintained in good condition, and work could be started at very short notice.

No. 1 Shaft is used as the downtake, and the No. 2 as the uptake.

Within this last year, some pumping was done and an examination made of the workings within 150 yards of the shaft.

The boundaries of this mine and of the adjoining Wellington Mine are co-terminous for about a mile and a half, so the greatest care will have to be exercised in approaching the boundary to see that the surveys are correct, as any "overlapping" might cause a frightful accident.

SHIPPING FACILITIES.

The shipping facilities of this company are excellent. The depth of water at the docks is such that any vessel can lay alongside safely, while the harbour is sheltered and well protected.

At Protection Island, the pit head and the bunkers on the wharf are so close together as to need no railway, while the coal runs from the bunkers directly into the vessels by gravity.

The coal from the other pits is brought by the company's railway a very short distance to the Nanaimo wharves, which have this year been thoroughly overhauled and improved.

The bunker capacity on and near the docks has been greatly increased, and is capable of holding a very large reserve stock.

On these docks, the company's engineer, W. H. Wall, has erected a very ingenious and novel loading platform of his own design, which is worked by steam power, and has greatly facilitated rapid loading and reduced the labour expense. The speed with which a vessel may be loaded is now limited only by the time required for trimming the cargo in the hold of the vessel. One of the company's steamers, the "Titania," plying between Nanaimo and San Francisco, having suitable hatches, takes on her full cargo and bunker coal, amounting to 6,000 tons, in 12 hours.

MACHINE AND WORKSHOPS.

The shops are thoroughly equipped with modern appliances and tools, and consist of machine and fitting shops for repairing engines, locomotives, and rolling stock; also blacksmith shops, carpenter and car shops, where the colliery waggons are made and repaired.

WELLINGTON COLLIERY.

Operated by R. Dunsmuir & Sons; Andrew Bryden, Manager. Head Office, Victoria, B. C.

Returns. The detailed Returns from this colliery have had to be omitted, in accordance with section 53 of the "Coal Mines Regulation Act," as the owners have refused permission to publish same.

The principal mines of this old established colliery are situated about 6 miles to the north-west of Nanaimo, and 3 miles from Departure Bay, which Bay is connected with Nanaimo Harbour by Exit Passage, both being under the same Customs and Harbour authorities.

No. 1 SHAFT.

William Bailey, Overman.

This pit, distant about a mile from the Bay, was first sunk, in a small way, about 25 years ago, by the late Hon. Robt. Dunsmuir. After reaching the coal, no further work was done until 1891, when it was again started, the shaft being enlarged to 8 x 18 feet and substantially timbered.

The coal was found at a depth of 300 feet from the surface, the seam being about 3 feet thick.

The mine is worked by a slope from the bottom of the shaft, with levels therefrom to the westward. The roof of the seam is tender. The ventilation is good, there being 8,000 cubic feet of air per minute for 30 men and 2 mules. The shaft is the "intake," the "return" being the fan shaft at No. 5 Shaft.

No. 3 SHAFT.

James Sharp, Overman.

This shaft reached the coal at a depth of 210 feet, at which point a slope was driven, from which levels were run off. At the present time, only pillars are being worked, and these are nearly finished.

Ventilation. The main shaft is divided by a partition, one compartment serving as an "intake," and the other as an "upcast." A home-made Guibal fan, 39 x 10 feet, is used, driven by a 14 x 60-inch engine. The total volume of air in circulation is 33,000 cubic feet, distributed as follows: To No. 2 Level, 6,050 cubic feet, supplying 19 men and 2 mules; to No. 3 Level, 9,720 cubic feet, supplying 20 men and 3 mules, leaving 17,230 cubic feet to be accounted for by leakage, which passes by doors and curtains through the old workings.

Upon application being made to me for permission to increase the working force to 60 men—as the connection with No. 4 Shaft, now shut up, was no longer available—I had no hesitation in recommending it, being so well satisfied with the way in which the mine was being worked, and feeling it was perfectly safe to do so.

No. 5 SHAFT.

David Wilson, Overman.

This is an important mine, well laid out and kept in good order, and is under excellent management. The shaft is 265 feet deep, from the bottom of which is a slope, with levels and inclines. The seam is from 5 to 10 feet thick, and its mode of occurrence is such that a very large percentage of the coal left in the pillars and as roof in the stalls can eventually be recovered. Considerable of the mining here has been "long wall" work, which has been done in a creditable and miner-like manner.

Ventilation. Ventilation is effected by means of a 14 x 5 Guibal fan, drawing up through the No. 5 fan shaft, which serves as an "upcast," not only for these workings but also for No. 1 Shaft workings, as already described. The total volume of air travelling in the fan shaft is 124,000 cubic feet per minute, which includes 8,000 cubic feet taken from No. 1 Shaft workings, leaving 116,000 cubic feet of air for these workings, which is split up as follows:—North-west level, 47,500 cubic feet for 75 men and 12 mules; east side, 18,000 cubic feet for 14 men and 1 mule; west side, 19,500 cubic feet for 20 men and 2 mules; side slope, 30,000 cubic feet for 30 men and 2 mules; leakage, 1,000 cubic feet.

The shaft head arrangements, hoisting engine, boilers, air compressor, and fan are good, and are kept in excellent order. There being a siding from the E. & N. Ry. right up to the bunkers, coal can be loaded directly into the railway cars.

Just before my appointment as Inspector, a cave from the surface occurred in this mine, caused by driving into the gravel beyond the rock caves, north-westerly. By coming back about 50 yards under good roof-caves, and cogging up the way by which the gravel and water entered the workings, the mine was secured to my satisfaction.

No. 6 Shaft.

This mine is about a mile to the south of No. 5 Shaft. The pillars near the shaft bottom were being taken out, and only about a month's work remained to finish.

About 20 men were at work, the supply of air being about 45,000 cubic feet per minute.

Machine Shops, &c.

The machine and general workshops are well fitted up with first-class lathes and modern mechanical appliances, and are equal to all demands of an extensive colliery.

Shipping Facilities.

From the north shore of Departure Bay, three shipping wharves with T heads project into deep water, over 27 feet at lowest tide, and from these wharves the Wellington coal has been shipped for many years.

The main wharf is equipped with a "Link Belt Conveyer," about 3 feet wide, which receives the coal from a hopper into which the cars are dumped, and conveys it on an incline to a chute, down which it slides into the hold of the vessel. The lower end of the conveyer and chute can be adjusted by blocks and falls to suit the state of the tide and height of the vessel's deck. The usual rate of loading is about 150 tons per hour, but it can be worked up to 200 tons.

Vessels waiting find a well-sheltered anchorage in the lee of Newcastle Island, and can discharge their ballast into deep water.

The colliery railway is 36 inches gauge. The cars, having a capacity of about 3¼ tons, are brought from the mine down a steep grade by suitable locomotives. Bunkers are provided at the rear of the wharf for storage. There is also a coal washer, well supplied with fresh water.

UNION COLLIERY.

Operated by the Union Colliery Company, head office Victoria, B. C. Jas. Dunsmuir, President; Jno. Bryden, Vice-President; C. E. Pooley, Secretary, all of Victoria; Alex. Dunsmuir, Treasurer, San Francisco; and John Matthews, Manager, Union.

Returns. The detailed Returns from this colliery have had to be omitted, in accordance with section 53 of the "Coal Mines Regulation Act," as the owners have refused permission to publish same.

The shipping wharves of this colliery are located at Union Bay, Baynes Sound, on the East Coast of Vancouver Island, where are also situated a well equipped Luhrig coal washer, a coking plant consisting of two batteries, each of 100 bee-hive ovens, and large and suitable coal bunkers. The mines being operated are situated at the town of Union, about eleven miles

north-west of Union Bay, connection between the two points being maintained by means of the standard gauge railway, built, owned and operated by the Company.

In addition to the colleries and works at Union, this Company is also operating the Alexandria Mine, in the Cranberry District, and the "Extension Mine," in the Douglas District.

No. 2 SLOPE.

This slope is down some 700 yards and was worked during the first six months of the year, but has since been shut down.

No. 4 SLOPE.

Richard Short, Overman.

This is an important and valuable mine producing a superior quality of coal.

Workings. The main slope is down some 6,600 feet (N. 25° W.), and from it, at a point about 300 feet from the surface, the No. 2 or diagonal slope branches off to the east at an angle of 45° (N. 20° E.). This diagonal slope has been run for 4,000 feet, nearly to the true dip of the coal, and although not as long as the main slope, the vertical depth attained therein is greater than in the latter, which runs across the dip.

At a point some 5,280 feet down the main slope a second diagonal slope has been run, parallel to the one already mentioned (N. 20° E.), and is now down 1,150 feet.

Off the No. 2 or diagonal slope, levels Nos. 10, 11, 12, and 13 are being worked to the east and west, while connection with the main slope is made through No. 11 level. From the old main slope levels Nos. 11, 12, and 13 are now being worked on either side.

The diagonal from this slope cuts through levels 12 and 13 to the east of the slope, and from this diagonal No. 14 level has recently been run 175 yards westerly, towards the main slope, and 200 yards easterly.

Hoisting and Haulage. The hoisting plant consisting of a large double-cylinder engine geared to double loose drums, boilers, etc., is situated 700 feet from the mouth of the slope, from which point the engineer hoists and dumps the mine cars. The slope head arrangements are such that these cars go to the tippler and return automatically. About 12 cars, each holding one ton, are brought up in one trip. Hoisting is through the main and No. 2 or diagonal slopes. In the new diagonal slope the coal is hoisted by an electric winch up to the old slope.

In lowering a run of empties there are difficulties met with in that certain flat places occur in the slope, where the grade is not sufficient to carry the rope. This is overcome by the use of a tail rope.

Ventilation. Ventilation is effected by a 14 x 5 feet Guibal fan, now causing a circulation of 65,000 cubic feet of air per minute, but if the fan was run up to its capacity of 95 revolutions it would move 85,000 cubic feet of air.

The air enters by the haulage slopes and is divided into separate splits, the main split being at the point where No. 2 branches off the main slope, part of the air going down each slope. Further down each of these slopes the air is again split and sent to the workings to the east and west of the respective slopes.

I found the air circulating as follows:—Diagonal slope, east workings, 9,400 cubic feet per minute, for 34 men and 3 mules; west workings, 12,200 cubic feet, for 58 men and 6 mules; old or main slope, east workings, 9,800 cubic feet, for 54 men and 5 mules; west workings, 15,400 cubic feet, for 60 men and 6 mules.

The ventilation is good and sufficient for all requirements. The mine is free from dust, under good supervision, and the safety of the miners is properly guarded.

The coal will average about 4 feet in thickness, and is being worked by the "pillar and stall" system.

There are two steam and eight triple electric pumps in the mine, the power for the latter being generated by two dynamos on the surface.

No. 5 SHAFT.

This shaft is sunk vertically, and cuts through two seams of coal, the upper seam at 275 feet and the lower seam at a depth of 590 feet from the surface. The shaft is 23 x 8 feet inside, very substantially constructed of heavy timbers and well lined. A partition of 3 x 12-inch planking, lined with tar-paper, divides the shaft into two compartments, one used as the air "downtake" and the other as the "upcast."

Upper Seam—A heading has been started in this seam, and is now in 200 feet. Some 9 men were at work on each of two shifts, and were well supplied with air, some 8,000 cubic feet per minute being in circulation.

Lower Seam—From the bottom of the shaft, an incline has been driven off to the south and headings off to the east and west. The heading to the east is now in 2,200 feet, while the incline is run about the same distance, and is being pushed forward to connect with No. 6 Shaft, now being sunk, which will then be used as the "upcast."

Ventilation. As already stated, the shaft is at present used as both a downtake and upcast. The ventilation is good and all-sufficient, a 14 x 5-foot Guibal fan being in use. The volume of air in circulation on the east side is 21,400 cubic feet per minute, supplying 35 men and 4 mules. The volume of air in circulation on the west side is 14,000 cubic feet for 6 men and boys.

Hoisting Plant. The pit-head works are good. The hoisting plant consists of a double-cylinder, 30 x 60-inch engine, connected with a 14-foot winding drum fitted with steam brakes, and has ample boiler service.

The shaft is connected by railway with the wharves, and all is in readiness for extensive working as soon as the connection for air is made with the No. 6 Shaft, which should be finished in 1899.

No. 6 SHAFT.

This shaft, which has already been referred to, is being energetically sunk by the company at a point distant some 4,300 feet to the south from No. 5 Shaft. The shaft is now down 215 feet, and at the rate of progress now being made should be down to the coal some time in July. The work is being done in a workman-like manner, and every precaution is taken to ensure the safety of the miners.

MACHINE SHOPS.

The company is well provided with machine and repair shops, which are well equipped and equal to the demands of a large and important colliery.

COAL WASHER.

At Union Bay, the company has built and is operating a large and very complete coal-washing plant of the "Luhrig" pattern, producing from the screenings of the mines a washed product of various sizes, a part of which is sold, and the remainder goes to the coke ovens. The machinery is operated by steam generated by boilers heated by the waste gases from the coke ovens.

COKE OVENS.

Near the coal washer, two batteries, each of 100 bee-hive coke ovens, have been erected, the second battery having only just been completed. The fine, washed coal is elevated at the washer into elevated bins, from which it drops into cars, which are hauled by an endless rope over the tops of the ovens, to be dropped where required.

The coke is pulled out of the ovens by hand on to a cooling floor, which is covered by a shed. From this shed the coke is loaded directly on to railway cars, and that portion of it going inland over the C. P. Ry. is taken over to Vancouver in the same cars on a transfer float.

The coke produced is good, bright, and firm, and well coked, although the ash contained is rather high, as shown by analysis already given.

Fire-brick are being made by the company from clay found associated with the coal, and some of the brick have been used in the new coke ovens, but this industry is, as yet, in the experimental stage.

RAILWAY AND SHIPPING FACILITIES.

The coal from the collieries at Union is brought down to the Bay, a distance of 11 miles, by a standard-gauge railway operated by the company, the large, 25-ton, gondola cars being used.

The road is down grade from the mine, and is in fair repair, although important improvements have been instituted since the sad accident of August 17th last, when a passenger train broke through the high bridge over the Trent River, causing the loss of many lives.

The old bridge has been repaired and is still in use, but it is to be hoped the new bridge now in course of construction will soon be finished.

On the line of the railway, and near the Bay, the Company has erected large coal bunkers capable of holding 4,000 tons, used as a reserve for shipments.

A well appointed wharf projects out into deep water, with berths on either side at which the largest vessels can lie in safety. Chutes are arranged for loading vessels from the cars with all possible dispatch.

ALEXANDRIA COLLIERY.

JOHN DICK, MANAGER.

This mine is situated in the Cranberry District, about 5 miles south of Nanaimo, and is operated by the Union Colliery Company.

At a point just to the west of the tracks of the E. and N. Railway, a slope was started several years ago and was continued down some 700 yards, with an easterly course, when operations were suspended, nothing further being done until 1896, when work was resumed.

Levels were then started off to the north and south from a point 650 yards down the slope, the former of which is now in 900 yards and the latter about 50 yards. All the workings are off the north level, to both the dip and rise, the coal being worked by the "pillar and stall" system.

The seam is irregular in thickness, varying from 3 to 18 feet, the coal having the same characteristics as that in the Southfield seam.

A 14 x 5 foot Guibal fan is in use and causes a circulation of 39,300 cubic feet of air per minute for the use of 73 men and 4 mules.

A small pump relieves the mine of the water made.

A good hoisting engine and substantial slope-head works have been erected, the latter connected by sidings with the E. and N. Railway, by which the coal is shipped to Victoria and Wellington.

———o———

EXTENSION MINE.

JAMES HAGGART, OVERMAN.

This mine is situated in the Douglas District, on the south slope of Mount Benson and is operated by the Union Colliery Company.

No. 2 SLOPE.

No. 2 slope is being worked and is now down 1,600 feet. From a point 1,400 feet down, levels and counter levels have been driven east and west, the former now being in 1,040 feet, and the latter 940 feet. No stalls have as yet been broken off these levels.

Ventilation is effected by means of a furnace and steam jet, supplying 15,000 cubic feet of air per minute for the use of the 16 men here employed.

Rock Tunnels.

About 100 feet vertically below the mouth of the slope, a 6 x 9 tunnel is being driven from the surface in line with the slope, and is calculated to strike it at 133 yards down. Just above Overton's Lake an 8 x 14 foot main tunnel is being driven to strike the east level, and is now in 2,624 feet, with about the same distance yet to go.

The ventilation of the tunnel is effected by means of a furnace, the air being conducted to the face in 3 x 2½ ft. wooden boxes. I found 4,812 cubic feet of air per minute in circulation, supplying the 9 men and 1 mule working.

RAILWAY AND SHIPPING FACILITIES.

A branch railway is being constructed to connect the main tunnel outlet with the E. and N. Railway at a point a little above the bridge over the Nanaimo River.

At Oyster Harbour, on a branch line from the E. and N. Railway, large coal bunkers were in course of construction. These are to be 400 feet long, 38 feet wide, and of an average depth of 25 feet, capable of holding 8,000 tons of coal. From chutes on either side coal can be loaded into cars underneath on tracks leading to the shipping wharves now being constructed, and at which the largest vessels can lie in safety, there being 30 feet of water at low tide.

———o———

CROW'S NEST PASS COLLIERY.

The coal field in which this colliery is situated has only become available since the completion of the Crow's Nest Pass branch of the Canadian Pacific Railway, and has been in operation for but a short time. I have not been able, as yet, to inspect this colliery.

COAL MINES REGULATION ACT.

Returns for year ending December 31st, 1898, from Coal Creek Colliery, Fernie Town, South-East Kootenay District.

Operated by The Crow's Nest Pass Coal Company; head office at ———

OFFICERS.

Hon. Col. Jas. Baker, President, Victoria. — Wm. Hanson, Man. Director, Montreal.
Senator Cox, Vice-President, Toronto. — E. Hanson, Treasurer, Montreal.
J. A. Gemmill, Secretary, Ottawa. — Wm. Blakemore, Gen'l Manager, Fernie.
Frank Smith, Mine Manager, Fernie.

Capital of Company, $1,500,000. Value of Plant, $50,000.

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	9,297	....			322	9		
" export to U. S.	37	....			38	11		
" " to other Countries	.....	....						
Total Sales	.....	....	9,334				361	
Used in making Coke	470	....						
" under Colliery Boilers, &c	150	....						
Total for Colliery Use	.....	...	620					
Stocks on hand first of year	.....	....						
" last of year	.....	....						
Difference added to Stock during year	.....	....						
Output of Colliery for year	....	....	9,954				361	

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	2	$3	4	$3	6	$3
Whites—Miners	60	$2.50	.....	.....	60	$2.50 to $3
Miners' Helpers	.....	.....	.....	.....		
Labourers	10	$2	25	$1.75	35	$1.75 to $2
Mechanics and Skilled Labour	.....	.....	20	$2 to $3	20	$2 to $3
Boys	2	$1	.....	.....	2	$1
Japanese	.....	.....	.....	.....		
Chinese	.....	.....	.....	.....		
Indians	.....	.....	.....	.....		
Totals	74		49		123	

Name of Seams or Pits—No. 1 seam, No. 2 seam.

Description of seams, tunnels, levels, shafts, &c., and number of same—No. 1 seam, 5 feet 6 inches clean coal; two tunnels driven through 150 feet of gravel to coal, and driven in the coal 600 feet, with cross-cuts every 100 feet; five rooms; system of working, pillar and stall, 30 feet and 18 feet respectively. No. 2 seam, 6 feet clean coal; two level tunnels, lower started on outcrop of coal, upper through 300 feet of gravel; levels 1,500 feet in coal; eight rooms; system of working, pillar and stall, 30 feet and 18 feet; pitch of seam 10° to 14°. No. 1, furnace ventilation; No. 2, Murphy fan.

Description and length of tramway, plant, &c.—Trestle connecting Nos. 1 and 2 mines, 1,000 feet apart; railway five miles long from town of Fernie to mines. Fernie is situated on the main line of the Crow's Nest Pass Railroad.

THE CROW'S NEST PASS COAL CO'Y, LTD.
W. BLAKEMORE, *General Manager.*

The Minister of Mines is hereby authorised to publish these Returns.

THE CROW'S NEST PASS COAL CO'Y, LTD.
W. BLAKEMORE, *General Manager.*

ACCIDENTS OCCURRING IN VANCOUVER ISLAND COLLIERIES DURING 1898.

CAUSE OF ACCIDENT AND NATURE OF INJURY.	COLLIERY AT WHICH ACCIDENT OCCURRED.															TOTALS FOR YEAR IN ALL VANCOUVER ISLAND COLLIERIES.			
	Nanaimo.			Wellington.			Union.			Extension.			Alexandria.						
	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.
Explosion of Gas	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19			
Fatal	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	2		
Serious	...	7	...	...	1	...	...	3	...	...	3	...	...	...	...	....	....	14	
Slight	...	...	...	...	...	1	...	...	2	...	...	...	...	...	...	....	....	....	3
Fall of Coal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7			
Fatal	1	...	...	...	...	...	2	...	...	...	...	...	...	...	...	....	3		
Serious	...	1	...	...	2	...	...	...	...	...	...	...	...	1	...	....	....	4	
Slight	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	0
Fall of Rock	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9			
Fatal	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	....	1		
Serious	...	3	...	...	1	...	...	1	...	...	...	...	...	...	...	....	....	5	
Slight	...	...	...	...	...	...	...	...	1	...	...	2	...	...	...	....	....	....	3
From Mine Cars	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13			
Fatal	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	....	1		
Serious	...	3	...	...	6	...	...	...	...	...	...	...	...	...	...	....	....	9	
Slight	...	...	...	...	...	2	...	...	1	...	...	...	...	...	...	....	....	....	3
From Mine Mules	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2			
Fatal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	0		
Serious	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	....	....	2	
Slight	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	0
Powder in Mine	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4			
Fatal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	0		
Serious	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	....	....	3	
Slight	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	....	....	....	1
Timber—at Pit-head	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2			
Fatal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	0		
Serious	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	....	....	2	
Slight	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	....	....	0
	3	15	...	...	15	3	4	5	5	...	3	2	...	1	...	56	7	39	10

STATEMENT IN DETAIL OF SUCH ACCIDENTS.

No.	Colliery.	Date.	Name.	Occupation.	Remarks.
		1898.			
1	Union	Jan. 12th .	Okading (Jap.).	Labourer	Fatally injured by loaded mine cars while crossing No. 4 Slope.
2	"	" 14th .	D. Walker	Overman.	Slightly injured by a small charge of giant powder going off unexpectedly in No. 4 Slope.
3	Wellington	" 15th .	John J. Thomas	Fireman	Slightly burned by explosion of gas in No. 5 Shaft.
4	Union	" 17th .	Angelo Lorenzo	Miner	Slightly burned by explosion of gas in their stalls in No. 4 Slope.
5	"	" 17th .	Son of "	"	
6	"	" 17th .	Chun Ah Moy.	Miner's Helper	Fatally injured by fall of top coal while working in stall in No. 4 Slope.
7	Extension Mine	" 26th .	A Chinaman ..	.....	Entered the working place immediately after a shot had been fired and was burned by explosion of gas that had accumulated there.
8	Alexandria	" 31st..	J. W. Dykes.	Miner	Leg broken by fall of coal in stall.
9	Wellington	Feb. 2nd.	James Kerr ...	Runner	Slightly injured by a mine car in No. 4 Shaft.
10	"	" 9th .	Joseph Radalet	Mule Driver...	Foot slightly injured while working in No. 5 Shaft, by a box.
11	Extension Mine	Mch. 9th .	A Chinaman ..	Labourer	Slightly injured by a piece of rock at face of rock tunnel driving into mine.
12	Wellington	" 10th .	Wm. Morgan ..	Mule Driver...	Leg broken by car in No. 1 Shaft.
13	"	" 26th .	Jas. Johnston .	" ...	Leg broken by car in No. 5 Shaft.
14	Extension Mine	" 31st..	Robert Ross...	Miner	Burned by explosion of gas in No. 2 Slope.
15	"	" 31st..	A Chinaman ..	Helper.....	Burned by same explosion.
16	Wellington	April 7th .	John Sedlock..	Mule Driver...	Two ribs broken while at work in No. 4 Shaft (no cause assigned in colliery report).
17	Nanaimo	" 7th .	John Bradshaw	Miner	Leg broken by fall of rock from roof of stall in No. 1 Shaft.
18	"	" 22nd.	Ah Moon	Outsider.....	Hurt by fall of timber at pit head, Protection Island Shaft.
19	Union	" 30th .	Joseph Livesly.	Miner	Arm broken by fall of rock while putting up a prop in No. 5 Shaft.
20	"	" 30th .	Ah Wong	Runner.....	Knee sprained while in the act of pushing an empty car up to a stall when a full car was coming down, in No. 5 Shaft.
21	Nanaimo	May 13th .	J. Westfeldt ..	"	Arm dislocated at shoulder by fall of rock while at work in No. 1 Shaft.
22	Union	" 25th .	Solar	Miner	Burned by explosion of gas. The colliery report states that "he crossed a fence which had a notice posted upon it, stating that gas was there," in No. 4 Slope.
23	"	" 25th .	Sing.....	Helper	
24	Extension Mine	" 26th .	Wm. Cosier ...	Miner	Slightly hurt by shale falling on his back while taking it down in rock tunnel.
25	Nanaimo	June 2nd.	Oscar Matson..	"	Leg broken by fall of coal from face of stall in No. 1 Shaft.
26	Union	" 8th .	Da Hee.....	Miner's Helper.	Fatally injured by rock in stall; while the miner was preparing for a post the rock came away.
27	Nanaimo	" 27th .	Wm. York	Mule Driver...	Leg broken, jammed between a car and a prop while driving in No. 5 Shaft.
28	"	" 30th .	J. Greenwall ..	" ...	Leg broken by a loaded trip of cars running down an incline while he was driving a mule in No. 1 Shaft.
29	Wellington	July 5th .	Robert Kelly..	Miner	Burned by accidental ignition of powder which they were carrying to their work in No. 5 Shaft.
30	"	" 5th .	Alex. Hogan ..	"	
31	"	" 5th .	Thos. Anderson	"	
32	Union	" 11th .	A Jap	Mule Driver...	Kicked by a mule and seriously injured about the head, lost one eye, in No. 5 Shaft.

STATEMENT IN DETAIL OF SUCH ACCIDENTS.—*Concluded.*

No.	Colliery.	Date.	Name.	Occupation.	Remarks.
		1898.			
33	Wellington	Aug. 3rd.	Mike Dolan ...	Miner	Leg broken by a mule that fell upon him in No. 5 Shaft.
34	"	" 4th.	Moses Nelson..	"	Leg broken by a fall of coal from the side, while working in his stall in No. 5 Shaft.
35	Nanaimo	" 5th.	D. Boggiano...	"	Leg broken by fall of rock in his stall in No. 1 Shaft.
36	Wellington ...	" 5th.	W. Cartwright.	Runner.....	Body crushed by a car which got loose from the trip in No. 1 Shaft.
37	Union	" 9th.	Alf. Whittle ..	"	Fatally injured by a fall of coal and roof in his stall, while in the act of cutting off the end of a stringer to put in place prepared. The coal fell on him in No. 4 Slope.
38	Wellington ...	" 19th.	John Davidson.	Fireman	Back injured by fall of roof rock in No. 1 Shaft.
39	Nanaimo	" 27th.	Jas. Dunbar...	Mule Driver...	Two ribs broken and severely injured on the body by falling off a car whilst in motion, in Protection Island Shaft.
40	Wellington ...	Sept. 2nd.	Isaac Portery..	" ...	Arm broken and badly bruised by falling in front of a trip of loaded mine cars in No. 5 Shaft.
41	" ...	" 26th.	A. O. Booth ..	Miner	Burned by an explosion of gas in No. 3 Shaft.
42	Nanaimo	Oct. 8th..	Angus McLeod	"	Fatally injured by a fall of coal while in the act of mining in his stall, Protection Island Shaft.
43	Wellington ...	Nov. 3rd..	Hum Sing.....	Outsider.....	Arm broken by a fall when carrying a prop on pit head in No. 5 Shaft.
44	Union	" 7th..	John Kesley ..	Fireman	Burned by an explosion of gas in No. 9 stall, No. 12 level, while carrying his naked light, No. 4 Slope.
45	Nanaimo	" 12th.	Wm. McGregor	Manager	Fatally injured by an explosion of gas in Lamb's incline in No. 1 Shaft.
46	"	" " .	Geo. Lee.....	Fireman	Fatally injured in the above mentioned explosion.
47	"	" "	Jas. Price.....	"	Burned in same explosion.
48	"	" "	Ed. Edmonds..	"	" "
49	"	" "	Peter High....	Timberman ..	" "
50	"	" "	Fred'k Hurst..	" ...	" "
51	"	" "	HarryShepherd	Miner	" "
52	"	" "	Don'd Ferguson	"	" "
53	"	" "	Morgan Harris.	Fireman	Thrown against side of airway by an explosion which followed the above.
54	Wellington ...	Dec. 12th.	Harry Blair ...	Rope Rider ...	Arm broken and body crushed by a runaway trip of cars caused by the breaking of rope on the incline in No. 5 Shaft.
55	" ...	" 14th.	John Haigh ...	Miner	Leg broken by fall of coal when mining in his stall in No. 5 Pit.
56	Union	" 15th.	Wm. Alsopp ..	"	Slightly injured by a fall of fire clay in No. 4 Slope.

SUMMARY—SHEWING ACCIDENTS OCCURRING IN V. I. COLLIERIES IN TEN YEARS—1889 TO 1898.

For the year	1889.				1890.				1891.				1892.				1893.				1894.				1895.				1896.				1897.				1898.				Total for 10 years.			
Output of coal—tons	579,830.				678,140.				1,029,097.				826,335.				978,294.				1,012,953.				939,654.				894,882.				892,295.				1,126,531.				8,958,011.			
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.
Gas explosions	..	1	1	2	..	6	2	8	2	2	13	17	..	..	1	1	..	1	6	7	..	..	9	9	.	5	7	12	1	3	8	12	..	2	2	4	2	14	3	19	5	34	52	91
Falls of coal	..	6	3	9	2	8	1	11	2	10	4	16	1	6	3	10	5	7	1	13	2	7	..	9	1	4	..	5	3	4	1	8	1	3	2	6	3	4	.	7	20	59	15	94
" rock	2	4	2	8	1	2	..	3	9	18	1	28	2	6	2	10	6	6	1	13	..	8	..	8	5	13	..	18	2	8	.	10	2	7	2	11	1	5	3	9	30	77	11	118
Mine cars	..	12	1	13	1	4	1	6	..	8	2	10	2	4	..	6	1	10	.	11	..	4	1	5	2	9	..	11	1	8	..	9	3	4	..	7	1	9	3	13	11	72	8	91
" mules	..	..	..	..	..	..	..	..	..	1	1	2	..	3	..	3	..	1	..	1	..	..	..	..	..	..	..	..	..	2	..	2	..	1	..	1	..	2	..	2	..	10	1	11
" timber	..	..	..	..	..	..	..	..	..	1	..	1	..	2	..	2	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	2	..	2	..	..	..	..	1	5	0	6
Hoisting, ropes, &c	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	2	..	2	..	3	..	3	..	1	..	1	..	2	..	2	..	..	..	..	2	8	0	10
Powder, &c., explosions	..	..	..	..	..	..	..	..	..	2	1	3	..	7	..	7	..	3	..	3	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	3	1	4	..	16	2	18
Shot	..	2	1	3	.	..	..	..	1	4	1	6	..	3	2	5	1	..	..	1	1	1	1	3	2	3	..	5	..	2	..	2	..	..	..	..	..	..	..	..	5	15	5	25
On surface—miscellaneous	1	..	..	1	..	..	..	..	1	2	..	3	1	1	..	2	2	1	..	3	..	..	..	..	..	2	..	2	2	..	..	2	..	..	..	..	..	2	.	2	7	8	..	15
	4	25	8	37	4	20	4	28	15	48	23	86	6	32	8	46	16	29	8	53	4	22	11	37	10	39	7	56	9	29	9	47	6	21	6	33	7	39	10	56	81	304	94	479

LIST OF CROWN-GRANTED MINERAL CLAIMS.

NOTE—A list of the Mineral Claims Crown-granted up to December 31st, 1896, will be found in the Report of this Department for 1896, while the list of those issued in 1897 will be found in the Report for that year.

CROWN GRANTS ISSUED IN 1898.

CARIBOO.

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Gold Finch	Barkerville	The Oriole Syndicate, Ld	42.42	Lot 318, G. 1	28th April, 1898

EAST KOOTENAY.

Albert	Fort Steele	Pyramid Koot. M. Co., Ld. (For.)	30.45	Lot 609, G. 1	16th June, 1898
Brooks	Fort Steele	Pyramid Kootenay M. Co., Ld	42.20	" 2126 "	16th " "
Bailey	"	" " "	41.73	" 2129 "	16th " "
Buckskin	Golden	L. B. Keyser and J. C. H. Joliffe.	19.69	" 1115 "	9th Sept., "
Comstock	Fort Steele	Pyramid Koot. M. Co., Ld. (For.)	46.93	" 610 "	16th June, "
Dorval	Fort Steele	Donald D. Mann	29.45	" 2996 "	24th Mar., "
Elkhorn	Fort Steele	A. D. Mitchell	48.60	" 2991 "	24th " "
Ellen D	Golden	L. B. Keyser and F. C. H. Joliffe.	14.21	" 1114 "	9th Sept., "
Favourite	Golden	*Manuel Dainard et al*	49.90	" 1115 "	28th July, "
Good Luck	Fort Steele	Percy C. Andrews	23.99	" 2994 "	24th Mar., "
Granite	"	Pyramid Koot. M. Co., Ld. (For.)	51.65	" 608 "	16th June, "
Harpham	Fort Steele	Pyramid Koot. M. Co., Ld. (For.)	27.61	" 2342 "	16th June, "
Hamlet	"	Sullivan Group M. Co	51.65	" 1386 "	12th Oct., "
Hope	"	" "	41.40	" 1387 "	12th " "
Kerin	Fort Steele	Pyramid Koot. M. Co., Ld. (For).	41.23	" 2341 "	16th June, "
Lake Shore	Fort Steele	Chas. A. Farrell *et al*	51.53	" 756 "	23rd Mar., "
Maverick	Fort Steele	Neil McL. Curran	25.39	" 2995 "	24th " "
Milton	"	Pyramid Koot. M. Co., Ld. (For.)	50.22	" 2127 "	16th June, "
Mountain Chief	"	" "	38.25	" 607 "	16th " "
Pearl	Fort Steele	A. D. Mitchell	50.04	" 3035 "	16th April, "
Pyramid	"	Pyramid Koot. M. Co., Ld. (For.)	37.68	" 2131 "	16th June, "
Stille	Fort Steele	Pyramid Koot. M. Co., Ld. (For.)	42.75	" 2128 "	16th " "
Shylock	"	Sullivan Group M. Co	51.65	" 1385 "	12th Oct., "
Toronto Fract.	Golden	John McRae	20.56	" 1111 "	15th Nov., "
Wolmer	Fort Steele	Pyramid Koot. M. Co., Ld. (For.)	38.73	" 2125 "	16th June, "
Walsingham	"	" "	37.68	" 2130 "	16th " "
Warren	"	" "	50.60	" 606 "	16th " "

WEST KOOTENAY.

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Aurora No. 2	Slocan	The Ruth Mines, Ld	42.38	Lot 2030, G. 1	25th Jan., 1898
Aurora Fraction	"	"	10.2	" 2036 "	25th " "
Alwent	Trail	Almota G. M. Co., Ld. Ly	2.5	" 1837 "	25th Feb., "
Alpha	Nelson	Can. Pacific Exploration, Ld	30.95	" 2388 "	7th Mar., "
American Girl	Slocan	The Queen Bess Prop'ty Co., Ld.	44.40	" 2295 "	3rd " "
Annie No. 2	Trail	Chas. Tetley	39.12	" 1747 "	9th " "
Ajax Fraction	Slocan	Wm. Braden	14.20	" 1727 "	26th April, "
Amelia	Trail	Chas. E. Hope & Jas. S. Johnston	47.49	" 2531 "	22nd " "
Abe Lincoln	Trail Creek	Hugh P. Shaw	51.65	" 1948 "	14th June, "
Alabama	"	Can. Gold Fields Syndicate, Ld.	30.37	" 1343 "	17th " "
Amazon	"	Kamloops M. & Dev. Co., Ld	45.40	" 1612 "	8th July, "
Almeda	Ainsworth	Geo. Alexander and H. D. Wood.	36.50	" 628 "	29th " "
Athabasca	Nelson	Athabasca G. M. Co., Ld. Ly	9.10	" 1569 "	29th " "
Algoma	"	" "	45.76	" 1560 "	29th " "
Alberta	"	" "	43.74	" 1561 "	29th " "
April Fool	Trail Creek	G. D. Johnston *et al*	29.3	" 1212 "	6th Aug., "
Almaden	"	Mary E. Rammelmeyer & Frank	15.48	" 2678 "	9th " "
Apex	Slocan	Geo. W. Hughes [J. Walker	44.97	" 1911 "	18th Oct., "
Arena Fraction	"	Chas. E. Hope	13.62	" 2539 "	13th " "
Australia	Trail	Chester Glass	34.82	" 2682 "	14th Dec., "
Argenteuil	Nelson	British America Corporat'n, Ld.	29.55	" 3326 "	27th " "
Atwood	Trail	B. C. Gold Discovery Co. (For.)	26.88	" 1231 "	13th Jan., "
Annie Fraction	"	Kootenay-London M. Co. (For.)	2.89	" 1833 "	16th Feb., "
Bank of England	Slocan	Richard Marpole	51.25	" 2214 "	26th Jan., "
Bolus	Nelson	Leopold Ernest Keller	43	" 2123 "	27th " "
Bonita	Ainsworth	Julia A. Wright and F. L. Fitch.	46.20	" 1683 "	2nd Mar., "
Bywater	Nelson	Philip White	44.48	" 2391 "	23rd " "
Blizzard	Slocan	Edwin H. Tomlinson and Wilbur A. Hendryx	2.04	" 1849 "	18th April, "
Big Bend Belle	Revelstoke	London and B. C. Alliance Syn.	50.86	" 2499 "	6th May, "
Bear Fraction	"	" "	17.74	" 2500 "	6th " "
Boundary No. 1	Trail Creek	Geo. Willard & Jno. H. McDonald	51.65	" 1944 "	26th April, "
Baby Ruth	Slocan	Eleanor J. Kendall and A. R. Fingland	51.65	" 2229 "	20th " "
Butterfly	Trail Creek	B. C. Rossland and Slocan Syn, Ld	33.12	" 1675 "	12th May, "
Black Knat Frac	Slocan	Dom. Mines, Ld	8.44	" 2490 "	18th June, "
Boadicea	Ainsworth	Carbonate Silver Mining Co	51.65	" 1961 "	18th " "
Bunker Hill	Trail Creek	Jno. R. Reavis *et al*	43.61	" 2939 "	18th " "
Beaver	Slocan City	Lucky George Mining Co	40.47	" 2407 "	28th July, "
Bell	Trail Creek	Chas. G. Major	9.5	" 1866 "	18th June, "
Black Hawk No. 2	"	Robert Miller	51.65	" 2941 "	11th July, "
Black Canon	"	Kamloops Mining and Development Co., Limited Liability	49.21	" 1611 "	8th " "
Black Hills	Ainsworth	Black Hills Mining Co. of B. C., Limited Liability	47.18	" 1892 "	8th " "
Blue Bird No. 3	Trail Creek	J. S. Colton Fox and C. Sweeny.	51.65	" 1454 "	8th Aug., "
Big Chief	"	" "	39.88	" 1456 "	8th " "
Badger State	Slocan	George Alexander	33.75	" 2033 "	8th " "
Baltic Fraction	Trail Creek	Brit. America Corporation, Ld	.82	" 2394 "	11th " "
Blue Peter	Slocan	The Comstock Mines, B. C., Ld.	6.4	" 1816 "	11th " "
Butte	Trail Creek	Virginia Gold M. Co. (For.)	1.78	" 2395 "	12th " "
Black Diamond	Trail	J. S. Colton Fox and C. Sweeny.	30.25	" 1444 "	24th " "
Bullion	Nelson	Alf Gold Mining Co., Limited	47 19	" 2190 "	30th " "
Blackberry	Trail Creek	Henry B. Smith	39.89	" 1637 "	11th Oct., "
Belmont	Trail	Adelia Stussi	26.3	" 1491 "	23rd Dec., "
Banner Hill	"	B. C. Rossland & Slocan Syn., Ld	8.28	" 3286 "	15th " "
Blue Chip	"	E. S. Topping	48.52	" 1698 "	16th " "
Blackcock	Nelson	Alex. Audet and A. Julian	40.10	" 2922 "	28th " "
Belle	"	J. A. Coryell, Alex. Goyette, and J. A. Quinlan	42	" 2461 "	28th Jan., "
Black Pearl	Trail	John G. Dickson	26	" 1834 "	16th Feb., "
Bolander	Slocan	Jas. F. Leahy	51.65	" 2143 "	25th Mar., "
Charleston	Ainsworth	The Charleston Mining Co., Ld	37.44	" 2091 "	28th Feb., "
Comstock	Slocan	Comstock Mines, B. C., Ld	46.46	" 1814 "	28th July, "
Concord	"	The Queen Bess Prop'ty Co., Ld.	40.80	" 2293 "	3rd Mar., "

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
C. O. D.	Revelstoke	London and B. C. Alliance Syn.	50.41	Lot 2653, G. 1	6th May, 1898
Confederation	Trout Lake	Lillooet, Fraser River and Cariboo Gold Fields, Ld.	32.81	" 2868 "	18th April, "
Copper Bell	Trail Creek	Waneta & Trail C. G. M. Co., Ld	51.45	" 2185 "	26th " "
Copper Glance	"	" "	41.40	" 2183 "	" " "
Copper	"	" "	40.61	" 2184 "	" " "
Contact	"	Jonathan W. Cruthers	50.4	" 1865 "	" " "
Celia	"	C. E. Hope and Jas. S. Johnston.	15.71	" 1670 "	22nd " "
Copper Crown	Illecillewaet.	Fish River Copper & Silver M. Co	51.65	" 2783 "	28th Nov., "
Copper Hill	"	" "	51.65	" 2780 "	" " "
Chatham	Slocan	John McQuillan	49.92	" 2493 "	18th June, "
Comiskey	"	Galena Mines, Ld. (For)	32.25	" 1391 "	29th July, "
Crouch Hall	Nelson	Alf Gold Mining Co., Ld. Lty.	18.40	" 2189 "	30th Aug., "
Convention Frac.	Slocan	Albert Behne and A. E. Fauqier.	44.53	" 2288 "	12th Dec., "
Crescent	"	Chas. E. Hope	18.17	" 2540 "	13th Oct., "
Copper Fraction	Illecillewaet.	Fish River Copper & Silver M. Co.	33.75	" 2781 "	16th Nov., "
Cliff	Slocan	Evelyn M. Sandilands	18.85	" 2606 "	20th Dec., "
Cliff Fraction	"	" "	4.43	" 2608 "	" " "
Conductor	"	Wm. H. Elson	29.61	" 1251 "	" " "
Cazabazua Fraction	"	Kootenay (B. C.) Exploring and Mining Co., Ld	5.37	" 1809 "	8th Jan., "
Colorado	Ainsworth	Henry Hulbert	38.	" 1476 "	11th " "
Comet No. 2	Trail	Kootenay London Mining Co.	36.19	" 1932 "	14th " "
Deadwood	Nelson	Wm. Moore	37.87	" 2232 "	11th Feb., "
Daylight	Trail	Edwd. Baillie	33.72	" 1963 "	1st March, "
Defender	Ainsworth	Geo. Alexander *et al*	31.41	" 2827 "	20th April, "
Deerslayer	Slocan	Lucy A. Shaw	51.65	" 2491 "	13th June, "
Death's Head	Ainsworth	Columbia M. Co., Vic., B. C., Ld.	31.6	" 2178 "	14th " "
Dunedin	Slocan	Thos. Brown and Jas. Marshall	17.10	" 1853 "	29th July, "
Derby	"	A. H. Buchanan	14.21	" 1855 "	12th " "
Durham Fraction	Trail	Thos. Dunn	13.66	" 1126 "	24th Aug., "
Duphunnie	"	F. McI. McIvor Campbell	8.23	" 2116 "	30th " "
Dew Drop Fraction	"	Thos. Lapslie	7.98	" 1647 "	29th " "
Duluth	"	F. A. Heinze	24.36	" 2974 "	27th Dec., "
Eagle No. 2	Slocan	Peter McLaren and Wm. A. Allen	51.65	" 2328 "	26th Feb., "
Epoch	Nelson	Franklin Riffle	41.5	" 2459 "	24th " "
Emily	"	Herbert J. Wilson	51.65	" 2020 "	2nd March, "
E. V. Debbs	Trail	Wm. Murphy	23.95	" 2673 "	4th " "
Emma	Nelson	Price McDonald *et al*	11.50	" 2306 "	19th April, "
Evening Star	Slocan	Jas. W. Ryan and Chas. Neuham	51.65	" 1584 "	21st " "
Enterprise	Trail	Chas. E. Hope & Jas. S. Johnston	51.08	" 1668 "	22nd " "
Excelsior	"	" "	35.52	" 1669 "	" " "
Edinburgh	Illecillewaet.	Fish R. Copper & Silver M. Co., Ld	20.61	" 2867 "	1st Dec., "
Elizabeth	"	" "	20.66	" 2785 "	" " "
East Lanark Frac.	Revelstoke	Lillooet, F. R. & Cariboo G. F., Ld.	1.94	" 2777 "	17th Dec., "
Evening	Trail Creek	Eureka Consol. Mg. Co. (For)	28.91	" 947 "	16th June, "
Earl	Ainsworth	D. F. Strobeck *et al*	46.38	" 1436 "	28th June, "
Emerson	"	DeRoy S. Carriel	40.04	" 1437 "	" " "
Elpro	Nelson	Pine Ridge Gold M. Co., Ld. Ly.	51.65	" 2528 "	" " "
Ella	Trail Creek	Kamloops Min. & Devel. Co., Ld.	46.04	" 1613 "	8th July, "
Elkhorn	Slocan	Jno. W. Stewart	43.65	" 859 "	4th Aug., "
Esmeralda Fraction	Trail Creek	Edgar Gold Min. & Smelting Co.	15.45	" 2980 "	11th " "
Excelsior Fraction.	Trout Lake	Sunshine, Limited	3.42	" 2625 "	19th " "
Eastern King	"	Angus McNish	51.65	" 1820 "	" " "
Emu	Trail	F. McI. McIvor Campbell	50.53	" 2115 "	30th " "
Emu Fraction	"	" "	15.	" 2121 "	" " "
Emily Edith	Slocan	Chas. E. Hope	36.55	" 2532 "	13th Oct., "
East Columbia Mountain Frac.	Trail Creek	B. C. (Rossland & Slocan) Syn., Ld.	1.92	" 3287 "	15th Dec., "
Election	Nelson	Nelson Poorman Gold M. Co., Ld.	40.91	" 2559 "	29th " "
Elvira	Slocan	G. D. McMartin & T. P. Durham	51.65	" 3155 "	12th " "
Fourth of July	Ainsworth	Columbia M. Co., Vic., B. C., Ld.	33.63	" 2052 "	3rd March, "
Fairford	Trail	H. L. A. Keller *et al*	15.72	" 1223 "	5th " "

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
First Extension	Slocan	The Queen Bess Prop. Co., Ld.	31.20	Lot 2294, G. 1	3rd M'ch., 1898
Four Hundred	Trail Creek	Chas. Tetley	51.65	" 1838 "	9th " "
Fanny	Nelson	Julius Peterson	48.30	" 1986 "	28th April, "
Fidelity	Slocan	Frank L. Byron *et al*	33.04	" 2411 "	9th June, "
Fred	Trail Creek	Arthur Going, Jas. C. Rodgers, and Ernest Kennedy	10.00	" 2676 "	7th " "
Free Coinage	"	Thos. B. Garrison *et al*	48.5	" 1945 "	12th Aug., "
Fraction No. 2	Ainsworth	Campbell Sweeny	.80	" 725 "	11th Nov., "
Fandango	Trail Creek	Jno. W. Heisner	51.28	" 3128 "	27th Dec., "
Freddie B	Trail	Mary Ann L. Archer	36.03	" 1780 "	13th Jan., "
Gray Cliff	Trail Creek	Eugene Sayre Topping	39.48	" 2470 "	27th Jan., "
Golden Butterfly Fr	"	Andrew W. Provand	11.29	" 1943 "	26th Feb., "
Great Boulder Frac.	Nelson	Herbert J. Wilson	17.19	" 2022 "	2nd March, "
Good Luck	Ainsworth	Julia A. Wright and F. L. Fitch.	40.68	" 1684 "	" " "
Grand Prize	Trail	Chas. Litchfield	44.39	" 933 "	1st " "
Gold Bar	"	Geo. W. McBride	51.	" 1952 "	4th " "
Gold Hill Frac	Revelstoke	London and B. C. Alliance Syn.	7.63	" 2654 "	6th May, "
Great Western Frac	Trout Lake	Hugh McPherson *et al*	.61	" 1102 "	10th " "
Great Northern	"	" "	24.82	" 1099 "	9th " "
Great Eastern Frac.	"	" "	.05	" 1103 "	10th " "
Galena Bank	Slocan	Eleanor J. Kendall and A. R. Fingland	48.60	" 2230 "	20th April, "
Good Hope	Trail Creek	Good Hope M. & M. Co., Ld. Ly.	23.39	" 1045 "	18th June, "
Gem	Slocan	Ramsdell M. & M. Co. (For)	6.40	" 1858 "	28th " "
Gladiator	Trail Creek	A. B. Railton	51.65	" 2940 "	9th July "
Gold Hunter	"	Can. Gold Fields Syn., Ld	46.73	" 1342 "	5th Aug., "
G. B. Architect Frac	"	Fritz A. Heinze	27.54	" 1707 "	9th " "
Gold Dollar No. 1	"	Richard A. Power	48.44	" 2981 "	10th " "
Green Crown	"	Wm. L. Raph	13.79	" 1232 "	20th Oct., "
Grey Eagle	Slocan	Byron N. White	13.11	" 2137 "	27th Dec, "
Great Eastern	"	Joseph Eaton	28.08	" 2289, A 1	11th Jan., "
Hardscrabble	Nelson	Nelson Poorman Gold M. Co., Ld	20.66	" 102, G. 1	27th Jan., "
Huron	"	Herbert J. Wilson	51.65	" 2019 "	2nd March, "
Halton Chief	Slocan	Edwin S. Graham	23.08	" 2158 "	27th April, "
Hope	Lardeau	B. C. Smelting and Refining Co	51.65	" 1706 "	28th " "
Hillside	Trout Lake	Hugh McPherson *et al*	39.17	" 1098 "	9th May, "
Hill Top Fraction	Slocan	Geo. Sleeman & Jas. C. Kelcher	.83	" 2849 "	20th April, "
Howard	Ainsworth	Geo. Alexander *et al*	22.63	" 2828 "	" " "
Humming Bird	"	Jno. McQuillan	51.48	" 2811 "	18th June, "
Hamburg	"	Macleod Gold & Silver M. Co., Ld	22.18	" 2829 "	13th " "
Humbolt	Slocan	Wm. H. Hellyer	17.55	" 2228 "	18th " "
Hinkeley	"	Hinckley & Black Colt M. Co.	45.09	" 1720 "	22nd Aug., "
Hustler	"	Silver Hustler Mining Co	13.	" 1888 "	20th " "
Hotstuph	Trail Creek	F. McI. McIvor Campbell.	8.13	" 2120 "	30th " "
Hauser Fraction	Ainsworth	C. R. Tryon	.84	" 2009 "	15th Nov., "
Hauser	"	Thos. A. Skilliter *et al*	48.43	" 2008 "	9th " "
Hendryx No. 3	"	Campbell Sweeny	19.	" 723 "	" " "
Hawkeye	Nelson	British America Corporation, Ld.	21.20	" 3327 "	27th Dec., "
Hazel	"	Howard Williams	38.90	" 2639 "	" " "
J. C	Ainsworth	R. C. Campbell Johnston	17.05	" 2283 "	29th Jan., "
Ida May	Trail	Red Mountain Ida May Gold Mining Co., Ld. Ly	22.30	" 1940 "	3rd March, "
Inverness	Slocan	John Brown *et al*	36.	" 2291 "	23rd " "
Innisfail	Slocan City	Lucky George Mining Co	40.35	" 2405 "	28th July, "
Isabel Fraction	Slocan	The Comstock Mines, B. C	15.48	" 1817 "	11th Aug., "
Imperial	Nelson	Geo. F. Whiteman	37.43	" 3025 "	12th Nov., "
Iron Colt Fraction	Trail	Thos. B. Garrison	.40	" 1140 "	13th Dec., "
Jack	Slocan City	Wm. Caldwell	57.45	" 1801 "	10th March, "
Jennie	Ainsworth	Can. Gold Fields Syn., Ld	35.83	" 2638 "	28th June, "
Jeff Davis	Trail Creek	Thos. B. Garrison *et al*	51.65	" 1946 "	11th Aug., "
J. I. C	Slocan	Chas. E. Hope	38.22	" 2533 "	13th Oct., "
Jenny Jones	"	"	22.30	" 2534 "	" " "

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
J. M. B.	Nelson	Hall Mines, Ld	8.60	Lot 902, G. 1	10th Nov., 1898
Jumbo No. 3	Trail Creek	New York Kootenay Mining Co.	2.81	" 3218 "	15th " "
Jumbo No. 3 Frac.	"	" "	2.40	" 3030 "	15th " "
Keystone	Slocan	J. D. Ryan and Neuham	36.15	" 1585 "	27th April, "
Kesef	Revelstoke	London & B. C. Alliance Syn., Ld.	48.89	" 2669 "	6th May, "
Katie D	Slocan	Geo. Sleeman and J. C. Ketcher.	24.16	" 2848 "	20th April, "
King Solomon	Ainsworth	King Solomon Consol. Min. Co.	20.39	" 2332 "	29th " "
Kesef	Slocan	Lucy A. Shaw	19.60	" 2492 "	13th June, "
Keystone	Ainsworth	James A. Mitchell	28	" 2179 "	28th " "
Kalamish	Nelson	Pine Ridge G. M. & M. Co., Ld.	51.65	" 2526 "	28th " "
Kaiser	Slocan	Wm. Lardner	50	" 1254 "	4th Aug., "
Key Fraction	Ainsworth	Vancouver Meteor Min. Co., Ld.	2.62	" 2506 "	10th " "
Kentucky Girl	Slocan	The Comstock Mines, B. C., Ld.	37.74	" 1818 "	11th " "
Keno	"	W. Perry Russell	41.10	" 530 "	30th " "
Kurrajong	Trail Creek	F. McI. McIvor Campbell	26.63	" 2117 "	30th " "
Kinkora	Slocan	Mary E. Bragdon *et al*	7.95	" 2104 "	21st Dec., "
Lizzie B	Nelson	Canadian Pacific Explo. Co., Ld.	35.70	" 2386 "	24th Feb., "
Lauder	Trail	W. Kirkpatrick *et al*	32.86	" 1962 "	26th " "
Lulu	"	Dollarocracy Mg. & Sm. Co., Ld.	33.29	" 2473 "	28th " "
Last Chance	Nelson	Herbert J. Wilson	51.32	" 2021 "	2nd Mar., "
Lake View No. 8	Slocan City	Wm. Caldwell	51.65	" 1802 "	10th " "
Little Widow Frac.	Slocan	Edwd. H. Tomlinson and Wilbur A. Hendryx	11.15	" 1850 "	18th April, "
Lake Fraction	Revelstoke	London and B. C. Alliance Syn.	25.60	" 2662 "	6th May, "
Lucy	Ainsworth	E. R. Wingate	20.65	" 2329 "	29th April, "
Last Chance	"	Thos. McGovern	20.66	" 2233 "	27th " "
Lillian No. 4	Slocan	Slocan Reciprocity Co. (For.)	35.30	" 1724 "	22nd " "
Lincoln No. 1	Trail Creek	B. C. (Rossland and Slocan) Syn	34.27	" 1931 "	12th May, "
Linnet Fraction	Ainsworth	Jno. McMillan	2.16	" 2813 "	18th June, "
Little Joe	Arrow Lake	Columbia & Cariboo G. M. Co., Ld.	35.05	" 2728 "	10th " "
Lady of the Lake	Ainsworth	McLeod Gold and Silver Min. Co.	12.02	" 2829 "	13th " "
Little Mamie	"	McLeod Gold and Silver Min. Co.	3.05	" 2830 "	13th " "
Lady Jane	Slocan	Jas. M. Dunn & A. H. Buchanan	20.66	" 1305 "	16th " "
Lucky George	Slocan City	Lucky George Mining Co.	39.33	" 2406 "	28th July, "
Laurence Fraction	Nelson	London & B. C. Gold Fields, Ld. (For.)	7.02	" 2303 "	18th " "
Lallah Rook	Slocan	Ed. Mahon	10.94	" 1856 "	11th " "
Lookout	Trail	Lookout Min. and Mill. Co. (For.)	4.13	" 643 "	17th Nov., "
Lorna Doone	Slocan	Frank Culver	51.10	" 1401 "	19th Dec., "
Little Jim	Trail	Little Jim G. M. & M. Co. (For.)	7.36	" 2685 "	14th " "
Lone Jack	Slocan	Edward H. Tomlinson	14.02	" 2633 "	27th " "
Mexico	Ainsworth	Kaslo Montezuma M. & M. Co. (F.)	20.54	" 2042 "	24th Feb., "
Montezuma	"	" "	20.03	" 2041 "	24th " "
Muldoon	Nelson	M. C. Monaghan *et al.*	20.40	" 976 "	7th Mar., "
Midnight Fraction	Slocan	Adams B. C. Co., Ld.	26	" 2292 "	23rd " "
Mountain Goat No. 2	Ainsworth	Alex. T. Garland *et al*	38.37	" 629 "	10th " "
Mountain	Trout Lake	Sunshine, Limited	51.65	" 2626 "	29th April, "
Marion	Slocan	Geo. Alexander *et al.*	28.91	" 2287 "	27th " "
Michigamie	Trail Creek	B. C. Rossland & Slocan Syn., Ld	13.21	" 1294 "	12th May, "
Molly Fraction	Arrow Lake	Columbia and Cariboo G. M. Co.	5.96	" 2729 "	10th June, "
Molly	"	" "	51.65	" 2727 "	10th " "
Mormon Girl	Trail Creek	Jno. R. Reavis *et al*	43.61	" 1949 "	18th " "
Mary D	"	Jno. R. Stussi	38.82	" 1514 "	18th " "
Mispickel	"	Adelia Stussi *et al*	34.27	" 1761 "	18th " "
Moonshine	Ainsworth	Victoria Min. & Devel. Co., Ld.	33	" 1881 "	28th " "
M. P. Fraction	Nelson	Pine Ridge Gold Mining Co., Ld.	17.45	" 2529 "	28th " "
Modena	Trail Creek	Edgar Gold Mining Co.	13.21	" 1694 "	18th " "
Manitoba	Nelson	Athabasca Gold Mining Co., Ld.	38.82	" 1572 "	29th " "
Mammoth	Slocan	Alf. W. McCune	27.48	" 1910 "	8th Aug., "
Morning Star No. 1	Trail Creek	The B. C. Smelting & Refin'g Co.	44.44	" 2976 "	10th " "
Myrtle R	Ainsworth	The Whitewater Mines, Ld. (For)	20.09	" 1418 "	10th " "
Mogul	Trail	Delaware Min. & Mill. Co. (For.)	41.23	" 1789 "	12th Jan., "
Meteor	Ainsworth	Vancouver Meteor Min. Co., Ld.	15.38	" 2501 "	10th Aug., "

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Mountain Fraction.	Trout Lake .	Sunshine, Limited	.36	Lot 3052,G. 1	19th Aug., 1898
Mohawk	Nelson	Alf Gold Min. Co., Ld. Ly	33.92	" 2187 "	30th " "
Mineral Hill	Trail Creek .	Sault St. Marie Gold M. Co., Ld.	10.53	" 3020 "	19th Oct , "
Mugwump	" . .	Mugwump Gold Mining Co., Ld..	15	" 963 "	11th " "
Midas	Nelson	W. J. Goepel, Geo. Alexander, and M. S. Davys	50.29	" 3135 "	11th Nov., "
Mocking Bird	Slocan	Granville Mining Co., Ld. Ly . . .	20.02	" 1265 "	16th " "
Mollie Hughes	"	Mary E. Bragdon *et al*	36.61	" 2106 "	21st Dec., "
Nighthawk Frac . .	Slocan	Geo. Alexander	25 26	" 2032 "	26th Jan., "
Nancy Hanks	Trail	Chas. Tetley	11.96	" 1787 "	9th Mar., "
N. P	"	"	49.79	" 2671 "	9th " "
Napier	Slocan	Vancouver Group Mining Co., Ld	46.56	" 2299 "	23rd " "
Northern Light	Trout Lake .	Hugh McPherson *et al*	43.49	" 1101 "	10th May, "
Northland	" . .	" "	48	" 1100 "	10th " "
Naoma Fraction . . .	Slocan	Dominion Mines, Limited	4.77	" 2519 "	10th June, "
Nako	Nelson	Pine Ridge G. M. & M. Co., Ld..	45.70	" 2527 "	28th " "
Nora Fraction	"	J. R. Robertson	2.89	" 2301 "	18th " "
Nick of Time	Trail	Fredk. P. Gutellius	17.96	" 1173 "	5th Aug., "
Newton Will	Trail Creek .	Sault St. Marie Gold M. Co., Ld.	33.09	" 3022 "	19th Oct., "
New Deadwood	" . .	" "	49.05	" 3019 "	19th " "
Nettie Fraction	Slocan	Vancouver & B. C. Gen. Explor. Co., Ld. (For.)	1.84	" 1249 "	15th Nov., "
Nil Desperandum . .	Ainsworth . .	Wm. R. Angus	37.33	" 2806 "	16th " "
North Columbia Fra	Trail Creek .	B. C. Rossland & Slocan Syn., Ld	32.31	" 3285 "	14th Dec., "
Noonday	Slocan	Byron N. White	50.80	" 2136 "	27th " "
Northern	Trail	Victor Mounier	33.34	" 1783 "	25th Mar., "
Ontario	Ainsworth . .	Wm. Braden	20.55	" 1725 "	7th " "
O. K	Slocan	E. S. Graham and Ad. Hellmers.	42.70	" 2156 "	26th April, "
Ole Bull	Revelstoke . .	London and B. C. Alliance Synd.	51.65	" 2497 "	6th May, "
Ole Bull Fraction . .	" . .	" "	20.33	" 2498 "	6th " "
O. K. Fraction	Trail Creek .	A. Provand	1.23	" 2675 "	26th April, "
Oxford	" . .	J. B. Chantrell *et al*	8.43	" 1935 "	9th June, "
Orphan Boy	Revelstoke . .	C. N. Davidson	51.65	" 2663 "	28th " "
Oriental	Trail Creek .	Montreal and B. C. Prospecting and Promoting Co	37.83	" 1701 "	8th Aug., "
Ocean	Slocan	D. W. Moore and Jas. Waugh . . .	39.32	" 1723 "	20th Dec., "
Ophir No. 1	Trail Creek .	C. O. Wickenden	37.67	" 3120 "	16th " "
Olympia	Trail	Delaware Min. & Mill. Co. (For.)	51.04	" 1788 "	12th Jan., "
Porto Rico	Nelson	Canadian Pacific Exploration, Ld.	51.65	" 2385 "	24th Feb., "
Portland	Trail	Sir Chas. Tupper & C. Ashworth	45.43	" 2523 "	1st Mar., "
Pete	"	Dollarocracy Min. & Sm. Co., Ld.	35.17	" 2472 "	28th Feb., "
Primrose Fraction .	"	Early Bird Gold Mining Co., Ld.	7	" 459 "	1st Mar., "
Princess	Nelson	Albert J. Gerrard	44.22	" 2023 "	24th " "
Pearl	Trail	Edmond Haney *et al*	.82	" 2392 "	4th " "
Pay Rock	Slocan	Ed. S. Graham and Ad. Helmers.	39	" 2157 "	27th April, "
Pelly	"	Vancouver Group Min. Co., Ld..	42.84	" 2298 "	23rd " "
Pilgrim	Trail	Thos. L. Savage *et al*	21.90	" 972 "	23rd " "
Penobsquis	Trail Creek .	Chas. Nelson *et al*	23.36	" 2530 "	18th June, "
Pountney Fraction.	Nelson	J. R. Robertson	10.11	" 2302 "	18th " "
Pink	Trail Creek .	Look-out Mountain Min. Co,, Ld.	31.05	" 2975 "	18th " "
Picton	Nelson	The Picton Develop. Synd., Ld	E ½24.38 / W½16.10	3134 "	31st Aug., "
President	Ainsworth . .	Thos. A. Skilliter *et al*	51.65	" 2006 "	9th Nov., "
President Fraction.	" . .	" "	11.32	" 2007 "	9th " "
Pinto	Slocan	Mary E. Bragdon	51.65	" 2107 "	21st Dec., "
Prior	"	Frank Culver	36.10	" 1402 "	22nd " "
Peerless	Slocan City .	Henry B. Boie	41.78	" 1812 "	14th Jan., "
Ricardo	Slocan	Vancouver Group Min. Co., Ld..	50.90	" 2300 "	23rd Mar., "
Revenue	Ainsworth . .	Geo. Alexander *et al*	35.98	" 2826 "	20th April, "
Reciprocity	Slocan	Slocan Reciprocity Mg. Co. (For.)	18.01	" 1722 "	22nd " "
Robin	Ainsworth .	John Macquillan	46.28	" 2509 "	18th June, "
Ruby Fraction	Nelson	Athabasca Gold Mining Co., Ld..	1.03	" 1573 "	29th Aug., "

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Red Bird	Trail Creek	Jno. S. Colton Fox & C. Sweeny.	49.27	Lot 1455, G. 1	8th Aug., 1898
Romeo	"	Thos. R. Morrow *et al*	51.10	" 1930 "	19th " "
Rutland	"	Sault St. Marie Gold M. Co., Ld.	26.43	" 3021 "	19th Oct., "
Reubenstein	"	Olga T. Merryweather	44.49	" 1120 "	22nd Nov., "
Ruby Trust	Slocan	The Comstock Mines (B. C.), Ld.	47.49	" 1804 "	12th Oct., "
Rawdon	"	Jas. L. Montgomery *et al*	10.	" 855 "	20th Dec., "
Real Idea No. 2	"	Mary E. Bragdon *et al*	51.37	" 2105 "	21st " "
Rosa	Nelson	J. A. Coryell, Alex. Goyette, and J. A. Quinlan	48.13	" 2460 "	28th Jan., "
Royal George	Trail	J. A. Coryell, Alex. Goyette, and J. A. Quinlan	33.29	" 1199 "	14th " "
Suburban Fraction	Slocan	The Ruth Mines, Ld.	10.02	" 2031 "	25th " "
St. Croix	Trail Creek	Ben. Perkins and E. S. Topping.	28.94	" 1703 "	27th " "
Sultan	Nelson	Franklin Riffle	16.09	" 2458 "	24th Feb., "
Sunset No. 3	Trail	Almota Gold Mining Co., Ld.	50.39	" 1835 "	25th " "
Star	Ainsworth	D. F. Strobeck and J. R. Hardie	51.65	" 1438 "	26th " "
Silver Cup	Slocan	Comstock Mines (B. C.), Ld.	50.97	" 1815 "	28th July, "
Silver Chief	"	" "	39.46	" 1813 "	" " "
Skylark	Ainsworth	The Adams (B. C.) Co., Ld.	16.28	" 1685 "	7th March, "
Sound Money	Trail	Chas. Tetley	23.60	" 2672 "	9th " "
Silver Star	Slocan	Vancouver Group Mining Co., Ld	37.58	" 2297 "	23rd " "
Silver Cord	"	E. H. Tomlinson & W. A. Hendryx	7.17	" 1848 "	18th April, "
Silver Cup Fraction	Trout Lake	Sunshine, Limited	3.67	" 2622 "	8th June, "
St. Laurence	Trail Creek	E. J. Noel *et al*	30.97	" 1197 "	28th April, "
Sarah B	Slocan	Geo. Sleeman and J. C. Kelcher	51.	" 2847 "	20th " "
Snowflake	"	E. H. Applewhaite & F. W. Hunt	18.84	" 1847 "	27th " "
Scotia	Illecillewaet	Fish River Copper & Silver M. Co.	20.66	" 2784 "	1st Dec., "
Santa Cruz	Trail Creek	B. C. Rossland & Slocan Syn., Ld	38.58	" 1676 "	12th May, "
St. Thomas	"	J. B. Chantrell *et al*	46.99	" 1933 "	9th June, "
Snow Slide	Nelson	Robt. F. Dodd	51.65	" 2679 "	14th " "
Skylark Fraction	Ainsworth	Jno. MacQuillan	6.29	" 2512 "	18th " "
Sincher	Slocan	Alf. W. McCune *et al*	9.14	" 1303 "	16th " "
Sappiro	"	Ramsdall Min. & Mill. Co. (For.)	18.58	" 1857 "	28th " "
Sunset No. 2	Trail Creek	Canadian Gold Fields Syn., Ld.	36.18	" 954 "	17th " "
Sir Charles	Ainsworth	Geo. Alexander & Hiram D. Wood	51.65	" 627 "	29th " "
Silver Bell	Slocan	Silver Hustler Mining Co	32.20	" 1887 "	20th Aug., "
Sutton	Illecillewaet	Lanark Con. Min. & Sm. Co., Ld.	20.66	" 2601 "	24th " "
Silver Bear	Ainsworth	Silver Bear Min. & Concent'g Co.	46.38	" 1781 "	12th Jan., "
Silverton Boy	Slocan	Chas. E. Hope	36.95	" 2536 "	13th Oct., "
Seneca Fraction	Trail Creek	Abraham B. Irwin	.05	" 2403 "	10th " "
Snow Water	Nelson	W. J. Goepel and A. J. Marks	20.66	" 3137 "	22nd Nov., "
Stemwinder	Trail Creek	Ernest Kennedy	30.44	" 1498 "	23rd Dec., "
Superior No. 3	Trail	Superior Gold Mining Co., Ld.	17.55	" 1623 "	22nd Jan., "
Titanic	Nelson	Franklin Riffle	48.90	" 2455 "	24th Feb., "
Tuesday	Trail	Willis A. Ritchie	32.27	" 1278 "	26th April, "
Triangle	Nelson	Athabasca Gold Mining Co., Ld.	1.65	" 1574 "	29th June, "
Timber	Trail Creek	Wm. J. Harris	12.79	" 2684 "	9th Aug., "
Tennie C	Ainsworth	The Whitewater Mines, Ld	17.02	" 1419 "	10th " "
Two Brothers	"	Thos. A. Skilliter	30.58	" 2005 "	9th Nov., "
Tootsie	Trail Creek	British America Corporation, Ld.	43.	" 3325 "	12th Dec., "
Tryon	Slocan	Mary E. Bragdon	44.69	" 2108 "	21st " "
Treadwell	Trail	Jno. A. Smith and Alex. Gibson.	27.81	" 1194 "	16th " "
Tennessee	Nelson	Hamilton & Rossland G. M. Co.	33.53	" 1317 "	10th March, "
U. B	"	Wm. H. Sherrod	24.50	" 2018 "	4th " "
U. S. No. 2	Trail Creek	John D. Hinkle	41.87	" 1964 "	18th June, "
Velvet Fraction	Trail	Sir Chas. Tupper & C. Ashworth	39.85	" 2521 "	1st March, "
Vancouver Fraction	Slocan	Vancouver Group Mining Co., Ld	.13	" 2900 "	23rd " "
Vancouver	Ainsworth	Vancouver Meteor Min. Co., Ld.	33.03	" 2502 "	10th Aug., "
Vernon	Trail Creek	Ross Thompson	1.03	" 1044 "	13th Dec., "
Vulcan No. 2	Trail	J. D. Farrell and Jno. F. Reddy.	51.65	" 1228 "	5th April, "
Wyoming	Slocan	The Ruth Mines, Limited	37.35	" 754 "	26th Jan., "
War Eagle	Arrow Lake	Geo. Alexander *et al*	32.19	" 2583 "	2nd March, "

WEST KOOTENAY.—*Concluded.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Willcock	Nelson	Phillip White	47.80	Lot 2390, G. 1	23rd Mar., 1898
Wild Swan	Ainsworth	John Macquillan	49.06	" 2512 "	18th June, "
Western Spy	Trail Creek	Little Joe Consol. Gold Min. Co.	8.74	" 1696 "	10th Aug., "
Western King	"	Angus McNish	46.22	" 1822 "	19th " "
Whirroo	"	F. McI. McIvor Campbell	17.73	" 2118 "	30th " "
Woodside	Nelson	Alf Gold Mining Co., Ld. Ly	51.43	" 2188 "	" " "
Waffer	"	Lucky Boy Min. & Dev. Co., Ld.	51.60	" 2468 "	18th Oct., "
Wakefield Fraction	Slocan	W. Kootenay (B. C.) Exploring and Mining Co., Ld.	1.11	" 1810 "	8th Jan., "
W. H. R.	"	Chas. E. Hope	45.30	" 2535 "	13th Oct., "
Willa	"	Willow Gold Min. Co. (For.)	26.86	" 1529 "	16th Nov., "
Wedge Fraction	Ainsworth	Robt. E. Lee Brown	.56	" 2267 "	14th " "
Whoop Up	Trail Creek	British America Corporation, Ld.	51.65	" 3324 "	12th Dec., "
Young Grouse	Nelson	Franklin Riffle	49.08	" 2456 "	24th Feb., "
Young American	"	"	51.65	" 2457 "	" " "
X Ray Fraction	Ainsworth	R. E. Lee Brown	27.40	" 2274 "	28th Dec., "
Zuma	Slocan	The Ruth Mines, Limited	40.49	" 2029 "	24th Jan., "
Zuma Fraction	"	" "	6.42	" 2037 "	25th " "

LILLOOET.

Avoca	Clinton	The B. C. Development Co., Ld.	51.65	Lot 410, G. 1	2nd Dec., 1898
Avon	"	" "	51.65	" 411 "	" " "
Amazon	"	" "	50.33	" 412 "	" " "
Ankobra	"	" "	46.20	" 413 "	" " "
Atrato	"	" "	49.82	" 414 "	" " "
Atarbo	"	" "	49.14	" 415 "	" " "
Arkansas	"	" "	51.65	" 416 "	" " "
Axim	"	" "	51.65	" 417 "	" " "
Alabama Fraction	"	" "	29.40	" 418 "	" " "
Athabasa	"	" "	18.40	" 419 "	" " "
Assiniboine	"	" "	4.05	" 420 "	" " "
Amoor	"	" "	6.15	" 421 "	" " "
Blue Pete	Lillooet	The Golden Eagle Mountain Gold Mining Co., Ld	51.63	" 407 "	2nd Mar., 1898
Berta	"	Ceriso A. Phair	50.59	" 445 "	19th Aug., "
Eagles Nest	"	The Golden Eagle Mountain Gold Mining Co., Ld	34.30	" 407 "	2nd Mar., "
Excelsior	"	Excelsior Gold Mining Co., Ld	41.27	" 387 "	28th Jan., "
Forty Thieves	"	R. B. Skinner and J. Marshall	47.39	" 443 "	19th Aug., "
Mineral Point	"	R. H. Verity and Wm. Wilkinson	42.12	" 390 "	29th Dec., "
Ural	"	R. B. Skinner and J. R. Williams	51.65	" 442 "	19th Aug., "

YALE.

American Eagle	Grand Forks	Jno. Holm and Jno. T. O'Brien	43.33	Lot 722, G. 1	28th Jan., 1898
Atlas	Osoyoos	Jno. R. Mitchell	50.58	" 664 "	28th Feb., "
Anchor	Kettle River	Geo. D. Leyson	51.65	" 1021 "	15th Oct., "
Aetna	"	Chas. E. Galt	24.91	" 978 "	9th Nov., "
August	"	Jno. Stevens *et al*	12.85	" 1050 "	16th " "
Athelstan Fraction	Grand Forks	Jno. Mack	18.85	" 1065 "	22nd Dec., "

YALE.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Bighorn	Osoyoos	Tin Horn Quartz Mining Co., Ld.	51.45	Lot 727, G. 1	28th Jan., 1898
Black Prince	"	W. A. Dier and A. A. Davidson.	44.97	" 937 "	25th Mar., "
Belmont Fraction	"	P. C. Stoess	11.	" 837 "	29th April, "
Boundary Falls	Kettle River	Boundary Falls Mining Co., Ld.	50.11	" 889 "	21st " "
B. C	Grand Forks	Albert Keough	51.65	" 882 "	28th June, "
Big Eddy	Kettle River	Ben. Perkins and H. Reed	39.50	" 1030 "	28th July, "
Brooklyn	"	J. M. Taylor *et al*	20.65	" 796 "	22nd Aug., "
Bonnie Bell	"	Robert Wood	51.18	" 880 "	22nd Oct., "
Blue Jay	Vernon	Arthur H. Craven	51.65	" 738 "	22nd Nov., "
Boneta	Osoyoos	Boneta Gold Mining Co. (For.)	50.17	" 716 "	7th Feb., "
California	"	Fairview Consol. Gold Mines Co., of Fairview, B. C.	51.65	" 547 "	" "
Capital Prize	Kettle River	Jno. Weir *et al*	36.11	" 914 "	3rd March, "
Coin	Grand Forks	Gold Coin Mining Co., Ld. Ly.	51.65	" 956 "	18th June, "
Chicamin	Osoyoos	Adams British Columbia Co., Ld.	51.65	" 799 "	8th " "
Commonwealth	Kettle River	Ben. Perkins and Hugh Reed	51.65	" 1029 "	4th Aug., "
Cimeron	"	Geo. W. Rumberger	48.6	" 980 "	16th Nov., "
Curlew	Grand Forks	Robert Denzler	7 63	" 893 "	27th Dec., "
C. O. D	Kettle River	Wm. L. Hogg	49.26	" 928 "	" "
Columbia	Osoyoos	Evan Morris	51.65	" 857 "	12th Jan., "
Densy	Vernon	Thos. P. Kempson	50.86	" 1051 "	4th Feb., "
Daisy	Osoyoos	John Robert Mitchell	51.60	" 665 "	28th " "
Defiance	Kettle River	H. J. Cole and Geo. F. Steele	51.65	" 758 "	29th April, "
Diamond Fraction	Osoyoos	Tin Horn Quartz Mining Co., Ld.	.66	" 943 "	25th March, "
Denver	Kettle River	G. Lavagnino	19.85	" 764 "	10th " "
Denero Grande	"	Mary McArthur and The Prospecting Syndicate of B. C., Ld.	47.51	" 851 "	24th " "
Divide	Osoyoos	Adams B. C. Co., Ld. Ly	51.65	" 800 "	8th June, "
Exchange	"	W. A. Dier and A. A. Davidson.	42.30	" 936 "	25th March, "
Enterprise	Kettle River	Geo. D. Leyson	12.7	" 1022 "	15th Oct., "
Elkhorn	Osoyoos	C. L. Thomet *et al*	47.95	" 818 "	26th Jan., "
Fanny Morris	"	Fairview Consol. Gold Mines, of Fairview, B. C., Ld	51.65	" 544 " [2 grants.	26th Jan., " 7th Feb., "
Fortune	"	Tin Horn Quartz Mining Co., Ld.	31.	" 940 "	5th May, "
Favourite	"	Thos. Elliott	41.60	" 944 "	29th April, "
Fourth of July	Kettle River	Jay P. Graves	29.	" 922 "	19th Dec., "
Grey Eagle	Grand Forks	Wm. W. Spinks, Wm. Hy. Gee, and Chas. Van Ness.	42.59	" 720 " [2 grants.	11th July, "
Gilpin Fraction	Osoyoos	Jno. R. Mitchell	7.33	" 838 "	19th April, "
Gold Bug	Kettle River	Adolph Drucker	46.17	" 895 "	29th June, "
Granada	"	Edwin S. Graham	47.30	" 869 "	8th " "
Gilt Edge	"	James Marshall	49.8	" 977 "	4th Aug., "
Grey Hound	"	Wm. J Harris	51.65	" 1014 "	24th Oct., "
Garnet	Grand Forks	Hy. Geo. Brown	31.45	" 785 "	10th Nov., "
Homestake	Osoyoos	Mance & M. Millar & Ed. Blewitt	.20	" 649 "	26th Jan., "
Hidden Treasure	Kettle River	Adolph Drucker	10.17	" 896 "	29th June, "
Highland Chief	Osoyoos	Randolph Elmore Quartz Mining & Mill. Co., of Fairview, B. C.	51.65	" 732 "	8th June, "
Hidden Treasure	Kettle River	Republic Gold Mining Co	51.48	" 1019 "	12th Aug., "
Jubilee Fraction	Osoyoos	Tin Horn Quartz Mining Co., Ld.	9.27	" 941 "	25th March, "
Jumbo	Kettle River	Wm. T. Smith & W. G. McMynn	50.59	" 592 "	3rd " "
Jewel	"	Prospecting Synd. of B. C., Ld.	51.65	" 850 "	24th " "
King Bee	Grand Forks	Hy. Geo. Brown	45.34	" 784 "	10th Nov., "
Lake	Kettle River	Wm. A. Corbett	51.65	" 765 "	28th Feb., "
Last Chance	Osoyoos	Stephen Mangott	51.65	" 751 "	3rd March, "
Monte Carlo	Grand Forks	J. T. O'Brien and S. M. Kirkham	48.44	" 721 "	28th Jan., "

YALE.—*Concluded.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Mattie Davies	Kettle River	Wm. T. Smith	51.65	Lot 795, G. 1	4th March, 1898
Minnie Moor	"	"	50.12	" 593 "	4th " "
Mountain Rose	Grand Forks	"	33.	" 794 "	10th " "
Monte Carlo	Kettle River	Theo. Roderick	51.65	" 976 "	5th Aug., "
Monte Cristo	"	Jas. Marshall and Jas. Nicholson	22.09	" 975 "	4th " "
Number Four	Grand Forks	Hy. White & May W. Palmerston	17.60	" 791 "	28th Feb., "
New York	Kettle River	Jos. B. McArthur	47.65	" 1843 "	19th Aug., "
Norfolk	"	Jas. Roderick Robertson	46.18	" 985 "	10th Nov., "
Nightingale	Osoyoos	Fairview Consol. Gold Mines Co., of Fairview, B. C., Ld	43.	" 855 "	21st " "
Osoyoos	"	Stephen Mangott	18.97	" 762 "	27th Jan., "
Ocean Wave	"	Fairview Consol. Gold Mines Co., Ld., of Fairview, B. C	36.19	" 854 "	26th " "
Orillia	"	Tin Horn Quartz Mining Co., Ld.	50.50	" 935 "	5th May, "
Ontario	Grand Forks	Wm. Shaw	50.39	" 861 "	20th April "
Powis	Osoyoos	Hy. Nicholson *et al*	51.49	" 946 "	29th June, "
Plutonia	Kettle River	Thos. F. Wren	44.67	" 884 "	22nd Oct., "
Quartz Queen	Osoyoos	Fairview Consol. Gold Mines Co., of Fairview, B. C., Ld	22.57	" 549 "	26th Jan., "
Rattler	Grand Forks	Hy. White & May W. Palmerston	37.70	" 791 "	28th Feb., "
Riverside	Osoyoos	Herschell Cohen	51.60	" 728 "	28th " "
Reliance	"	W. A. Dier and A. A. Davidson	48.	" 938 "	25th March, "
Riverside	Kettle River	Benj. Perkins	50.13	" 1031 "	29th July, "
Randolph	Osoyoos	Randolph Elmore Quartz Min. & Mill. Co., of Fairview, B. C., Ld.	49.31	" 731 "	8th June, "
Rocky Point	"	Wm. L. Nicol *et al*	42.07	" 802 "	29th " "
Rob Roy	"	Fairview Consol. Gold Mines Co., of Fairview, B. C., Ld	51.65	" 546 "	17th Nov., "
Rob Roy	Kettle River	Alex. Wallace	51.52	" 1153 "	29th Dec., "
Sailor	Osoyoos	Charles Deitz	42.02	" 766 "	4th March, "
Skylark	Kettle River	G. Lavagnino	31.84	" 763 "	10th " "
Shamrock	Osoyoos	The Shamrock Gold Mining Co.	31.73	" 770 "	6th May, "
Silver Bow	"	Fairview Consol. Gold Mines Co., of Fairview, B. C., Ld	20.66	" 730 "	28th April, "
Spotted Horse	Kettle River	Boundary Falls Mining Co., Ld.	45.24	" 887 "	21st " "
Snow Shoe	"	Thos. McDonnell *et al*	51.65	" 891 "	22nd " "
Seattle	"	E. P. Davis and L. P. Duff	51.65	" 652 "	1st June, "
Sunset	Similkameen	R. A. Brown and F. A. Averill	51.65	" 1077 "	21st Sept., "
Tinhorn	Osoyoos	Tinhorn Quartz Mining Co., Ld	47.	" 726 "	28th Jan., "
Tunnell	Kettle River	Lindsay Michael	22.66	" 888 "	8th July, "
Teaser	Osoyoos	Hugh Cameron and M. McCuaig	41.04	" 951 "	29th June, "
Tenas	"	David Leggatt	.68	" 650 "	29th " "
Twin	Kettle River	John W. H. Wood	51.65	" 819 "	21st Oct., "
Toronto	"	Thos. F. Wren	10.52	" 1013 "	22nd " "
Victoria	Kettle River	Jay P. Graves	46.60	" 933 "	19th Dec., "
White Swan	Osoyoos	Fairview Consol. Gold Mines Co., of Fairview, B. C., Ld.	39.	" 548 " [2 grants.	26th Feb., " 7th " "
Winchester	"	Winchester Gold Mines Co., of Fairview, B. C., Ld. Ly.	14.66	" 550 "	27th Jan., "
Waneta	"	Thos. Elliott	51.65	" 945 "	29th April "

COAST—ALBERNI.

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Blackbird	Alberni	Alberni Gold Devel. Synd., Ld	51.65	Lot 64, G. 1	3rd Aug., 1898
Barney Barnato	"	" "	49.50	" 49 "	29th July, "
Estrella	"	" "	37.	" 76 "	3rd Aug., "
Green Mountain	"	James Armstrong	51.65	" 96 "	29th Dec., "
Humming Bird	"	Alberni Gold Devel. Synd., Ld	23.	" 63 "	3rd Aug., "
Happy John No. 4.	"	James Armstrong	23.50	" 44 "	29th Dec., "
Last Chance	"	Quadra Mining and Milling Co	34.01	" 220 "	18th June, "
Ophir	"	" "	44.66	" 221 "	" " "
Regina No. 1	"	Alberni Gold Devel. Synd., Ld	51.65	" 57 "	3rd Aug., "
Regina No. 2	"	" "	41.56	" 54 "	" " "
Regina No. 3	"	" "	51.65	" 55 "	" " "

COAST—NANAIMO.

Blue Bells	Nanaimo	Frederick Arm Mining Co., Ld	51.65	Lot 235, R. 1	18th April, 1898
Cone Fraction	"	The B. C. Agency, Ld	2.5	" 273 "	11th Feb., "
Commonwealth	"	Wm. Whalen	20.65	" 277 "	14th June, "
Champion	"	Martin Nash	22.50	" 276 "	9th Nov., "
Douglas Pine	"	Dan. Leahy and Edwd. Jackson	31.02	" 271 "	8th Feb., "
Dashwood	"	Frederick Arm Mining Co., Ld	44.11	" 248 "	18th April, "
Emperor Fraction	"	H. Rhodes	16.50	" 227 "	10th March, "
Empress	"	Chas. Coulson *et al*	44.9	" 279 "	19th Aug., "
Enid	"	W. A. Bauer	46.25	" 280 "	6th June, "
Gold Exchange	"	The B. C. Agency, Ld	14.76	" 272 "	1st Feb., "
Gold Bug	"	Frederick Arm Mining Co., Ld	40.79	" 240 "	18th April, "
Jubilee Fraction	"	H. Rhodes	16.33	" 230 "	10th March, "
Julie	"	W. A. Bauer *et al*	38.84	" 233 "	6th June, "
Jennie B.	"	" "	42.53	" 278 "	7th " "
Nancy Bell	"	A. C. Blair	26.77	" 46 Tex	25th Nov., "
Stella	"	W. A. Bauer	25.60	" 281, R. 1	6th June, "
Silver Tip	"	A. C. Blair	42.64	" 44 Tex	25th Nov., "
Waterloo	"	Harry Rhodes	5.55	" 226, R. 1	10th March, "

COAST—NEW WESTMINSTER.

Providence	New West'r.	Providence Min. & Devel. Co., Ld.	41.57	Lot 1737, G. 1	27th Jan., 1898
Silver Bell	"	" "	51.65	" 1738 "	" " "

COAST—VICTORIA.

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Herbert	Victoria	Thos. A. Wood *et al*	38.02	Lot 20, G. 1	15th Aug., 1898
Tyee	"	C. Livingstone *et al*	48.44	" 36 "	25th " "
X. L	"	Thos. A. Wood *et al*	31.	" 9 "	15th " "

COAST—SKEENA.

Emma Mine	Skeena	Skeena River Mining Co	50.37	Lot 71, R. 5	8th July, 1898
I. X. L	"	" "	51.62	" 72 "	8th " "

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Secretary to the Department,	M. RICHARDSON	"
Provincial Mineralogist	WM. F. ROBERTSON, B. A. Sc.	"
" Assayer	HERBERT CARMICHAEL	"
Inspector of Coal Mines	THOS. MORGAN	Nanaimo.
" Metalliferous Mines	JAS. MCGREGOR	Nelson.

GOLD COMMISSIONERS AND MINING RECORDERS.

Mining Divisions.	Name of Recorder.	Address.	Name of Gold Commissioner.	Address.
Cariboo—				
Omineca	John Bowron	Barkerville	John Bowron	Barkerville.
Richfield	"	"		
Quesnelle	W. Stephenson	Quesnelle Forks		
Omineca (Land Rec'd'g D).	F. W. Valleau	Manson Creek	F. W. Valleau	Manson Creek.
" (sub office)	Ralph Grassham	Fort St. James		
Cassiar, etc.—				
Stickine	James Porter	Telegraph Creek	James Porter	Telegraph Creek.
Liard	"	"		
McDame	"	"		
Laketon	"	"		
Teslin Lake	"	"		
Bennett Lake	W. J. Rant	Lake Bennett	J. D. Graham	Atlin City.
Atlin Lake	W. G. Paxton	Atlin City		
Skeena	John Flewin	Fort Simpson	W. S. Gore	Victoria.
" (sub office)	R. S. Sargent	Skeena		
East Kootenay—				
Donald	J. Stirret	Donald	J. E. Griffith	Donald.
Golden	F. C. Lang	Golden		
Windermere	G. Goldie	Windermere		
Fort Steele	C. M. Edwards	Fort Steele	J. F. Armstrong	Fort Steele.
" (sub office)	M. Phillipps	Tobacco Plains		
West Kootenay—				
Revelstoke	F. Fraser	Revelstoke	H. N. Coursier	Revelstoke.
Illecillewaet	W. Scott	Illecillewaet		
Lardeau	Geo. Summer	Comaplix		
Trout Lake	Thos. Taylor	Trout Lake		
Slocan	Angus McInnes	New Denver	A. Sproat	New Denver.
Slocan City	H. P. Christie	Slocan City		
Ainsworth	John Keen	Kaslo	J. A. Turner	Nelson.
Nelson	D. A. McBeath	Nelson		
Goat River	J. C. Rykert	Rykerts		
Arrow Lake	F. G. Fauquier	Nakusp		
Trail Creek	H. R. Townsend	Rossland	J. Kirkup	Rossland.
Lillooet—				
Clinton	F. Soues	Clinton	F. Soues	Clinton.
Lillooet	C. A. Phair	Lillooet		
Yale—				
Kamloops	Martin Beattie	Kamloops	G. C. Tunstall	Kamloops.
Yale	Wm. Dodd	Yale		
Similkameen	H. Hunter	Granite Creek		
Vernon	J. C. Tunstall	Vernon	Leonard Norris	Vernon.
Osoyoos	J. R. Brown	Fairview	C. A. R. Lambly	Fiarview.
Kettle River	W. G. McMynn	Midway		
Grand Forks	S. R. Almond	Grand Forks		
Alberni—				
Alberni Mining Division	Thos. Fletcher	Alberni	Thos. Fletcher	Alberni.
West Coast, V. I. M. D.	W. T. Dawley	Clayoquot		
Nanaimo—				
Nanaimo Mining Division.	M. Bray	Nanaimo	M. Bray	Nanaimo.
Victoria—				
New Westminster	D. Robson	New Westminster	W. S. Gore	Victoria.
" (sub office)	L. A. Agassiz	Harrison Lake		
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Atlas of maps to accompany Geology of Canada. Published 1865.

Geological map of Canada, 1867.

Map of British Columbia, by Hon. J. W. Trench, 1871. Referred to by Dr. Dawson.

Map of part of Straits of Georgia and Vancouver Island, Cretaceous Coal. Richardson, 1872.

Map of Coal Fields on East Coast, Vancouver Island. Richardson, 1872.

Map of British Columbia between Fraser River and Coast Range. Dr. Dawson, Geological Survey Report, 1876-7.

Coal Fields, North-Eastern Vancouver Island. Richardson, 1876-7.

Hixon Creek quartz locations, Cariboo District, 2 sheets. Geological Survey Report, 1887-8.

Island Mountain and Mosquito Creek, 1887.

Geological Map, Skidegate Inlet, Queen Charlotte Islands. Geological Survey, 1878.

Map showing distribution of Trees in British Columbia. Geological Survey Report, 1879-80.

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Geological map, Cascade Coal Basin, Rocky Mountains. 1885 Report.

Geological map North Coast of Vancouver Island and part of Mainland. Geological Survey Report, 1886.

Geological Sections across Rocky Mountains, near 51st parallel. Geological Survey Report, 1886.

Geological map of Canada touching Omenica District. Geological Survey Report, 1886.

Index map touching Cassiar District. Dr. Dawson, 1888.

Geological sections near Quesnelle River and Cache Creek, and panoramic sketches in Cariboo District. Amos Bowman, Geological Survey Report, 1887-8.

Part of Trail Creek Mining Division, West Kootenay District, Map No. 620. Geological Survey Report, 1897.

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