ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31st DECEMBER,

1896,

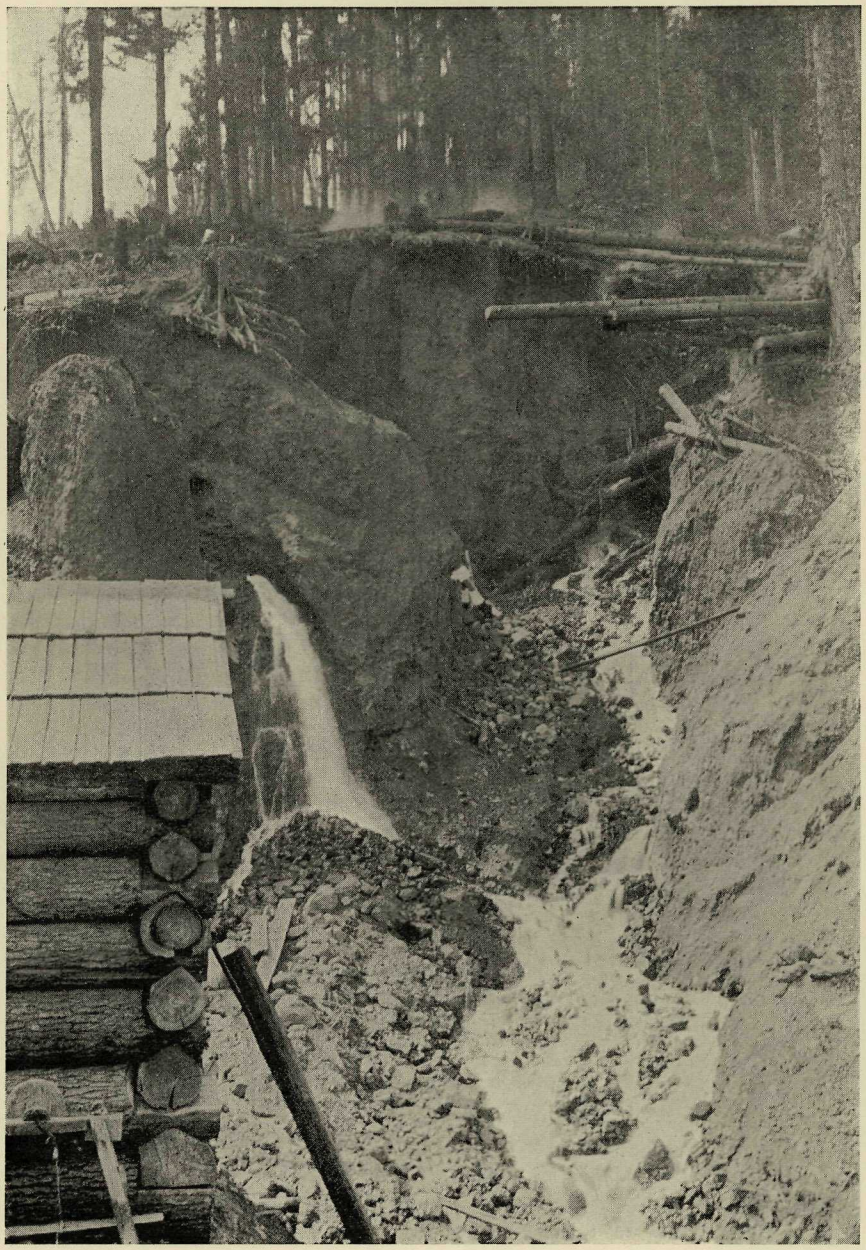
BEING AN ACCOUNT OF

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.
1897.



HYDRAULIC MINING OF SILVER-LEAD ORE.

WONDERFUL MINE, SLOCAN.

(See page 52, Bulletin No. 3.)

REPORT

OF THE

MINISTER OF MINES,

1896.

To His Honour EDGAR DEWDNEY,

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 1896 is herewith respectfully submitted.

JAMES BAKER,

Minister of Mines.

Minister of Mines' Office,

26th February, 1896

REPORTS.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

COMPILED BY WILLIAM A. CARLYLE, PROVINCIAL MINERALOGIST.

To the Hon. Jas. Baker,
Minister of Mines.

I have the honour to submit the following tables of the mineral production of the mines of British Columbia.

In compiling these statistics I have sought to assemble for the first time from the best of sources available all statistical information of the mineral out-put from the commencement of mining operations in this Province up to the beginning of the present year, 1897, and the returns in Dr. Geo. M. Dawson's very valuable report on the "Mineral Wealth of British Columbia, 1888," the "Mineral Statistics," by Elfric Drew Ingall, as published in the annual reports of the Geological Survey of Canada, and the returns in the annual reports of the Minister of Mines for British Columbia have been supplemented by returns sent in by the Gold Commissioners and Recorders, and by the smelter and customs returns collected by the Bureau of Mines.

These statistics are as complete as it has been possible to make them, considering the imperfect records kept during the earlier years of production, and that as yet the mine-owners have not been required to give full statements of their mines' out-put, the nearly complete smelting returns given below having been obtained by their courtesy. However, these figures will serve not only to show the total production to date, but also to demonstrate the *recent commencement of lode mining* and the rapid increase now being made in the amounts of gold, silver, lead and copper now being produced in these new mining districts which but a few years ago were trackless wildernesses of mountain, river and forest.

TABLE I.

TOTAL PRODUCTION FOR ALL YEARS.

Gold, placer	$ 57,704,855
Gold, lode	2,177,869
Silver	4,028,224
Lead	1,606,427
Copper	254,802
Coal and Coke	33,934,427
Building stone, bricks, etc	1,200,000
Other metals	25,000
	$100,931,604

The next Table shows the rapid increase in production during the last seven years, the increase for 1891 over 1890 being due to the larger export of coal, the output of which for that year of 1,000,000 tons, being the largest ever reached by our collieries. In the year 1892 the influence of the production of the lode mines began to be felt, and since then the very marked increase in production has been carried by the quickly growing value of the gold, silver, lead and copper produced.

TABLE II.

PRODUCTION FOR EACH YEAR FROM 1890 TO 1896 (INCLUSIVE).

YEAR.	AMOUNT.
1890	$2,608,608
1891	3,546,702
1892	3,017,971
1893	3,588,413
1894	4,225,717
1895	5,655,302
1896	7,146,425

Table III. gives a detailed statement of the amount and value of the different mine products for 1895 and 1896, but it has as yet been impossible to collect statistics concerning the amount of building stone, brick, lime, fire-clay, tiles, etc., hence these tables do not contain any particulars this year about the mining of the economical materials which, of course, should be here included.

However the increase in the value of the precious metals produced, and the baser metals, especially of lead, is marked, and the total increase for 1896 over 1895, very gratifying, the total production of the mines, other than coal, having increased from $2,834,000 to $4,816,000.

TABLE III.

AMOUNT AND VALUE OF MATERIALS PRODUCED 1895 AND 1896.

	Customary Measures.	1895.		1896.	
		Quantity.	Value.	Quantity.	Value.
Gold, Placer	Oz	24,084	$ 481,683	27,201	$ 544,026
" Quartz	Oz	39,264	785,271	62,259	1,244,180
Silver	Oz	1,496,522	977,229	3,135,343	2,100,689
Copper	Lbs	952,840	47,642	3,818,556	190,926
Lead	Lbs	16,475,464	532,255	24,199,977	721,384
Coal	Tons	939,654	2,818,962	846,235	2,327,145
Coke	Tons	452	2,260	615	3,075
Other materials			10,000		15,000
			$5,655,302		$7,146,425

TABLE IV.

PRODUCTION OF METALS PER DISTRICT.

NAME.	DIVISIONS.		DISTRICTS.	
	1895.	1896.	1895.	1896.
CARIBOO	.....	.....	$ 282,400	$ 384,050
Barkerville Division	$ 81,000	$ 82,900	.....	.....
Lightning Creek "	40,700	53,000	.....	.....
Quesnellemouth "	18,200	51,100	.....	.....
Keithley Creek "	142,500	197,050	.....	.....
CASSIAR	.....	.....	22,575	21,000
KOOTENAY, EAST	.....	.....	17,575	154,427
KOOTENAY, WEST	.....	.....	2,223,206	4,002,735
Ainsworth Division	388,944	189,589	.....	.....
Nelson "	63,608	545,529	.....	.....
Slocan "	1,057,677	2,010,048	.....	.....
Trail Creek "	702,457	1,243,360	.....	.....
Other parts	10,520	14,209	.....	.....
LILLOOET	.....	.....	40,663	33,665
YALE	.....	.....	241,581	206,078
Osoyoos Division	147,731	131,220	.....	.....
Similkameen "	41,650	9,000	.....	.....
Yale "	48,400	65,108	.....	.....
OTHER DISTRICTS	.....	.....	10,000	15,000
	$2,743,387	$4,592,115	$2,838,000	$4,816,955

PLACER GOLD.

Table V. gives the yearly production of placer gold as determined by the returns sent in by the banks and express companies of gold sold 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, and from then to 1895, one-fifth, which proportion was considered to represent approximately, the amount of gold sold of which there was no record.

The gold output is now beginning to steadily rise as the operations of the large hydraulic mining companies in Cariboo begin to assume such a scale, that with larger water supplies and the mines more opened out for work, a much larger amount of ground can be washed.

This placer gold contains from 10 to 25 per cent. silver, but the silver value has not been separated from the totals.

TABLE V.

YIELD OF PLACER GOLD PER YEAR TO DATE.

1858	$ 705,000	1878	$1,275,204
1859	1,615,070	1879	1,290,058
1860	2,228,543	1880	1,013,827
1861	2,666,118	1881	1,046,737
1862	2,656,903	1882	954,085
1863	3,913,563	1883	794,252
1864	3,735,850	1884	736,165
1865	3,491,205	1885	713,738
1866	2,662,106	1886	903,651
1867	2,480,868	1887	693,709
1868	3,372,972	1888	616,731
1869	1,774,978	1889	588,923
1870	1,336,956	1890	490,435
1871	1,799,440	1891	429,811
1872	1,610,972	1892	399,526
1873	1,305,749	1893	356,131
1874	1,844,618	1894	405,516
1875	2,474,004	1895	481,683
1876	1,786,648	1896	544,026
1877	1,608,182		
			$57,704,855

PRODUCTION OF LODE MINING.

The next table shows very clearly the fact that lode mining in this Province has just fairly begun, and that the progress now being made, is decided and very satisfactory.

The gold production of course consists mostly of the output of Rossland mines as per smelter returns, but there are added the gold saved by amalgamation in the Oeoyoos District, as at Camp McKinney, in the Nelson District as at the Poorman Mine, and the product of small lots of gold ore sent out to the smelters from other parts.

Some silver ore is known to have been sold prior to 1887, but no record has been obtained regarding these small sales.

TABLE VI.

PRODUCTION OF LODE MINES.

YEAR.	GOLD.		SILVER.		LEAD.		COPPER.		TOTAL VALUES.
	Oz.	Value.	Oz.	Value.	Pounds.	Value	Pounds.	Value.	
		$		$		$		$	$
1887	...	...	17,690	17,331	...	...	...	...	17,331
1888	...	...	79,780	75,000	...	...	...	...	75,000
1889	...	...	53,192	47,873	...	...	...	...	47,873
1890	...	...	70,427	73,948	113,000	5,805	...	...	79,753
1891	...	...	4,500	4,000	588,665	25,607	...	...	29,607
1892	...	...	77,160	66,935	1,768,420	72,505	...	...	139,440
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
Totals	108,945	$2,177,869	5,907,993	$4,028,224	50,943,072	$1,606,427	5,096,076	$254,802	$8,067,322

PRODUCTION OF COAL AND COKE.

In Table VII. is given the total number of long tons (2,240lbs.) of coal and coke for each year as reported to the Government by the different collieries in the Province. The production of coke is small, but will be now rapidly increased when the coke ovens, now being perfected at the Union Mines at Comox, and the coking coal of the Crow's Nest Pass, will have begun the regular supply of this fuel to the smelting centres. For the last two years the output of coal has been declining by reason of the increasing competition of British and American coal in the Pacific Coast markets of the Uuited States where most of the coal exported from British Columbia is sold.

TABLE VII.

COAL AND COKE PRODUCTION PER YEAR TO DATE.

YEAR.	TONS (2,240lbs.)	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	148,459	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	522,538
1879	241,301	723,903
1880	267,595	802,785
1881	228,357	685,171
1882	282,139	846,417
1883	213,299	639,897
1884	394,070	1,182,210
1885	265,596	1,096,788
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
1695	939,654	2,818,962
1896	846,235	2,327,145
Totals	11,248,759 tons.	$33,926,602
Coke	1,565 tons	$7,825

TABLE VIII.

PRODUCTION IN DETAIL OF THE METALLIFEROUS

District.	Year.	Tons.	Gold—Placer.		Gold—Quartz.	
			Ounces.	Value.	Ounces.	Value.
CARIBOO						
Barkerville Division	1895		4,050	81,000		
	1896		4,145	82,900		
Lightning Creek "	1895		2,035	40,700		
	1896		2,650	53,000		
Quesnellemouth "	1895		910	18,200		
	1896		2,555	51,100		
Keithley Creek "	1895		7,125	142,500		
	1896		9,853	197,050		
CASSIAR	1895		1,129	22,575		
	1896		1,050	21,000		
KOOTENAY, EAST	1895		878	17,575		
	1896		1,054	21,076		
KOOTENAY, WEST	1895					
	1896					
Ainsworth Division	1895					
	1896					
Nelson "	1895	1,148	275	5,500	1,000	20,000
	1896	30,160	275	5,500	236	4,720
Slocan "	1895	9,649			6	120
	1896	18,215			152	3,040
Trail Creek "	1895	19,693			31,497	629,940
	1896	38,075			55,275	1,104,500
Other Parts	1895		526	10,520		
	1896	58	231	4,627	35	700
LILLOOET	1895		2,033	40,663		
	1896		1,683	33,665		
YALE	1895					
	1896					
Osoyoos Division	1895		620	12,400	6,767	135,331
	1896				6,561	131,220
*Similakmeen "	1895		2,083	41,650		
	1896		450	9,000		
Yale "	1895		2,420	48,400		
	1896		3,255	65,108		
TOTALS	1895		24,084	$481,683	39,264	$ 785,491
	1896		27,201	$544,026	62,259	$1,244,180

*Platinum, 1895, $3,800; 1896, $750.

MINES FOR 1895 AND 1896.

Silver.		Copper.		Lead.		Total for Divisions.		Totals for Districts.	
Ounces.	Value.	Pounds.	Value.	Pounds.	Value.	1895	1896	1895	1896
			$		$	$	$	$	$
.....	.....	.....	.....	.....	.....	.....	.....	282,400	384,050
.....	.....	.....	.....	.....	.....	81,000	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	82,900	.....	.....
.....	.....	.....	.....	.....	.....	40,700	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	53,000	.....	.....
.....	.....	.....	.....	.....	.....	18,200	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	51,100	.....	.....
.....	.....	.....	.....	.....	.....	142,500	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	197,050	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	22,275	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	21,000
.....	.....	.....	.....	.....	.....	.....	.....	17,575	.....
73,796	49,443	.....	.....	2,808,411	83,908	.....	.....	.....	154,427
.....	.....	.....	.....	.....	.....	.....	.....	2,223,206	4,002,735
263,030	171,759	.....	.....	6,724,000	217,185	388,944	.....	.....	.....
187,297	125,489	.....	.....	2,151,000	64,100	.....	189,589	.....	.....
49,750	32,487	112,420	5,621	.....	.....	63,608	.....	.....	.....
631,960	423,413	2,237,921	111,896	.....	.....	.....	545,529	.....	.....
1,137,040	742,487	.....	.....	9,751,464	315,070	1,057,677	.....	.....	.....
2,141,088	1,434,529	.....	.....	19,210,666	572,479	.....	2,010,048	.....	.....
46,702	30,496	840,420	42,021	.....	.....	702,457	.....	.....	.....
89,285	59,830	1,580,635	79,030	.....	.....	.....	1,243,360	.....	.....
.....	.....	.....	.....	.....	.....	10,520	.....	.....	.....
11,917	7,985	.....	.....	29,900	897	.....	14,209	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	40,663	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	33,665
.....	.....	.....	.....	.....	.....	.....	.....	241,581	206,078
.....	.....	.....	.....	.....	.....	147,731	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	131,220	.....	.....
.....	.....	.....	.....	.....	.....	41,650	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	9,000	.....	.....
.....	.....	.....	.....	.....	.....	48,400	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	65,108	.....	.....
1,496,522	$ 977,229	952,840	$ 47,642	16,475,464	$532,255	.....	.....	$2,828,000	.....
3,135,343	$2,100,689	3,818 556	$190,926	24,199,977	$721,384	.....	.....	.....	$4,801,955

BUREAU OF MINES.

THE OPERATION OF THE BUREAU OF MINES.

The organisation of the Bureau of Mines, in accordance with the "Bureau of Mines Act," Chap. 3, 1895, was begun in January, 1896, by Wm. A. Carlyle, Ma. E., Provincial Mineralo gist, and Herbert Carmichael, Assayer and Chemist, but awaiting the completion of the new Government buildings, in which will be proper rooms for offices, assay and chemical laboratories, and for collections of ores, minerals, rocks, etc., this organisation cannot yet be perfected along those lines it is now proposed to follow. Necessarily a large amount has been done, and yet remains to be done, in arranging the methods of work to be followed in collecting and systematically recording all information pertaining to the mining industry of the Province, which is now assuming such proportions as to attract the attention of capitalists and mining men, who are demanding authoritative statements and statistics concerning these newly opened mineral resources.

It is proposed to—

(*a.*) Ascertain the name and progress of every mine or mining company, keeping a comprehensive directory of their locality, ownership, kind of ore mined and conditions of property:

(*b.*) To visit and examine, from time to time, the different mining districts, and to issue reports to the Hon the Minister of Mines, descriptive of them, and their progress in mining affairs:

(*c.*) To collect full and accurate statistics of the mine, out-put, number of men employed, etc.:

(*d.*) To maintain a laboratory for assay and chemical analysis, for which will be charged the customary fees, and to determine, free of cost, specimens of rock, mineral or ore that may be sent in, and give all possible information concerning the occurrence or probable commercial value of such, with hints concerning the best methods of treatment, etc., etc.

(*e.*) To maintain student laboratories, for instruction in assaying, blow-piping, mineralogy, geology, etc., etc.

(*f.*) To assemble and systematically arrange in a public museum specimens of mineral, ore, country rock, building and other economical mineral materials from the mines; and also, for comparative study, specimens of the same from other mining countries, models, maps, etc.:

(*g.*) To assemble, for the use of the Bureau and also the public, a library of the best reference books and papers relating to the art and industry of mining and metallurgy, mining magazines, reports, tables of statistics, etc.:

(*h.*) To establish and equip a plant for testing, metallurgically, the different kinds of ore, coal, coke, etc., etc.

WORK OF THE YEAR.—BULLETINS.

In January and February a series of lectures was given at Victoria, Vancouver and New Westminster, on ores and ore deposits, chemical and metallurgical subjects by the Provincial Mineralogist, Mr. H. Carmichael and Mr. W. Pellew-Harvey. In the spring the Provincial Mineralogist visited the State Bureau of Mines in San Francisco, where, by the kindness of Mr. J. J. Crawford, State Mineralogist, who is doing excellent and valuable work in his Bureau, the methods of conducting the work incident to an organisation of this kind were studied and much important information gained. Besides issuing the regular reports, Mr. Crawford is having written, by men thoroughly experienced in the subject under discussion, monographs of especial value to every miner and metallurgist, and copies can be got by remitting to him sixty to seventy-five cents for each of these bulletins, that are now highly recommended:—

No. 2.—Mine Timbering, by W. H. Storms.
No. 5.—The Cyanide Process, by Dr. A. Scheidel, E. M.
No. 6.—California's Gold Mill Practices, by Ed. B. Preston, M. E.
No. 9.—Mine Drainage, Pumps, etc., by Hans C. Behr.

On May 28th, the Mineralogist, accompanied by Mr. Carmichael and Dr. Newcombe, left by small steamer for Barclay Sound and the Alberni District, where many points of work were

visited, although it was almost too early in the season to examine several parts of the district, to which the trails had not yet been opened through the snow. On return to Victoria *Bulletin No. 1*, on the *Alberni Mining District*, was issued.

Towards the end of June the examination of Rossland Mining Camp was begun, and in August was published *Bulletin No 2*, on the *Trail Creek District*, a report to which the writer could have done much more justice, both to the district and to himself, by taking more time in its compilation, only it was thought that as great interest had been aroused, and many were being attracted to this new gold field, that a prompt report, even if not so long and more detailed, would prove more serviceable by supplying official information just when the demand for such was urgent.

After visiting Rossland, the Slocan, Nelson and Ainsworth Districts were examined as far as time would permit, the object aimed at being to obtain as wide an acquaintance as possible concerning the general conditions of the mining industry, ore bodies, shipping facilities, etc., and data gained has recently been published in *Bulletin No. 3*, on the *Slocan, Nelson and Ainsworth Districts.*

A short visit was paid East Kootenay, a district of great promise, that this year will attract much wide interest by the reason of the discovery of fine bodies of silver and silver-lead ores and of large gold-bearing quartz ledges, and a large influx of mining men and prospectors is now promised, like that of the early days in the sixties, when thousands of men were working along the gold placer diggings of Wild Horse, Perry and other creeks. A short account of this district is embodied in this Annual Report and also the three bulletins mentioned, and important reports from the other districts in the Province, by the Gold Commissioners and Mining Recorders.

LIBRARY.

The foundation of an excellent library has been laid by the purchase of some of the best books on mining, metallurgy, geology, mineralogy, etc., all of which are at the disposal of those who may wish to come and consult them, but cannot, however, be taken away from the building. Among these books are:—

Transactions of American Institute of Mining Engineers (complete series).
The Mineral Industry (complete series).
Mining, Iron and Steel.
Mining and Ore Dressing Machinery (Lock).
Practical Gold Mining (Lock).
Text Book of Ore and Stone Mining (Le Neve Foster).
Modern Copper Smelting (Peters).
Metallurgy of Lead (Hoffman).
Matte Smelting (Lang).
Ore Deposits of the United States (Kemp).
The art of Ore Dressing in Europe (Kunhardt).
System of Mineralogy (Dana).
Geology (Dana).
Geology (Sir Wm. Dawson).
Geology (Shaler).
Ore Deposits (Phillips).
Geological Survey of Canada (complete).
Reports and Bulletins, Bureau of Mines, California.
Smithsonian Institute Reports.
Mining Reports of New Zealand.
Arkansas Geological Survey.
Mineral Resources of the United States (Chas. D. Wolcott).
Reports of the Bureau of Mines, Ontario.
Reports of the Inspector of Mines, Nova Scotia.
Reports of the Commissioner of Mines, Colorado.
etc. etc. etc.

Among the periodicals taken are the Engineering and Mining Journal (New York), the Mining and Scientific Press (San Francisco), the Canadian Mining Review, the B. C. Mining Record, the Western Mining World, the Canadian Engineer, Mining, Etc., and shortly other books and mining magazines will be added to this nucleus of excellent publications.

The many thanks of this Department are due to the Geological Survey of Canada, the Director of the Bureau of Mines, Ontario; the Inspector of Mines of Nova Scotia, the State Mineralogist of California, the Director of the Geological Survey of the United States, the Director of the Geological Survey of Arkansas, Hon. Henry M. Teller, Senator for Colorado; the Commissioner of Mines of Colorado, the Minister of Mines of New Zealand, and others, who have kindly forwarded copies of their reports, etc., to this Bureau.

THE ASSAY OFFICE.

This office has been removed, *pro tem.*, to the old printing building, but when finally installed in the proper quarters will be thoroughly equipped with all the best appliances for rapid and accurate work. If not brought in too late an endeavour is always made to give the assay results on the same day the samples are sent in for assay, and all assaying is charged for by Order in Council, after the following schedule of prices:—

BUREAU OF MINES, 1st July, 1896.

The following are the fees charged in the Government Assay Office, Victoria, for mineral assays, and for the future all applications for assays—no matter from what quarter they may come—must be accompanied by the cash for the fee, otherwise the Government Assayer has strict orders not to perform the assay:—

Gold and silver	$ 1 50
Lead	1 50
Copper	3 00
Iron	3 00
Mercury	5 00
Tin	5 00
Antimony	5 00
Zinc	5 00
Nickel, qualitative assay	5 00
Nickel, quantitative assay	10 00
Cobalt, qualitative assay	5 00
Cobalt, quantitative assay	10 00
Chromium, qualitative assay	5 00
Chromium, quantitative assay	10 00

JAMES BAKER,
Minister of Mines.

Mr. Carmichael is not only performing his duties as assayer most satisfactorily, as is attested in one way by the large increase in the revenue for 1896 from assay fees, but is showing much zeal in, and doing every endeavour to forward the work of this Bureau, with which he has been intimately connected since its inception.

MINERAL COLLECTION.

During the past season a large collection was made of ores, minerals and rocks, which will be properly arranged when the Mineral Museum is ready for occupancy, and valuable collections have been promised from Butte, Mont., the Cœur d'Alene Mines, California, Colorado and elsewhere, and with the collections now in the Provincial Museum a very interesting and needed museum will be connected with this Bureau.

STATISTICS.

By consulting all the authorities available, from reports of the Government officers, and by the collection of smelter and customs returns by this Bureau, a comprehensive statement of the mineral production of British Columbia is given in the opening pages of this report, and from this time on it is intended to issue regular reports, at present half-yearly if possible. The data concerning the production of the economical mine products, as building stone, bricks, etc., will also be collected, and thus increase the totals that are being yearly augmented rapidly.

LODE MINING.

We desire to emphasise strongly the fact that lode mining in this Province has but just begun, that in reality it has assumed important proportions only during the last four years, and the figures given above will clearly indicate the rapid progress now being made, with every promise that this class of mining, now firmly established, the latent mineral resources so long untouched and unknown will prove one of the most profitable and important industries in this Province.

ACKNOWLEDGMENTS.

Much appreciation must be expressed of the great interest in the mining industry, as shown by the Hon. the Minister of Mines, and for his efforts to aid its progress as far as lay in his power; also many thanks are due Mr. Tom Kains, Surveyor-General, for his valuable assistance in the prompt preparation of maps, etc., for the reports, and to Col. R. Wolfenden, Queen's Printer, for the careful editing and the issue of bulletins and reports with utmost dispatch.

EXPLOSIVES AND CHEMICALS.

The demand for dynamite powder and black powder, especially the former, is keeping pace with the progress of mining, and in three establishments in the Province are explosives being manufactured for mining purposes. Of the dynamite powder, commonly known as giant, the two grades, No. 1 and No. 2, are manufactured and shipped by the usual means of carriage to the mine centres. Two of the largest companies have branch establishments on the Island of Vancouver, of which—

The Hamilton Powder Co., of Montreal, have works at Northfield, near Nanaimo.

The Giant Powder Co., of San Francisco, Cal., manufactures near Cadboro Bay, a few miles from Victoria.

A third and small plant is making dynamite powder near Balfour, near the entrance to the West Arm of Kootenay Lake.

At Victoria all the commercial acids are being made at the Victoria Chemical Works, near the outer wharf, such as sulphuric, nitric and hydrochloric, and if metallurgical processes are introduced into the Province, such as chlorination plants, all chemical supplies such as acids, bleaching powder, etc., will be procurable from this manufactory at the lowest market prices. This firm supplies all acids to the powder manufacturers.

CARIBOO.

BY MR. JOHN BOWRON, GOLD COMMISSIONER.

SIR,—I have the honour to submit herewith for your information the 22nd annual report on the mining industry in Cariboo District, accompanied by the customary statistical information.

Both placer and quartz mining have received more than the usual attention during the past season.

The principal sources of the gold supply at the present time are the hydraulic claims, the profitable working of which depends on the amount of water supply obtainable under pressure. This season being the driest ever known, those claims that secured a few weeks' run only were deemed fortunate, while many of the regular producers were unable to clean up at all, hence the comparatively light increase in the product, considering the number of men engaged, as compared with other years. A large majority of those employed were engaged in development work on both placer and quartz claims.

HYDRAULIC MINES.

The hydraulic claims on Mosquito Creek and the Black Jack hydraulic claim on Williams Creek have contributed their usual quota to the general output, but the Forest Rose claim on Williams Creek, for the reasons mentioned above, was unable to make a clean up.

The Waverley claim on Grouse Creek, which has so long disappointed its shareholders, was enabled to make a clean up on bedrock for the first time this season, and as a result a dividend of $1.00 per share was declared. This claim will doubtless pay dividends for the next thirty years.

On Dragon Creek, a tributary of Willow River, a Seattle company which has acquired two hydraulic leases has, under the management of Mr. Gust. Lange, been pushing ahead the preparatory work with vigor, and will be in readiness to take advantage of the spring freshet. This is a very promising mine.

Mr. Seymour Baker, of London, representing an English syndicate, has acquired by purchase a group of hydraulic leases situated on the east bank of the Fraser, below the mouth of the Cottonwood River.

Preparations have been made during the season to operate these claims next summer. A large ditch about fifteen miles in length is being constructed, upon which work will be continued during the winter, and it is proposed to have the hydraulic plant placed upon the ground in the early spring. I have not had an opportunity to visit this mine, but I understand the prospects obtained warrant the belief that it will soon become a valuable property.

The Marquette and Menominee Hydraulic Mining Co., of Michigan, having purchased the rights of a Chinese company operating on Cunningham Creek, which has hitherto been worked to much disadvantage, owing to the indifferent nature of the appliances used, have made surveys for a ditch, and acquired adequate water rights, and will place on the ground a large hydraulic plant in time for next season's use.

The Cariboo Mining and Development Co, of Seattle, having acquired a group of leases on the left bank of Antler Creek, have during the season constructed a large ditch to bring water on to their claims, which they believe to be a blind channel of Antler Creek, which view appears to be justified from the prospects obtained from ground-sluicing before cold weather set in. This company will also put on a plant during the winter to be ready for operations in the spring.

In addition to the companies named there are a number of strong syndicates formed to operate hydraulic claims on Lightning, Williams, Slough, Antler and Cunningham Creeks, to say nothing of the extensive works undertaken or companies formed to work the gravel deposits on the Quesnelle River and at Horsefly, on which Mining Recorder Stephenson will report. We, therefore, confidently predict for the season of 1897 unusual activity throughout the district in the development of our placer mines.

CREEK DIGGINGS.

On Willow River, Mr. F. C. Laird is nobly fighting against adverse circumstances in his endeavour to reach the deep channel in his claim. A shaft has been sunk 100 feet through gravel and 105 feet through bedrock, and a drive is now being run some 600 feet to tap the channel. Mr. Laird's report on his work will be found appended hereto.

The Slough Creek Mining Co., of Slough Creek, are also persevering with their work. After having been beaten in their attempt to sink a working shaft through the gravel and slum, they decided to continue their drain tunnel on towards the mouth of Nelson Creek until bedrock is reached, and then sink in rock and drift out into the channel. In running the drain tunnel they have experienced much difficulty from the quantity of slum, water and large boulders encountered, which necessitated the running of a "balloon" drive to cut off the surface water. The work is now progressing favourably, and Mr. Sargent, the secretary of the company, has promised a report upon the same, which, if received, will be appended hereto.

As the ground owned by the last two companies mentioned, and the territory lying between and adjacent thereto, will doubtless attract much attention in the future, I have caused a map to be prepared to accompany this report showing the position of the various leaseholds.

The Big Valley Creek Gold Mines, Ld., holds a group of four claims on Big Valley and Two Bit Creeks. Development work has been prosecuted since June last under the superin-

tendence of Mr. W. Adams, M.P.P. A tunnel of somewhat over 700 feet in length has been run, but bedrock in the channel has not yet been reached. Wherever rim rock was encountered in running the tunnel heavy gold was found, leading to the belief that when the bottom of the channel is reached a valuable mine will be developed. This company has recently completed an incline, run down near the face of the drive, which will facilitate the disposal of the dirt. Work will be prosecuted during the winter.

Big Valley Creek is situate about fifteen miles north-east of Barkerville, the surface of which was worked to a limited extent in the early sixties, paying about wages, which at that time were from $8 to $10 per day, but the bottom of the deep channel was never reached. This company has also sunk a shaft on the side hill to a depth of eighty feet to test the value of the ground as a hydraulic proposition, but as yet bedrock has not been reached.

On the Urquhart claim, just above Dunbar Flat, on Lightning Creek, good prospects of very coarse gold were obtained. The owner, Mr. Walter Urquhart, feels confident that he has discovered a spill from the Dunbar lead, and that he has nearly a thousand feet of it. He is prepared for carrying on work during the winter, and expects to be taking out pay dirt shortly.

In the South Wales leasehold, comprising the Old Spruce, South Wales, Lightning and Ross claims, a good strike has been made on a bench about ten feet higher than the old worked channel, and between it and the lower end of the Butcher bench. The owners, Messrs. Jones, Tregillus and Price, have expended an immense amount of labour in reaching this ground, the existence of which had been proved before by a party of prospectors, who had the misfortune to lose their shaft and block the drainage before they were fairly on the bench, and after several ineffectual attempts to open it again were forced to give it up. The present company took up the ground in 1890, and have worked it continuously ever since. It is impossible to state the exact extent of this bench, but from surface indications it is nearly 100 feet wide, and may be from 400 to 1,000 feet in length, and as it lies between ground that yielded richly in the past, and is paying now, there is reason to believe that this is a valuable property.

The sale for taxes of the three real estate claims adjoining the upper line of the old Eleven of England Claim, has made possible the amalgamation of the Water Lily, Amalgamated and Bay State with the Eleven of England leasehold under one company, known as the Consolidated Eleven of England Company. This is a very good property, and its development will give a decided impetus to the mining industry on Lightning Creek.

It is to be regretted that the Lightning Creek Mining Co. and the Antler Creek Mining Co , who acquired last season what are regarded as valuable properties on Lightning and Antler Creeks, respectively, and who hold by Acts of the Legislature special privileges, have not yet commenced work upon their holdings, although several well-known men of experience have reported thereon. It is hoped that these companies will be in a position to commence active operations shortly.

HYDRAULIC ELEVATOR.

On Williams Creek the Cariboo Gold Fields, Ld., have continued to prosecute their extensive works with vigor. Bad ground was encountered in the drain tunnel, which is intended to reach and drain the works, being over half a mile in length. They were compelled to suspend work during the spring freshet, thus causing some three or four months' delay before the water drained off sufficiently to allow work to be resumed. Fair headway is now being made. This company has met with serious drawback in getting its heavy iron pipe hauled from Ashcroft and placed on the ground, the freight rates being almost prohibitive. With its usual perseverance, however, a contract has been recently let for the transportation of the pipe, and, the road permitting, a large quantity will be brought in during the winter. This is but one instance of the difficulties to be encountered in the development of a mining camp 300 miles from a railway or other good means of communication. Mr. Champion, the present manager of the company, has kindly consented to furnish a report on the work, which I append hereto.

NEW MINES.

It is satisfactory to note that there is a disposition shown among some of the new arrivals in Cariboo to leave the beaten track of the old prospector. Half a dozen applications are just to hand for leases on a small creek, called Lake Creek, described as being 30 miles north of Cottonwood River. The demand for leases still continues, some 250 having been applied for during the season.

Some recent discoveries have been made, of the extent and importance of which it would at present be premature to judge, but that they will be contributors to the gold yield of the district in the future is a fact that cannot be gainsaid.

The first I will refer to is a discovery made by Messrs. Wendle, Campbell & Co., on Pleasant Valley Creek, on the east side of Valley Mountain. This party, working only 25 feet square of ground to bedrock, the depth being from 15 to 20 feet, took out about $1,000. When their water supply was exhausted they at once started to bring in a ditch some two miles in length, which was completed too late to be of service this season. The company is now engaged in running a tunnel, and as soon as water can be obtained in the spring they will doubtless do well. All the ground adjoining this claim has been located, on which prospecting is now going on.

Messrs. Isaac, Johnson, Cockell and Walker have been running a tunnel through bedrock on Stewart's Creek, a tributary of Big Valley Creek, about 3 miles above the Big Valley Creek Gold Mining Co.'s work. The distance run is about 500 feet, which brought them into the channel, and they were rewarded by finding excellent pay gravel, as high as $2 to the pan being obtained. But for the scarcity of water the company would be taking out good pay from now on, being well situated for working during winter. All the adjoining ground has been located and is now being prospected.

Parties prospecting on Bear River, 16 miles to the north-east of Barkerville, report finding diggings that will pay $4 per day to shovel into sluices. This ground is very extensive, and with the necessary water supply and improved appliances can be made to pay handsome dividends.

RIVER DREDGING.

This branch of our mining industry may be said to be still in the experimental stage. Three scows, fitted with powerful machinery, were constructed at Quesnellemouth during last winter and spring, all of the suction type, although differing somewhat in the machinery used. The first put in operation was that constructed under the superintendence of Mr. Underwood, of Chicago, to operate on the lower part of the Quesnelle River. When put in operation it was found that although the heavy machinery (two 75 h. p. engines) did its work perfectly, much difficulty was experienced in keeping the screen at the mouth of the pipe clear, owing to the presence of numerous small boulders, thus preventing the auriferous gravel from being brought up into the sluices. The presence of gold in paying quantities when worked under favourable conditions was proven, and it is understood that the company proposes to put in either a bucket or dipper dredge at once.

The Youngs dredge, built to operate on the Pittsburg and Cariboo Gold Dredging Co.'s leases at Cottonwood Canyon, on the Fraser River, after experiencing the usual mishaps incident to new undertakings in remote localities, and anticipating the difficulty experienced by the Underwood dredge, made use of an appliance for removing such rocks as were sucked up against the grating at the end of the suction pipe. For some days the dredge did good work, bringing up some coarse gold, but as it was not found to be in paying quantities the dredge was removed to another place, which gave very satisfactory returns until their pump burst, leaving them powerless to continue the work. Mr. Youngs, who was in charge of the work, informs me that $60 in coarse gold was obtained from the last eight hours' operation. Work will be resumed by this company in the early spring.

The Alexandria Dredging Co., whose holdings are on the Fraser River, below Quesnellemouth, constructed, under the management of Mr. McCaskell, a suction dredge of somewhat lesser capacity than the two former, which commenced operations about three miles below the mouth of the Quesnelle River, and is said to have paid more than wages. As it was quite late in the fall before the dredge was started, only two or three weeks' run was made before the cold weather set in. The best evidence that this dredge at least is not a failure is the receipt of the royalty on the gold won from Mr. Heimick, of Vancouver, the secretary of the company. This is the first revenue of the kind paid into this office.

QUARTZ.

Very much interest has been engendered in our quartz mines during the season, presumably in consequence of the proof that our ores are adapted to the cyanide process of treatment, which Mr Marsh claims that he has demonstrated beyond question. Be this as it may, never before has so much confidence been manifested in our ledges as is evidenced in the unusual arge number of locations made.

Messrs. Thompson & Marsh, the lessees of the Government Reduction Works, are entitled to much credit for the push and energy displayed in carrying out the undertaking of placing a cyanide plant in the works. These gentlemen are the holders of an option on the Black Jack mine near Barkerville, on which they have expended a large sum of money in putting it in proper shape for working, and although they have at present suspended operations I understand this is but temporary.

Mr. Tatlow, of Vancouver, has bonded the Wintrip real estate claim, and is now engaged in running a tunnel on one of the ledges. This property, which contains three distinct ledges, adjoins the Black Jack mine, and is regarded as a most valuable proposition.

Two claims on Burns' Mountain have been bonded and first payments made, and it is expected that a large amount of development work will be done on these and several other locations in the vicinity next season.

As the years roll on the necessity for preserving, in a permanent form, some authentic record of the amounts produced from the famous gold-bearing creeks of the district becomes more manifest, I have therefore had prepared to accompany this report a map of Williams Creek, showing the present locations as well as the position of all the old claims of the early days, accompanied by a table stating the amount of gold produced from each particular locality, from the early days to the present time.

In the compilation of the table accompanying this map I am indebted for information to nearly all the old miners now resident in the district, and would especially mention the names of Capt. G. W. Robinson, and Messrs. H. McDermott, W. Hodgkinson, Wm. F. Anderson and Harry Jones.

The estimated gold product for the year is as follows:—

Barkerville Polling Division	$ 78,900
Lightning Creek "	50,000
Quesnelle "	48,100
Keithley, Quesnelle Forks and Horsefly	200,000
Estimated product from 1st to 31st December, including desultory mining, of which no account could be obtained	10,000
Total	$387,000

WILLOW RIVER LEASE.

By Mr. Fred. C. Laird, Manager.

In giving a report of the work done on this claim for the past year I beg to state as follows:—

When I made my last report to you we had finished our tunnel to rim rock, and had built a small shaft house to sink a shaft from the surface of the ground to the rim rock, connecting with the tunnel. Last winter we completed the shaft, making it six by twelve feet in the clear, and in three compartments. The shaft to rim rock is just 100 feet deep. Early last spring we began to grade out the hillside, in order to place our large shaft house and machinery, and get the machinery up the hill. Three months were spent in grading, building a tramway seven hundred feet up the hill, and hauling up the machinery by steam power. After getting buildings and machinery in shape we continued our shaft 112 feet deeper through the rock.

Leaving the last twelve feet of this shaft for a sump we broke out early in November into the tunnel, through which we expect to reach the channel of Willow River. We are now working day and night at this tunnel, and are progressing at the rate of 100 feet a month. The tunnel is six by five feet in the clear, and will be about 600 feet long when completed. We are now 160 feet in the tunnel. We use an Ingersoll-Sergeant drill and a blasting battery. We have had as usual many difficulties to surmount. The rock has been most difficult to work on account of its softness. All of the tunnel has to be timbered, and a great deal of extra work has been caused by rock caving.

Our plant now consists of main shaft house, 45 x 25 feet, boiler house 30 x 20 feet, and blacksmith shop 12 x 18 feet. Our other buildings consist of seven houses, stables and powder house.

Machinery comprises a fifty-horse power boiler, a pair of thirty-five-horse power engines, one 18-inch Cornish pump, two 12-inch Cornish pumps, one horizontal steam pump, a sixteen-horse power hoisting engine with upright boiler, besides the rock drill already referred to, and tools of all kinds.

We are thoroughly equipped to push the work, and barring unforseen accidents we confidently expect to reach the channel of Willow River by March 15th next.

From the surface of the ground to bedrock in the channel, as determined by the borings, it is 100 feet. In order to reach the channel, however, we have had to run a tunnel into the hill 620 feet long, sink a shaft to the rim 100 feet deep, continue the shaft 112 feet in rock, and then run a tunnel in the rock about 600 feet long, making in all nearly 1,500 feet of work.

SLOUGH CREEK MINING CO.

FROM MR. W. H. FIFE, PRESIDENT.

The work of development upon the property of the Slough Creek Mining Company has been continuously prosecuted during the entire year, but owing to the open winter season last past progress was slow during the early part of the year. Development work has been confined principally to the running of drainage tunnels, for the double purpose of draining the surface water from the high rock at the mouth of Nelson Creek, that it may be worked for its gold, and for the further purpose of draining the water so that we may proceed with the sinking of our proposed bedrock shaft and drive out to the old channel. The character of the ground through which we have been running the tunnels has been that of a loose wash, with large boulders throughout the entire distance and filled with surface water.

In order to complete the work of running the lateral extension of the main drain tunnel it was found necessary to open for its entire length, about 700 feet, an old abandoned drainage tunnel run by Nelson Creek miners many years ago, which in caving had not only drawn the surface water to it, since its abandonment, but had allowed water to accumulate as in a reservoir. This was a laborious undertaking and occupied much time, but it has been of great benefit. It was further found necessary to run a "balloon" drive between the lower tunnel and the old Nelson Creek tunnel referred to. As a result of these two undertakings the lower tunnel is nearly free from water, and the work of continuing it to the bedrock is progressing favourably, and so soon as the rock has been reached it is our intention to begin the construction, at once, of a working bedrock shaft to the old channel.

QUARTZ MINING—EXPERIMENTS WITH CYANIDE PROCESS.

BY S. J. MARSH, M.E., BARKERVILLE.

In giving a resume of quartz mining so far as it has come to my notice during the past summer, I may say that prospectors have been particularly active in looking for and locating quartz claims. Development work has been performed to the extent of $100 or more on a large number of claims, and on several a large amount has been expended. The results are most encouraging. In many instances large bodies of ore have been uncovered, and in no case that has come under my notice has bonâ fide work failed to show most beneficial results.

Many important facts have been demonstrated by this work, a few of which are:—

(1.) The limestone bands are closely related as to their position to the larger and well defined veins:

(2.) The country rock (slate) in the vicinity of richer portions of large veins, is mineralized with pyrite, and carries gold in varying quantities:

(3.) There are large bands of siliceous slates carrying gold, sometimes in paying quantities:

(4.) Free gold exists in all decomposed ores and siliceous slates, while very little, if any, exists in ores where decomposition has not taken place to some extent:

(5.) As depth is obtained the veins show less faulting and better defined walls.

Some of these facts are of great importance, and will be of value to the prospector who carefully studies the condition of the country, as well as to those who may wish to go more deeply into the nature and origin of the deposits of placer gold in this district.

In regard to practical reduction tests, as you are aware, a most complete test plant, using the McArthur-Forrest cyanide process, has been added to the Reduction Works, and the same put in first-class condition.

Since 17th August 265 tons of ore have been treated by the above-named process, and while I am not at liberty to give the exact figures I may say that the results obtained have been most satisfactory.

In this connection much important data has been gained, and the cyanide process has been placed on a solid basis here, and its scope of usefulness determined.

One fact, however, should be mentioned in regard to treatment by cyanide, lest it be regarded as a "cure all."

The heavier sulphides here, as in other places, have not as yet yielded to it except to a small degree. Finer crushing and agitation, with perhaps some modification of the present process, may overcome the difficulty, and while this will require some more experimental work, the fact is established beyond doubt that these sulphides, which may be easily separated by concentration, and which compose but a small part of the weight of the ores, may be successfully treated by chlorination, while the tailings and slimes will readily give up their gold to cyanide.

A concentrating plant will be added to the works this winter, also a small chlorination test plant, and a small cyanide plant to treat black sand from placers, which has been successfully treated during the summer.

From data carefully collected and estimates made, I may say that the average ore can be treated on a basis of fifty tons per day, by the combination of the two processes above referred to, for $2.98 per ton, exclusive of mining and royalty.

Of the work laid out for next season I am not at liberty to speak. I may assure you, however, that a large amount of important work will be done.

The assurance of a railway would give more impetus just now than anything else to the development of quartz mines, as eventually a large amount of machinery must be got here, which at the present freight rates would be very expensive.

CARIBOO GOLD FIELDS CO.

By JAMES CHAMPION, M. E., SUPERINTENDENT.

As a statement of work done on the Cariboo Gold Fields, Limited, during the past year I beg to report as follows:—

Since the last yearly report the drain tunnel (owing to very bad ground) has been driven only 800 feet, making the total length excavated to date 2,100 feet, leaving about 500 feet more to be driven to strike bedrock.

The No. 5 shaft has been sunk and connected with the tunnel at a perpendicular depth of 43 feet. On this shaft we have built a shaft-house 50 feet long, 25 feet wide, and 20 feet high, and have erected a steam-engine to hoist the gravel, which is washed in a "dump-box" as it is taken from the tunnel. We clean up the dump-box on the first day of each month, and I am pleased to state that our "clean-ups" have been very encouraging.

New blocks have been put in the Williams Creek flume, which is 2,200 feet long, 14 feet wide, and 6 feet deep; we have also put in a partition in the centre of said flume for the convenience of repairing at low water, when we can turn all the water of the creek in one compartment while we are repairing the other. Each compartment is 6 feet 7½ inches wide by 6 feet deep in the clear.

The ditch from Jack of Clubs Creek to Lightning Creek is completed, and we are now running water through the ditches from Lightning to Williams Creek, a distance of seven miles.

The ditch from Williams Creek to a point opposite proposed elevator shaft is also completed; length of ditch, three-quarter mile.

The Eye Opener ditch has been cleaned out and enlarged the whole length of the ditch.

The clean-up from the Eye Opener claim this season was so satisfactory that we have put in place ready for next season a new monitor having 4 and 5-inch nozzles, and 1,800 feet of 12-inch pipe, which will give a pressure of 350 feet. This monitor will be worked in conjunction with the old one.

Mr. S. Tingley has taken a contract from the company to deliver all the elevator pipe from Ashcroft to Quesnelle; about 100 tons has been delivered. The balance of about 300 tons is at Soda Creek, and will be delivered at Quesnelle, according to contract, by the first of March. The company's teams are now hauling the pipe that has been delivered at Quesnelle to this place, and we expect to get all the pipe delivered at Barkerville by the first of August next, and have the pipe and elevators in place ready to work before the end of next season.

OPERATIONS OF THE PITTSBURG AND CARIBOO GOLD DREDGING CO.

By F. E. Young, General Manager.

The Pittsburg and Cariboo Gold Dredging Co. was incorporated in West Virginia June 3rd, 1895, with an authorised capital of $200,000, the stock being taken by Pittsburg, Pennsylvania, capitalists.

A new form of suction dredging machinery, patented by the writer in Canada, November 15th, 1895, was adopted and built during the following winter and spring, and commenced active dredging operations in the Fraser River at Quesnelle in July, 1896. Only traces of gold were found at that point, and the plant was soon removed to the lease of the company above the mouth of the Cottonwood River, at the foot of Cottonwood Canyon, which was then prospected thoroughly, little or no gold being found on the bars for the first 1½ miles, above which the canyon narrows to about 400 feet and the water becomes very deep, the bottom having practically no gravel on the bedrock, which is every where exposed.

In this deep water, in the crevices of the bedrock, coarse heavy gold was found in pieces running as heavy as 84 cents, with many from 25 cents upwards, and in quantities sufficient to pay well had the dredge been operated continuously there. A few days after this pay was found the main shell of the centrifugal pump was broken, suspending operations for the season, it then being late in October.

The end of the suction pipe of this dredger is provided with a chisel or plow blade adapted to loosen up the gravel on the bed of the river, or to disintegrate and break up the surface of the bedrock bottom so as to free the gold lodged in the crevices, which is then easily lifted by the pump. The dredger is essentially a steam propelled scow, 26 feet by 80 feet, on the bow of which is placed a turntable carrying an 8-inch sand dredging pump, with steel suction pipe and connections, and a double drum hoisting engine, connected so as to rotate the turntable through an arc of 180°, and adapted to handle the steel suction pipe and plowing device so as to loosen up the gravel and break up the surface of the bedrock on the bottom of the river. The stroke of the plow ended, suction pipe is, to and from the turntable, radially a distance of about 25 or 30 feet, thus covering a very large area of the river bed without having to move the boat.

The results of the first season's work, while not financially satisfactory, are of great value from the knowledge gained of this branch of mining. They prove, *first*, that much of the river bed contains so little gold as to be no value for dredging.

Second—Bars which carry good pay above low water mark often carry little or no gold below it.

Third—Coarse gold once deposited in deep water in the bed of the river practically never travels.

Fourth—Pay streaks found on the bed of the river are often as sharply defined as if found in a vein of quartz. A few feet below where good pay is obtained not a trace of gold will be found.

Fifth—No form of dredger yet devised can be expected to give good results under all the differing conditions found on the Fraser River.

Sixth—Where the gold lies on bare bedrock, or but slightly covered with gravel, a suction dredge is far superior to any other form.

Seventh—Where the gold is fine and distributed through deep bodies of gravel a good form of dipper or bucket dredge is preferable, but the bottom should be afterwards worked over with a suction dredge to clean the bedrock.

Eighth—Below low water mark the gravel rarely exceeds six feet in depth over the bedrock or clay, and averages less than two feet.

Ninth—The location of valuable pay streaks in the bed of the rivers can only be done by systematically prospecting every portion of the stream by means of a small steam dredger, after which machines of large capacity properly designed to meet the conditions where the pay is found can be made to yield large returns, and bring this branch of mining to the front as one of the best paying propositions in the country.

KEITHLEY DIVISION.

By Mr. W. Stephenson, Mining Recorder.

Sir,—I have the honour to inclose herewith the estimate yield of gold for 1896 of the Keithley Division of Cariboo District, which if not fully coming up to our expectations at least shows a considerable increase over last year, which taken into consideration with a very poor mining season, owing to the want of rain experienced all over Cariboo District, gives a very fair showing for this section. Development work in this section has not been pushed to the extent that I expected it would have been during this last season, in some cases the want of water expected to be obtained from small streams to be used in prospecting has been the cause, and in other cases the cause is not very apparent; but as a whole there has been a considerable amount of preliminary work done, also quite a number of new locations made, which promises well for the coming season's work. Even at the present time there is work for all those who wish to work, as the Golden River Quesnelle Company are employing all the men they can get on their dam works at the outlet of Quesnelle Lake. This Company, since they commenced operations, have been pushing their work as fast as men and money can make it go.

In the way of new developments there is little to report except in the case of one company, the "California Consolidated," holding three mining leases on Roses Gulch. This company, with a limited supply of water, has opened up a cut in their ground, obtaining good results for the work done, and there is little doubt that with a good water supply would have a valuable mine.

On the Horsefly River the Horsefly Gold Mining Company (the old Harper leasehold) have their hydraulic elevator plant in place, and expect to commence operations early in the coming spring.

The Horsefly Hydraulic Mining Company, on the Horsefly River, owing to scarcity of water, have only had part of a season's work in this mine. The cement still bothers them for hydraulic working, and there is talk of turning it into a drift mine, with a plant for crushing the cement. The prospecting claims on the Horsefly have not yet succeeded in getting on to pay, still they are sanguine of making a strike some day in the near future.

On the South Fork of the Quesnelle River the Cariboo Hydraulic Mining Company have steadily pursued the even tenor of their way, the necessary force of men being employed in the mine, with another force employed in constructing several miles of new ditch, which was needed to bring the water in at a higher level to the mine, so as to obtain a greater pressure for their hydraulic pipes for next season's work. The results from the Company's work for the season are deemed quite satisfactory, over $127,000 being obtained for the season's work, and this with a very limited supply of water for the last two months of the working season; the last two wash-ups showing a great improvement over any ground worked during the first part of the season. Outside of this Company's work very little gold has been obtained from the South Fork of Quesnelle River during the season.

On the North Fork of Quesnelle River there has been a very considerable amount of work done during the season in the way of preliminary work and prospecting, also quite a number of new locations made.

The Victoria Consolidated Company commenced work early in the spring on Keithley Point with a good supply of water, and were progressing favourably until the freshet carried out the bridge which conveyed their pipes across the river; this put an end to their hydraulic work for the season. I have not learned what their intentions are for the prosecution of their work on Keithley Point.

On the other locations on the North Fork prospecting and preliminary work has been going on during the season, and there is little doubt but that some valuable mining properties will be developed on the North Fork during the coming season.

On the main Quesnelle River the companies owning mining leases have not carried on work for the season to the extent expected, some of them doing only enough work to hold their leases. It is to be hoped the coming season will see more active work carried on in this section.

On Keithley, Harvey, Snowshoe and other creeks in this vicinity work was carried on as usual while the water lasted, but as a whole this has not been a favourable season for miners on those creeks, the season being very backward in the spring, and following that a heavy freshet, after which the water failed altogether for the remainder of the season.

Re mineral claims in this division there is little to note, there being only four new locations made for the year, and on those previously located very little has been done in the way of development or prospecting.

CASSIAR.

By JAMES PORTER, GOLD COMMISSIONER.

SIR,—I have the honour to inform you that owing to the scattered state of the mining population here and the great distance they are apart, etc., and the expense that would necessarily be incurred in visiting all points in order to gather anything like accurate information, I regret to say that I am not in a position this season to frame a mining report and to furnish you with mining statistics.

I think that the output of gold for the season might be computed as being a trifle less than that of last.

During the summer some prospecting was done in various directions, but so far I have not heard of anything of importance being discovered. Very little or no attention has been paid during the season towards quartz development here.

A few days ago a gentleman representing Mr. C. F. Law, of British Columbia mining renown, came here, and the object of his mission is to visit some sections of the district where quartz is known to exist. He at once started out intending to secure some samples of rock from these ledges.

I have received a letter from Mr. Law, saying that if he could get anything promising from here that it was his intention to come in here early next season.

There is plenty of quartz known to exist here, and I do not see why some of it should not be sufficiently rich to pay. So far but little attention has been paid to this place, and I honestly believe that if prospecting was turned in this direction that something of importance would be discovered. Some good openings are also here for hydraulic mining, and it is my honest opinion that if some attention was paid to this sort of mining that it would prove to be a good investment.

EAST KOOTENAY.

BY W. A. CARLYLE, PROVINCIAL MINERALOGIST.

A short examination was made of those parts in East Kootenay where mining was being actively carried on, but with the exception of mines such as the North Star, Moyie Lake Mines, and the placer mines on Wild Horse Creek, little work other than assessment work was being done. However, in the southern part of Fort Steele District the prospectors were very busy during the past season, both in the Selkirks and Rocky Mountain Ranges, and a large number of claims were staked off in close vicinity to the North Star Mine and on the St. Mary's River, Bull River, Perry Creek, and their tributaries. The construction of the Crow's Nest Pass Railway, which now seems to be an assured fact, will certainly stimulate far greater activity, for there is no doubt whatever but that this part of the Province should be thoroughly explored as means of ingress and egress improve, as already some very valuable properties have been discovered and developed, and many locations have been made, which work will greatly enhance in value and importance.

Hitherto means of communication have been such that considerable time had to be consumed in reaching any part, and prospectors and mining men have been attracted to other parts more easy of access, but with a more extended steamboat service on the rivers, new roads and trails, and with keener interest aroused by the progress of mining in other parts of Kootenay, the Division of East Kootenay is on the eve of receiving much greater interest, with every probability that her latent resources will prove very valuable.

At Golden, in the office of the Gold Commissioner, is an excellent collection of samples of ore, mostly argentiferous galena and tetrahedrite ores, also copper ores, from the various lodes uncovered in the district.

TOPOGRAPHY.

Running north and south for over two hundred miles, flanked on the east and west by the towering ranges of the Rockies and the Selkirks, is the wide and beautiful valley through which flows the Columbia River to the north, and the Kootenay River to the south, to join waters at Robson in West Kootenay. This valley is ten to thirty miles wide, and gently rises to the foot-hills along the main ranges, which are often bold and craggy and rise in lofty peaks.

TRANSPORTATION.

Steamers.—From Golden, on the C. P. R. R., a very comfortable steamer of the Upper Columbia N. & T. Co., Capt. F. P. Armstrong, leaves for the Upper Columbia every Tuesday morning when navigation is open, and runs for most of the season as far as Mud Lake Landing, 113 miles, where passengers and freight are transferred by a horse tram, 4¾ miles, to the Upper Columbia Lake, where another steamer runs to Canal Flats, about 15 miles, and thence by the stage to Fort Steele, 46 miles, stopping over night at Hanson's, at Wasa Creek, 12 miles from Fort Steele, one of the best hostelries in Kootenay. When navigation ceases a weekly stage runs between Golden and Fort Steele, carrying the mails. To the south steamers of the same navigation company run down the Kootenay River from the North Star Landing, 6 miles above Fort Steele, to Jennings, and at high water these boats go as far north as Canal Flats, or about 4 miles from the steamer landing on the Columbia. Anticipating a large influx of men and supplies from the south during the present year, Capt. Armstrong intends establishing a daily steamer service, as long as the depth of water will permit, between Fort Steele and Jennings.

Roads.—A good waggon road extends from Golden to Fort Steele, whence roads radiate to Wild Horse Creek, Perry Creek and St. Mary's River, North Star Mine, Cranbrook, and to Tobacco Plains and across the border to the south.

Trails.—(*a.*) The Dewdney or Moyie Trail runs from Cranbrook south-west past the St. Eugene Mines, on Moyie Lake, to the landing on Kootenay River, where stop once or twice a week steamers on the Kootenay Lake service. This was the trail traversed by the placer miners in the early sixties.

(*b.*) The Toby Creek Trail, or Well's Trail, starts a few miles north of Windermere, and crossing the Columbia runs up Toby Creek to the Divide, thence down Hamill Creek to Argenta, at the north end of Kootenay Lake.

(*c.*) From Carbonate, south of Golden, a road for part way and trails lead up the different branches of the Spillimacheen River and into the McMurdo District. Of course there are many other trails, such as over the Crow's Nest Pass, etc., etc.

Ore.—Shipments are made by the steamers on the Kootenay Lake south to Jennings in the United States, and thence by G. N. R. R. to the smelters. The smelter at Golden has never yet been blown in, as no ore has so far been obtainable, but the development of the northern part of the Golden and other districts may yet supply these works, which were built rather prematurely.

FORT STEELE DISTRICT.

All the time available in this short visit of inspection was directed to the examination of those properties working in this district, and for notes regarding the discoveries on Perry Creek, Wasa and Bugaboo Creeks and the Dardanelles Mine, the writer is much indebted to Mr. Jno. E. Hardman, of Montreal, a mining engineer of wide experience and very high reputation, with whom the writer had the pleasure of travelling for three or four weeks.

NORTH STAR.

This valuable property comprises the *North Star*, *O. K.*, *Dreadnaught* and *Buckhorn*, Crown-granted; and the Rowan, Daffodil, Cromarty, Notre Dame, Dorval, Maverick, Good Luck, Canton, Full House, Brandon, Stemwinder and Ontario, mineral locations, owned by the North Star Mining Co., Ltd., Montreal. Pres., D. D. Mann; Sec., H. S. Holt, Montreal; Business Manager, N. W. Curran, Fort Steele.

These claims, 1,500 feet square, are located on a gently sloping mountain one mile south of Mark Creek, and 23 miles by waggon road west of the North Star landing on the Kootenay River six miles above Fort Steele, and 2,600 feet above the landing, or 16 miles directly west of the river. This lode was located in June, 1892, by Jos. Bourjouis, the locator of the War Eagle, Centre Star and Lily May, at Rossland, and since that time it has been so developed as to expose one of the largest bodies of silver-bearing galena ore yet uncovered in the Province; but it is to be hoped, and strongly recommended, that the company will follow the policy of extending the development work and keeping it well in advance of the mining of ore, and not rest content in simply working out the large body of ore now in sight, without the exploratory work so essential to the success and productiveness of any mine.

GEOLOGY AND ORE-DEPOSIT.

There was no time to study the geological conditions, but the rock inclosing the ore found in these and adjoining claims is dark grey with a fine-grained, hard and tough texture, apparently of igneous origin, except for slight evidences of bedding planes on the Sullivan Group, indicating the probability of its being very highly altered stratified rock. In the mine is rock looking much like the typical miner's "porphyry," running in places as tongues into the mass of solid ore, as if a dyke were there, but this might be simply the country rock altered near the ore-shute.

The Ore.—(*a.*) Is primarily a very clean, solid, argentiferous galena, rather fine-grained, with only a small amount of zinc blende, while underlying it along the foot-wall is the "iron-ore," or iron and maganese oxides, assaying about 20 ozs. in silver per ton. The assay value of the ore as per smelter returns is:—

Silver, 23.5 ozs. to 45.3 ozs. per ton; lead, 53 to 68%.

(*b.*) The upper part of the ore-shute has been decomposed to a mass of reddish-brown, black and yellow oxides and carbonites of iron and lead, with beautiful specimens of moss-like metallic silver and crystals of cerussite. There is a large amount of this ore, and unlike the "carbonate ore" in the Slocan it carries a higher silver value than the crude or solid galena ore, the values from smelter returns being:—

Silver, 52 to 60.8 ozs. per ton; lead, 49 to 57%.

In shipping ore a mixture is made of both kinds of ore and then sacked in jute sacks (made in Montreal) so that 16 sacks of the ore weigh one ton, and this is not low grade ore by any means, as is shown by the smelter returns on between two and three thousand tons sold during the past season, when the *net* or *yield* values averaged per ton:—

Silver, 30 ozs.; lead, 55 %.

Such ore was worth $52.40 per ton, and left a very good profit, after deducting costs of mining, transportation, smelting and duty.

Ore Body.—The existence of the ore-body was betrayed by the large amount of galena float on the surface, but it was not until much prospecting work (much of it very useless) had been done that the magnificent ore-body was found, the value and significance of the decomposed material first found apparently not having been appreciated until proven to be the richer carbonate ore overlying the unaltered galena.

The strike of the ore-body is nearly true north and south, and the dip to the east at an angle of 40° to 50°, the apparent greater flatness being due, it is believed by the writer, to a series of faults running north and south and dipping west that have faulted and lifted up the ore-shute in a series of short steps, a condition of affairs, if demonstrated to be such, that may be also found in other claims along this ore-bearing zone, but in nowise detrimental to their value, as dislocations or breaks are found, with few exceptions, in every mine.

The large size of the ore-body is shown in the mine workings. Shaft No. 1 was sunk 67 feet, and at 30 feet a short cross-cut to the west entered the ore, and along this level for a distance of 290 feet north and south a solid body continues, with fine ore in both breasts of the drift, with a thickness of 8 to 20 feet of ore, consisting of solid galena overlaid by decomposed or "carbonate" ore, which in one place was fully 15 feet thick. Along the dip this shute is known to be continuous for a width of 40 to 60 feet, and a large amount of ore now stands ready to be broken down. A cross-cut tunnel, 300 feet long, strikes this shaft at a depth of 60 feet, and continues west in barren ground 90 feet, the rock in the tunnel to the *east, i. e.*, in direction of the dip of the lode from a point 25 feet from the shaft changing from its very hard, solid character to a soft decomposed material with no ore, but at 105 feet east of the shaft the tunnel passed through a body 1½ to 3½ feet wide, strike north and south, dip east 60°, of soft yellow-coloured material, assaying 20 to 25 ounces of silver per ton, with no assay made for lead. Whether this is the continuation of the lode on the dip faulted up to its present position remains to be proven. Shaft No. 2, sixty-five feet north of No. 1, is sunk to the main work level, and then follows down the foot-wall for 22 feet, along which the ore-body is 6 to 8 feet wide.

During the coming season contracts are reported to have been made for the shipment of 5,000 tons of ore to the American smelters from the Landing, down to which the ore will be hauled on sleighs while winter lasts.

TIMBER AND TIMBERING.

The claims are covered by small, dead, black pine, and larger timber has to be hauled up to the mine in which the stopes are timbered up after the method of square setting, while the main tunnel, when necessary, is also well timbered.

WATER.

Not much water comes into the mine and can easily be handled by steam pumps when work is done below the tunnel level.

BUILDINGS.

In the shaft-house is a small steam hoist and a pump, and there were several large ore-houses filled up at the time of visit (October) with sacked ore. At shaft No. 2 is a horse whim, and a third shaft was being fitted up. There are good log buildings for the offices and assay laboratory, boarding and sleeping houses.

TRANSPORTATION.

(*a.*) A waggon road has been built from the Landing, 23 miles, to the mine, at a cost of $11,000, and in summer time a four-horse team will take down five to six tons of ore a day, and in winter six to eight tons, at a contract price of $5 per ton, horses being changed at the stables, half-way between the mine and the river.

(*b.*) The steamer during the season of 1896 ran from the 26th May to 22nd of August, and carried the ore to Jennings Landing at a contract price of $4 per ton.

(*c.*) The freight charges to the smelter at Great Falls, Montana, from Jennings was $4.50 per ton, while the smelter or treatment charge was $17 per ton for crude ore and $15.50 for "carbonate" ore.

The cost of labour was the same as in the Slocan District.

OTHER CLAIMS.

The company has done a little prospecting on some of its other claims, and to the west of the main ore shute, which is being worked on the North Star and Dreadnaught, it was claimed that more ore of the same character had been found in probably parallel leads.

THE SULLIVAN GROUP.

The *Shylock*, *Hamlet* and *Hope* mineral claims, owned by Jno. W. Cleaver, Pat. Sullivan, *et al.*, Fort Steele, and bonded to Col. Ridpath, Judge Turner, *et al.*, Spokane, are situated on Sullivan Hill, north of Mark Creek, and about 1½ miles north of the North Star, and two miles by trail from the road.

On this group there are large surface showings of mineral, not only of solid lead ore, but of concentrating galena ore, for which purposes the very ample supply of water and water-power of Mark Creek, 4,000 feet distant, will be easily available. Little prospecting had been done, but this work had been sufficient to indicate the relative importance of this property and the existence of an ore zone extending north and south, along which the ground has all been located between the claims of this group and the North Star. From the exposures of mineral there are evidently more than one lead in this belt, which further developing will prove up. The three claims of the property lie across this belt, and there are evidently two distinct ore-horizons, one on the Hope, the other on the Hamlet, or 12 to 1,500 feet apart.

The Hope.—On this claim for 7 to 800 feet there runs in a north and south direction a heavily mineralized belt, with a strong iron capping of typical gossan, and in shallow surface cuts are large exposures of mixed galena ore with considerable iron oxides resembling haematite, and a little iron pyrites, blende and mispickle. About 800 feet south of this showing of ore is a large exposure of light coloured, fine grained rock, more or less permeated with galena for a width of nearly 125 feet, in which a few pop-holes had been fired. The galena is generally arranged along the many small cracks in the rock mass, and if the amount of sulphides increase as depth is attained this may prove to be a large mass of concentrating material.

The Hamlet.—About 1,500 feet west of these croppings on the Hope, some excellent out-croppings of more or less solid galena ore had been stripped on the Hamlet Claim, and in stripping off the surface débris, large boulders of fine and coarse grained galena, exposing *in situ* at one place a body of solid galena ore eight feet wide. The dip and strike of this ore had not then been determined, but Col. Ridpath had just arrived with men and supplies sufficient for a short campaign of prospecting. West of this exposure of ore, other galena in place was uncovered, but beyond the many evidences of the presence of ore, probably in abundance, but little could be really learned from the little surface work done. Near by on these claims is highly altered rock with decided bedding planes, but also eruptive rock that in some places might be classed as a diorite, and this eruptive rock appears to be associated with the mineral.

OTHER CLAIMS.

As a result of the opening up of the fine ore-shute on the North Star, many locations were made in this locality along this belt during the past season, and on some of these properties, with only a little work done, this galena ore has again been found, while there are strong evidences of this belt along the strike, especially when crossed by the North Star road, where all the wash and the rock material is very heavily iron stained.

The *Quantrelle*, *Utopia* and *Stonewall Jackson*, lying south of the Sullivan Group, owned by F. P. Norbury, C. M. Edwards, *et al.*, had some ore reported exposed in the work done for assessment purposes, and these claims are said to have been sold to some gentlemen in Scotland. The vein has been traced by open cuts for nearly 300 feet, with, in one cut, 6 to 10 inches of solid galena, assays of which gave 18 to 23 ounces of silver per ton, and 55 to 57% lead. On the Stonewall Jackson there is said to be a quartz vein 12 feet wide, with some galena in the decomposed surface material, but, as on nearly all the other claims, little work has been done to show what the true conditions are.

The *Midnight*, lying immediately north of the North Star, has had considerable work done, with the disclosure of vein material.

The *Deane* and *All-Over* are owned by R. O. Jennings, C. D. Porter, and the Kansas City Smelting and Refining Co., and have been prospected to some extent, uncovering some mineral in place.

Work has been done on other locations, but during this year this locality will be developed to a much greater extent; claims of comparatively recent location will be properly prospected, and if more large ore-bodies are opened up, quicker transport facilities may be supplied, as a branch of the proposed new railroad can be built with very little trouble up along the foothills to the proximity of these mines.

ST. EUGENE GROUP.

On the south side of Moyie Lake, 33 miles south-west of Fort Steele, reached by the Dewdney Trail, is an important group of claims extending south, up the mountain side from the lake, of which the *St. Eugene*, *Peter*, *Loretta* and *Rose* (the last two fractional claims), Crown grants applied for, are owned by J. Cronin *et al.*, with a part interest bonded to Jno. A. Finch, who has been so successful in West Kootenay.

At an elevation of nearly 1,400 feet above the lake, in the flat-lying, highly-stratified shales, quartzites and silicious limestones, a vein of nearly solid galena is being developed, in a systematic manner, with a large amount of fine ore accumulating on the dump awaiting the advent of a railway for good transportation facilities, as it is believed that the Crow's Nest Pass R. R. must pass along this side of Moyie Lake, or within a very short distance of this mine, and then these large bodies of lead-silver ore will become very valuable. The strike of the vein is nearly east and west, with a dip of 65° to 80° south, and in the upper tunnel, No. 1, 170 feet long, for the first 40 feet there was found only mixed ore or galena, quartz, and country rock, then followed the more solid ore, in which at 65 feet an upraise to the surface for 40 feet passed through nearly solid ore, which from this point in the tunnel to breast continues as a solid glittering mass, 4 to 5 feet wide, of coarsely crystalline galena, while the face of the drift on the day of examination (Sept. 30th) was all ore, or solid clean galena. At the mouth of the tunnel a shaft was being sunk 6 by 10 feet, on a dip of 65° to 70°, and from top to bottom, or for nearly 35 feet, this working was all in solid galena ore, 5 to 6 feet thick, with the bottom all in ore. Tunnel No. 2, 100 feet below No. 1, was run as a cross-cut for 100 feet, and then for 300 feet along the supposed (but barren) course of the ledge, with but a short distance remaining to connect with the shaft above mentioned, which connection may serve to show whether this tunnel has been following the vein fissure, or simply parallelling it.

On the surface, this vein has been well traced for 800 feet, especially above the upper tunnel, where open cuts disclose mineral for nearly 600 feet, while to the west this vein passes through several claims to be described. For the most part the galena is very coarsely crystalline, with a very little zinc blende, and several stringers or veinlets run off from the main vein into the country rock, but the vein is pretty well hidden under the débris, on removing which the ore *en masse* has been found.

On the dump the ore taken out in development work, was being piled up, and it was claimed that in one large pile of clean galena ore the average values ran 45 to 50 ounces silver per ton, and 65 to 70% lead.

In another pile was collected a large amount of concentrating ore that would concentrate about 2½ tons to 1, but no ore was being extracted, except that mined in the exploration of this property, which will be able to ship a large amount of this silver-lead ore as soon as the means of easy shipment are supplied.

There is an abundant supply of good timber, good mine buildings had been erected, and should a concentrator be erected at the lake, then an aerial-rope tramway, dropping down 1,200 feet, can easily be constructed to bring ore down to the railroad or the mill; but in the meantime Mr. Cronin is contenting himself in developing these claims, and twelve men were employed.

Between the St. Eugene Group and Moyie Lake, ore has been found in three claims, and work was done during the past season, showing the continuation of the ore zone for nearly 4,000 feet.

MOYIE AND QUEEN OF THE HILLS.

These two claims, owned by F. Houghton, C. E., Montreal, E. P. Davis, *et al.*, were located on the south-west of the St. Eugene Group, in June, 1893, and starting on the upper or eastern end of the "Moyie" claim, and extending into the "Queen of the Hills," or about 1,500 feet westerly of Mr. Cronin's workings, the upper tunnel runs in on the vein, with 25 feet of the ledge matter, carrying galena, carbonates and iron oxides, and then for 50 feet to the face exposes a vein of solid coarsely crystalline galena, with some blende, 2 to 4 feet wide, narrow-

ing at the face of the tunnel. On the dump were piled 2 to 300 tons of this ore, said to run 45 to 50 ounces silver per ton, and of course with a high percentage of lead.

On the surface there appears to be two leads, 4 to 500 feet apart, the southern one of which is thought to be the extension of the St. Eugene vein, and several small cuts were made in the iron-stained cap-rock, disclosing the galena more or less decomposed with quartz in the very silicious limestone country rock. On the lower or western end of the "Moyie," 600 feet lower down the mountain side, the lower tunnel was in 30 feet prospecting for ore that was showing immediately across the side-line in cuts on the Lake Shore claim.

THE LAKE SHORE.

This claim and the *Legal Tender* a fractional claim, owned by Chas C. Farrel *et al.*, lie between the Moyie claim and the lake, and are crossed by the Dewdney trail. In several cuts and strippings galena ore, more or less mixed or scattered, has been exposed, ore that has assayed from 40 to 60 ounces silver per ton, besides the lead value. A working tunnel had been started and was in 40 feet, with only a few inches of galena showing, but more work will be done in the search for more continuous ore bodies, which may be found below in a less scattered form. There is a good supply of mine timber, and a new cabin was being constructed below the workings near the trail.

TRACY CREEK.

On Tracy or Wasa Creeks several veins have been located in the mountains of the Rockies, and also nearly as far south as the Boundary Line, on which work is now progressing. The Tracy Creek mines are a few miles east of Wasa (or Hanson's), and about 5,000 feet above Kootenay River, and at present comprise two groups.

The *Stella* and *Cashier*, owned by G. Scott, A. Murtz *et al.*, Fort Steele, were located in October, 1895, on the north side of Tracy Creek basin. The rocks are stratified, mostly slates, with bands or dykes of eruptive rocks, and the quartz vein running N. E. by S. W. and dipping at a flat angle or 28°, contains iron pyrites, galena and tetrahedrite, assays of which have given from picked samples 130 ounces silver and $13 in gold per ton; also 14 % copper and 5 % lead. A little work had been done, but supplies were being sent up to keep two men employed all winter sinking an incline on the lead.

On the *Skylark* and *Rover*, south of the Stella Group, Capt. F. P. Armstrong is running in a 200-foot tunnel on a galena vein of about 8 feet of mineralized calcareous quartzite, in which much solid galena ore is seen, both coarsely crystalline and of the steel galena variety. This vein can be traced throughout one claim with a strike S.E. and N.W. (mag.), and a dip of 50° south, and shows very plainly in the face of the cliff, with bunches of the solid galena 8 to 12 inches wide. Assays yield 30 to 35 ounces of silver per ton, and 65 to 75 % lead, and should mining operations be undertaken a good waggon road can easily be built right to these properties.

GOLD PROPERTIES.

PERRY CREEK.

Considerable excitement has been aroused by the discovery and location of several very large quartz ledges on the north side of Perry Creek and west of Saw-Mill Creek, which flows into Perry Creek, a tributary of the St. Mary's River and a stream much washed in the seventies for placer gold, two or three miles above which placer ground, or by roads and trails 25 to 30 miles westerly from Cranbrook, these quartz leads are now located. For 5 miles west and 2 miles east of Ellwood Creek, a small branch of Perry, the country has been all located along the course of three, if not more, quartz ledges which have proved to be auriferous, but to what value had not then been determined.

The three ledges seen by Mr. Hardman were running N. 10° W. and S. 10° E., or parallel with the stratification of the country rock or slates, and standing nearly vertical about 1,200 feet apart.

Vein No. 1, the first met with on going up from the Creek, running about north and south with a dip from 50° to vertical, is 1½ to 2 feet wide, and can be traced through 7 claims. Although 13 claims (or over 3 miles) had been staked off along this lead, on which claims owned by John Sherwood some surface work had been done, showing up the vein of whitish granular quartz containing some iron pyrites and magnetite, from which free gold can be got by crushing and panning samples.

Vein No. 2 is 1,200 feet west and 9 to 11 feet wide, on which are claims pegged off by Jno. Sherwood, Chas. Ellwood (in August, 1896) and others, but little work had been done except on the "Snow-Shoe" and "Sour Dough" in a 9-foot vein of solid quartz, with a little iron pyrites, which had been clearly traced through 7 claims, or for nearly 10,000 feet, while 2 miles south of these claims the vein is said to be again shown in some shallow cuts. Assays of $6 in gold per ton had been got from this vein, and also fair prospects by panning.

Vein No. 3, or the "big vein," still further west about 1,200 feet from No. 2, is a quartzose band in the slates over 40 feet wide, from which the locators claim to have got assays of $4 to $15 in gold. Over four miles of locations have been made along this ledge in October, but very little work had been done, although much will be done, as many claims have at the present time been bonded or sold, and during the coming season much attention will be directed to this creek, and also to the ground along the tributaries of the St. Mary's and Moyie Rivers.

The timber on the Perry Creek locations is small and scanty, and if mills are erected they will have to be down on Perry Creek, where is abundant water for milling purposes, about 500 feet below the small vein or No. 1, and 900 feet below the 40-foot vein. The mountains are all much rounded and not cliffy, and should these veins prove to be rich enough in gold to pay, there will not be much difficulty in getting in the necessary stamp mill machinery, etc.

THE DARDANELLES,

On the tributaries of the Wild Horse Creek, famous for the production in the past of its placers, many mineral locations have been made, on one of which, the *Dardanelles*, mining was being done. This claim and the "Mother Lode" and "Ethel," owned by Banks Bros. and O. S. Frigeele, Fort Steele, lie on the mountain side 2,000 feet above Wild Horse Creek, and 1½ miles by a steep trail from the arrastra on that creek (10 miles east of Fort Steele). The quartz vein, 2 to 3 feet wide, striking N. W. by S. E., and dipping S. W. at an angle of 23° to 33°, contains a small amount of iron-pyrites and galena besides the gold values (not ascertained), and can be traced for 4,000 feet in the country rock of slate. It is being developed by an incline, in which the maximum width of ore is 4 feet, but at 130 feet the vein has split in two or bifurcated, the upper part being about 10 inches wide, while the lower, dipping at an angle of 45°, is only 3 inches wide. The ore is roasted in heaps at the mine, then rawhided down to a new arrastra near by an overshot wheel, the arrastra being 9 feet in diameter, 2 feet 4 inches deep, with 5 to 800 pound drags, and equipped with 3 copper plates and blanket sluices. As no clean-up had been made no details as to amount of gold being saved could be secured.

THE INVICTA GOLD MINING (PLACER) CO., LTD., ENGLAND

This English Company having secured about one mile along Wild Horse Creek, from which much gravel had been washed during the last thirty years, during the past season began the installation, under the superintendence of Mr. J. W. R. Young, M. E., of a requisite plant, sluices, etc., for the hydraulicing of the large bank of gravel shown in the engraving, but as there had been a long delay in the transportation of piping, monitors, etc., but little washing could be attempted during the season, although about 70,000 cubic yards were moved, that yielded, according to the annual report of this company, 7 cents per yard.

The bank is now about 5,000 feet long, and washed back 6 to 800 feet from the creek by former holders of small claims, and now stands nearly vertical, showing several more or less uniform strata dipping easily towards the creek, of which the (*a.*) upper stratum of 50 feet to 60 of top dirt carries no value; (*b.*) the next stratum or "red-dirt" is about 20 to 25 feet thick, and so far has proved to be most profitable; (*c.*) the blue-dirt stratum, 35 feet thick in places, is so solid that it has to be broken up by dynamite before hydraulicing; (*d.*) the alternate layers of clay and conglomerate of considerable depth, are to be tested for their values, and these lie on the bedrock of highly tilted chloritic slates. A large amount of dirt on the bedrock has not been tested, but two shafts are being sunk this winter for this purpose, which, if profitable,

may have to be washed out by driving in a tunnel from an advantageous point down the creek, and then washing the dirt into sluices laid along this working.

There is a considerable number of rounded boulders too large for the sluices, that accumulate, and as yet no derricks have been supplied for their removal, in case the ground now underlying is washed out down to the gutter.

Dump.—A large amount of boulders collect at the outlet of the sluices, which are then extended out towards the stream as these pile up; the finer dirt collects more or less in the stream, but is all sluiced out by the yearly freshets.

Water—Is supplied by two ditches on the north side of the creek, of which the "China" ditch, 3¾ miles long, supplies, when running full, 1,000 miners inches of water, and the "Victoria" ditch, 4½ miles long, 1,500 inches, the former supplying the water to the monitors in the pit, under a head of 250 feet, the latter of 350 feet. The water usually begins to rise about the middle of May, with a good head about June 1st, which lasts from 3 to 4 months and then begins to decrease rapidly, so that effective hydraulicing can only be done for about five months in favourable seasons.

Plant.—From the pressure boxes at the ditches, two pipe lines, 1,300 feet apart, consisting of steel pipe of 16 to 10 gauge and 22 to 12 inches in diameter, lead down into the pit where, when the water supply is full, one No. 4, one No. 3, and two No. 2 monitors are used. Water is also used by letting it cut down the bank by running over the edge as shown in the engraving.

Sluices.—There are two about 650 feet long each, 3 by 3 feet, with a grade of 8 inches to 16 feet. No mercury is used or under-currents, as there is claimed to be no fine gold, 95% of the yield being saved in the upper 100 feet of boxes.

An electric light plant of 12,000 candle power is driven by a Pelton wheel, and serves to light all the workings and permit night working.

Cost of Labour.—Pipemen receive $3.50 per 12 hours, and whitemen for other labour $3, and Chinamen $2.50 per 10 hours. During the coming season the company will be so equipped for work that they may avail themselves of the full water supply, and thus handle a much larger amount of dirt, and plans for future working of the property will be perfected.

NIP-AND-TUCK GOLD MINING CO.

This placer mining company of Vancouver, has rights over the placer ground below the Invicta ground, but on the south side of Wild Horse. There is a ditch about 5 miles long for the water supply, and as Mr. J. H. Cunard, Superintendent, was engaged near the head of the water-way on the day of visit, he could not be seen for further particulars, but a very good clean-up is said to have been the result of the season's washings.

Quite a number of Chinamen are washing on small leases, and down in the canyon they were building a large flume, so as to be able to work out the creek bottom in low water.

COAL AND COKE AND OIL.

The building of the Crow's Nest Pass R. R., and the demand for coal, and more especially coke, are attracting much attention now to the large deposits of coal that will be made available by this railway, and by the splendid coking qualities of this coal, or of a large part of it, and the subjoined report by Dr. Selwyn, late Director of the Geological Survey of Canada, will be of great interest at this present juncture. From the analysis given it will be seen that an excellent coke, very low in ash, can be produced; a coke not excelled by any other made in the west; and as large smelting works are now being constructed, this fuel supply will be a valuable factor in the smelting of the ores of this Province within her own borders. With the advent of the railway, the oil fields described will also receive that exploration their surface indications warrant.

REPORT ON THE COAL FIELDS.

In connection with this may be quoted the following extracts from the Summary Report on the operations of the Geological Survey of Canada, for 1891, giving an account of a visit of Dr. Selwyn, C. M. G., into these coal fields and oil fields, in the summer of 1891:—

"On the 31st of July, Colonel Baker joined me here, and on the following day we camped at the east end of Crow's Nest Lake, and on the next day, 2nd of August, we reached the coal prospecting camp, situated about 1,200 feet above the trail, on the ridge which runs in a

GOLD PLACER MINING, WILD HORSE CREEK, EAST KOOTENAY.

THE INVICTA GOLD MINING CO. LTD. (ENG.)

north-easterly direction between Marten Creek and Michel Creek, and form the west side of the valley of the west branch of Michel Creek. From this ridge a number of spurs, with steep intervening gullies, descend abruptly to the trail; in these, and on the intervening ridges, a wonderful series of coal seams is disclosed, one above the other from near the level of the trail to the summit of the ridge. No exact measurements were taken, and it may be that some of the lower cannel seams are the upper ones repeated by faulting. The out-crops which can be seen on the ground are as follows, twenty seams in all, showing a total thickness of 132 feet of coal:—

No. 1	5 feet.	No. 1 to 10, inclusive, are cannel coals.	No. 12 (Peter seam)	15 feet.	
" 2	3 "		" 13	7 "	
" 3	4 "		" 14 (Selwyn seam)	6 "	
" 4	2 "		" 15 (Jubilee ")	30 "	
" 5	4 "		" 16 (Williams ")	20 "	
" 6	3 "		" 17	5 "	These 4 are cannel coals.
" 7	2 "		" 18	3 "	
" 8	4 "		" 19	2 "	
" 9	5 "		" 20	2 "	
" 10	5 "				
" 11	4 "			132	

"The number and thickness of these seams in the above table are as supplied by Mr. Fernie, who has superintended all the exploratory work that has been done on the seams. Between the eastern out-crops I examined, and the western ones close to the junction of Marten Creek and the west branch of Michel Creek, is a distance of about two miles along the steep mountain side, to the north of the trail. Within this distance the out-crops were seen of nearly all these seams, either on the ridges or in the sides of the ravines which score the face of the mountain. The few hours I was able to spend on the ground, while not sufficient to enable me to affirm the absolute correctness of the details of the table, were, however, ample to enable me to see that there is in the Crow's Nest Pass, between the eastern summit, 4,330 feet above tide, and the valley of Elk River, in British Columbia, an area of not less than 144 square miles, that is destined to be one of the most valuable and most productive coal fields in Canada. A rough calculation would give about 49,952,000 tons per square mile. If one-half of this is available, there are in each square mile 24,976,000 tons. The average elevation of the field is about the same as that of Canmore and Banff, or between 4,000 and 5,000 feet. From Pincher Creek westward to Elk River the Pass presents no difficulties for railway construction. The eastern entrance to the Pass in Alberta is 3,800 feet, and where it comes out on Elk River is 3,300 feet, the highest intervening summit being 5,500 feet. A better route to the Elk River, however, than that of the present trail, would be to follow down Michel Creek, from near the eastern summit, and thus avoid the western and higher summit, and reach Elk River about ten miles above the mouth of Coal Creek. The distance through the Pass from Lee's Lake, Alberta, to the Elk River, is about thirty-seven miles.

"On the 4th August, after devoting the forenoon to a further examination of the Marten Creek seams, we proceeded through the Pass and reached Elk River at 6 p.m. No coal seams were seen until about four miles above the mouth of Coal Creek; here, at the mouth of a steep rock gulley, about 200 yards to the right of the trail, a fine seam of coal, 7 feet thick, had been cut into. The section exposed showed, in descending order:—

Shale	10 feet.
Hard ferruginous band	1 "
Coal	1.6 "
Shale	7.6 "
Coal	7.6 "

"Cherty conglomerate and massive gritty sandstones are seen both above and below; the dip is about E. 10 degrees, N. 15 degrees—20 degrees. A close search along the mountain side, between here and the water-shed at the head of Coal Creek, would almost certainly disclose the out-crops of many more of the Marten Creek seams.

"On the 5th August we descended the Elk River Valley about seven miles, then turning to the left ascended the mountain, a steep climb of 1,500 feet. Here on top of a broken-down

cliff of massive sandstone, about 50 feet thick, we came to the first of a series of coal seams, the dip being E. 20, N. 35, and the seam 25 to 30 feet thick, with a shale parting about 2 feet, barometer 24.93. Ascending 130 feet, over shales and brown thick bedded sandstone, forming a similar broken-down cliff of about 50 feet, a second seam of coal was reached, also 30 feet thick, bar. 24.80. Above this four more seams were examined:—

No. 3	15 feet,	bar.	24.57
" 4	4 "	"	24.50
" 5	7 "	"	24.42
" 6	30 "	"	24.35

"Above No. 6 there are six more seams which were not visited, but the particulars of which, given to me by Mr. Fernie, are as follows:—

No. 7	10 feet,	100 feet	from No.	6
" 8	4 "	100 "	"	7
" 9	7 "	100 "	"	8
" 10	2 "	100 "	"	9
" 11	7 "	100 "	"	10
" 12	4 "	200 "	"	11

"The distances are approximate only; they have not been measured.

"The above gives a total thickness of 148 feet of coal against 132 feet in Marten Creek area on the eastern side of the basin, while in other respects the seams correspond so closely as to make it almost certain that, except where cut out in the valleys, they are continuous beneath the whole intervening area. For much detailed information respecting the Crow's Nest Pass, the annual report of the Geological Survey, Volume I., Part B, 1885, already cited, and the accompanying map can be referred to.

"Many of the seams are first-class coking coals and other are good gas coals, but none of them are anthracites. For analyses of those of the Jubilee and Peter seams, Marten Creek, *see* Annual Report of the Geological Survey, Volume III., Part II., pp. 12s to 15s, and for those of the "cannel" seams, Volume IV., pp. 7r and 8r."

REPORT AND ANALYSES OF SAMPLES OF COAL.

The following is the report and analyses of the various samples of coal made by G. C. Hoffman, Esq., F. Inst. C., Chemist and Mineralogist of the Geological Survey of Canada:—

Coal.—From the Peters seam, second crossing Marten Creek, Crow's Nest Pass, Rocky Mountains, British Columbia. Seam said to be 14 feet thick. Geological position, cretaceous Kootanie series. Taken thirty feet in from outcrop. Locality referred to by Dr. Geo. M. Dawson in Annual Report for 1895, p. 75b.

"This coal has crumpled, foliated structure; shows slicken-sides; colour, greyish black to black; lustre, resinous; that of the slicken-sided surfaces occasionally inclining to vitreous; firm, fracture, irregular; slightly soils the fingers; does not contain any interlaminated calcite, but occasionally here and there a delicate film of iron pyrites; powder brownish-black; it communicates a faint brownish-yellow tinge to a boiling solution of caustic potash; resists exposure to the air.

"Specific gravity, 1.3052 (temp., 15.5 degress C.). Weight of one solid cubic foot, calculated from the specific gravity, 81.57 pounds.

"Analyses by slow and fast coking gave:—

	Slow Coking.	Fast Coking.
Hygroscopic water	1.79	1.79
Volatile combustible matter	25.45	33.04
Fixed carbon	69.14	61.55
Ash	3.62	3.62
	100.00	100.00
Coke per cent	72.76	65.17
Ratio of volatile combustible matter to fixed carbon	1 to 2.72	1 to 1.86

An ultimate analysis gave (exclusive of sulphur, ash and hygroscopic water):—

	Slow Coking.	Fast Coking.
Carbon	80.51	85.57
Hydrogen	5.20	5.53
Oxygen and nitrogen	8.37	8.90
Sulphur	.51	.....
Ash	3.62	.....
Hygroscopic water	1.79	.....
	100.00	100.00

"Calorific power, experimental, determined by Thomson's Calorimeter:—

Indicated power of fuel in calories 8,050

Indicated evaporated power, 14.99 pounds of water (at 100 deg. C.) per pound fuel, deducting the units of heat necessary to vaporize the hydroscopic and combined water of combustion of the fuel, we have an indicated power of fuel in calories 7,790

Indicative evaporative power, 14.1 pounds of water (at 100 deg. C.) per pound fuel, and these latter figures will express the greatest effect obtainable from this fuel in generating steam. Calorific power, theoretical, calculated from its chemical composition:—

Expressed in calories 7,990
Pounds of water (at 100 deg. C.) evaporated by 1 ℔. fuel 14.39

Deducting from these figures the heat units required to vaporize the hygroscopic and combined water, and water of combustion of the fuel, we obtained the following values:—

Expressed in calories 7,730
Pounds of water (at 100 deg. C.) evaporated by 1 ℔. fuel 14.39

Which gave the closest approximation to the available heat. It yielded by slow coking a non-coherent coke; by fast coking a compact, firm, coherent coke in concentratic layers, in which the form of the particles of coal from which it has been derived is entirely obliterated; gases evolved during the coking burnt with a yellow, luminous, smoky flame. Colour of the ash, white, with a faint, reddish tinge; exposed to a bright red heat it does not become agglutinated; at a most intense red heat it becomes slightly fritted."

Coal.—From the Jubilee seam, second crossing Marten Creek, Crow's Nest Pass, Rocky Mountains, British Columbia. Seam said to be 30 feet thick. Geological position, cretaceous Kootanie series. Taken fifty feet in from outcrop. Locality referred to by Dr. Geo. M. Dawson in Annual Report for 1885, p. 75b.

The description given of the immediately preceding coal, viz., that from the Peter seam, applies also to this one, the only difference being that this coal did not contain any visible iron pyrites, and communicated a very pale, brownish yellow, and hence a somewhat more decided colour to a boiling solution of caustic potash.

"Specific gravity, 1.3088 (temp. 15.5 deg. C.). Weight of one solid cubic foot, calculated from the specific gravity, 81.80.

"Analyses by slow and fast coking gave:—

	Slow Coking.	Fast Coking.
Hygroscopic water	1.89	1.89
Volatile combustible matter	24.88	30.41
Fixed carbon	68.86	63.38
Ash	4 37	4.37
	100.00	100.00
Coke, per cent	73.23	67.70
Ratio of volatile combustible matter to fixed carbon	1 to 2.77	1 to 2.08

"An ultimate analyses gave (exclusive of sulphur, ash and hygroscopic water):—

	Slow Coking.	Fast Coking.
Carbon	80.04	85.82
Hydrogen	4.94	5.30
Oxygen and nitrogen	8.28	8.88
Sulphur	.48	.....
Ash	4.37	.....
Hygroscopic water	1.89	.....
	100.00	100.00

"Calorific power, experimental, determined by Thompson's Calorimeter:—

Indicated power of fuel in calories 8050
Indicated evaporative power, 14.99 pounds of water (at 100 C.) per pound of fuel.

Deducting the units of heat required to vaporize the hygroscopic and combined water, and water of combustion of the fuel we have an—

Indicated power of fuel in calories 7990
Indicated evaporative power, 14.51 pounds of water (at 100 deg. C.) per pound of fuel.

And these latter figures will express the greatest effect obtainable from this fuel, when used in generating steam.

"Calorific power, theoretical, calculated from its chemical composition:—

Expressed in calaries 7990
Pounds of water (at 100 deg. C.) evaporated by 1 lb. of fuel 14.88

Deducting from these figures the heat units required to vaporize the hygroscopic and combined water, and water of combustion of the fuel, we obtain the following:—

Expressed in calories 7618
Pounds of water (at 100 deg. C.) evaporated by 1 lb. of fuel 14.18

Which latter gives the closest approximation to the available heat. It yields, by slow coking a non-coherent coke; by fast coking, a compact, firm, coherent coke, in concentric layers, in which the form of the particles of coal from which it has been derived, is entirely obliterated; gases evolved during coking, burnt with a yellow, luminous, smoky flame. Colour of ash, white; exposed to a bright red heat, it remains unaffected, at a most intense red heat it becomes fritted."

Coal.—From second crossing, Marten Creek, Crow's Nest Pass, Rocky Mountains, British Columbia. There are said to be four seams of this particular material at this locality, having a thickness of respectively, 3, 4, 5 and 6 feet Geological position, Cretaceous, Kootanie series.

"Structure compact, made up of more or less spherical or lenticular shaped nodular grains of pitch-black colour and brilliant lustre, thickly disseminated through a matrix of dull grayish-black coaly matter. Does not soil the fingers; tough; sonorous; fracture somewhat irregular, with a tendency to large conchoidal; powder, brownish-black; it communicates a reddish-brown colour to a boiling solution of caustic potash. Takes fire in a lamp-flame, burning with a yellow, luminous flame which, however, dies out almost immediately after withdrawal from the source of heat. Resist exposure to the air. From a microscopic examination of thin slices of this coal, it is inferred that the aforementioned nodular grains consist of an altered resinous matter.

"Analyses by slow coking and fast coking gave:—

	Slow Coking.	Fast Coking.
Hygroscopic water	2.10	2.10
Volatile combustible matter	44.41	57.71
Fixed carbon	43.63	30.33
Ash	9.86	9.86
	100.00	100.00
Coke, per cent	53.49	40.19
Ratio of volatile combustible matter to fixed carbon	1 to .98	1 to .52

"It yields by slow coking, a bulky, coherent, highly vesicular coke; by fast coking, a firm and lustrous coke in concentric layers, in which the form of the particles of coal from which it has been derived is entirely obliterated, and of about the same, or if anything, less bulk than the original coal. When heated in a covered crucible, it produces a very large amount of gases which burn with a yellow, luminous, very smoky flame. Colour of the ash, pale reddish-white, when exposed to a bright red heat it remains unaffected, at a most intense red heat it becomes slightly sintered.

"This material constitutes an excellent gas coal, not only by reason of the large amount of volatile combustibe matter it is capable of affording, in which respect it is superior to a very large number of cannel coals, which are employed for gas-making, but also from the fact that this would appear to be of superior quality for illuminating purposes."

REPORT ON OIL FIELDS.

The following are extracts from Dr. Selwyn's report of his visit in 1891, to the oil fields, situated in the south of East Kootenay (see Summary Report, Geological Survey of Canada, 1891, pp. 9, 10):—

"Cameron Falls Brook is a rapid mountain stream eight or ten yards wide. After following it up about a mile and a half on the left bank, Mr. Fernie, my guide, remarked that we must be close to where the oil had been seen. He had scarcely spoken when, while still in the saddle and on the trail eight or nine feet above the brook, I noticed a powerful odour of petroleum. Descending to the edge of the water and stirring the stones and gravel in the bed of the stream, considerable quantity of oil at once rose to the surface and floated away. Crossing to the right bank, some inches above the then level of the stream, here, skimming off the surface of a shallow pool, a wine bottle full was soon collected. This can now be seen in the Geological Survey Museum. Sixty or seventy yards below where the oil was seen, a rocky reef of gray silicious dolomite crosses the creek and rises into a steep bluff on the left bank; on the right bank, seven or eight feet above the creek, a broad, thickly timbered flat extends for 150 yards to the base of the bordering mountains, which culminate six miles to the south-west at the boundary monument, 6,000 feet above sea level. No work whatever has been done to test the nature of the oil sources. A comparatively small outlay for some shallow sinking or boring on the flat above described would do this.

"On the 24th, we proceeded down the valley, and about four miles north of the 49th parallel the trail came down to the level of the brook, and here, on the edge of a beaver dam pool, there were ledges of dark blue shale dipping E. 30°, N. 12°. Lifting layers of this at and below the water, a quantity of dark green circular parches of oil rose to the surface, and a precisely similar result followed by stirring up the mud in the bottom of the pool. This place is about 15 miles in a direct line west, 10 degrees south, from the occurrance on Cameron Falls Creek, the main watershed of the Rocky Mountains and Mounts Kirby, Spence and Yarrell intervening, oil is said, by the Indians (the Stoneys) who frequent this region, to occur at other points, in the Akamina Brook Valley, both above and below that recorded. The Akamina joins the Flathead River in Montana, about four miles south of the International Boundary. The Beaver dam oil is of a dark greenish-black, and does not apparently differ much from that of Cameron Falls Creek. Preliminary tests might be made here by sinking a shallow shaft in the shales at the Beaver dam pool, and by boring on the sandy and gravelly flat country about two miles and a half north of the boundary line.

At about a mile and a half higher up, the creek leaves the high mountains, which border its upper course in a north-easterly direction up to the main watershed some twelve miles distant, and here, at the edge of the water, on the left bank, I found hard, dark flinty shales like those at the Beaver dam pool on the Akamina, dipping S. 25 degrees, 30 degrees, W. 25 degrees. Directly the layers of this rock are raised, the oil rises and spreads over the surface of the water in such abundance that a short time suffices, with the aid of a tin cup, to collect a bottle full. Here, also a considerable quantity of gas escapes from the cracks and joints in the rock, and ignites freely on the application of a match.

"Less than half a mile higher up, on the right bank and on the opposite or west side of the valley, oil was again found issuing from the base of the bank or drift, which has here filled the valley and causes the stream to make a sharp bend eastward to the base of the opposite mountain. No rock was exposed here, but every stone in the bed of the creek, especially on being broken or rubbed, gave out a strong odor of petroleum. The oil collected here, a

sample of which can be seen in the Museum, differs entirely in appearance from those of the Cameron Falls Creek and Akamina or Kish-e-ne-nah Creek. Some of it was of a light lemon-yellow, but most of it nearly the colour of pale brandy and with a very powerful petroleum odor."

WINDERMERE—GOLDEN—DONALD DISTRICTS.

Some prospecting work was done during the past season, most of it in the Selkirks, but also some in the Rockies, and from the very fine samples of ore seen, and the reports of the characteristics of the ledges, a large and rich section of the country is awaiting easier means of access, and the transport of ore to smelting centres.

The *Thunder Hill* property, 1½ miles west of Upper Columbia Lake, was standing idle, the ore having proved unsuitable for concentrating, for which purpose a mill was erected on the lake, but recently this property has been tested for its gold values, but with what result is not known. The ledge is reported to be very large, and if it contains gold in paying quantity, it should be thoroughly exploited.

Bugaboo Creek.—Six miles west of the Spillimacheen Landing or Galena, Mr. F. W. Aylmer of Golden, was working the "Balrath" group of two claims, on which crossing the slates and quartzites, was a wide vein strike, N. W. and S. E., dip 70°, about 16 feet wide, of which 11 feet were solid fine-grained opaque quartz, and 5 feet broken slate and quartz stringers. A cross-cut tunnel, 150 feet long, cuts the vein, where is 9 feet of quartz carrying about 20% iron pyrites. Mr. Aylmer has got assays of $2.50 to $36 in gold per ton, and if it proves to be profitable enough for milling, there is abundant and excellent water power right at the mine.

Toby Creek.—Prospecting was in progress in this country, now opened up by a trail, and veins 10 to 22 inches wide of silver-bearing galena were being located.

Vermont Creek.—From Well's Landing, 30 miles north of Golden, a sleigh road leads back 22 miles up the south fork of the Spillimacheen to Vermont Creek, where on the "*Minnie*," "*Ruth*" and "*Charlotte*," located in 1893, Capt. Armstrong had mined over 150 tons of galena ore, carrying zinc blende.

McMurdo District.—Some prospecting was being done, and assessment work, but nothing was doing on the "*Bobbie Burns*" and "*International*," gold quartz veins situated along branches of the Spillimacheen.

Some have waited long and patiently for the wave of mining interest to flow through this large territory, and it will not be long now before the hidden resources here will receive that careful examination they merit.

BY J. F. ARMSTRONG, GOLD COMMISSIONER.

The chief statistics are—

	1895.	1896.	Increase.
Free Miner's Certificates	404	537	33 per cent.
Other Mining Receipts	$ 2,203 10	$ 2,873 26	76 "
Value of Mineral Output	17,575 00	154,427 00	779 "

The value of the output from placer mines has decreased in consequence of several properties formerly worked by hand passing into the hands of hydraulic companies, who did not get their plant into operation until the best part of the season was over. The wash-up for the balance of the season was satisfactory to the proprietors, and both companies on Wild Horse Creek are now well prepared for next year's work. A little desultory placer mining was done on other creeks, but the proceeds were small.

The output from lode mines is practically confined to shipments from the North Star Mine. This would have been larger but for accidents to two of the largest steamers transporting the ore, one being laid up for a month, and another being sunk at the beginning of the best stage of water. The shipments from this mine consisted of 2,544 tons of ore, yielding 83,220 ounces of silver and 3,179,807 lbs. lead.

Development work has been done on the Sullivan group, on Mark Creek, on the Cronin group, on Moyie Lakes, on the Dibble group, on Lost Creek, and on a few others, while the

work on the bulk of the claims has been confined to the necessary representation. The Cronin group has much ore on the dump, but will not make shipments until the construction of the Crow's Nest Railway, which is expected to pass close to the mine.

During the past season some capital has been secured, and the spring of 1897 will see more men at work on development than any previous season.

Fine prospects, on which little work has been done, are numerous, and capitalists who are willing to assist in development work, can find profitable investments.

The number of prospectors in the district has increased, but the majority of them have only enough capital to locate and represent their claims, and without more financial strength the progress of mining will be slow.

If the Provincial Mineralogist could visit and make a report on the district at an early date next summer, it would be of great advantage to the mining interests, for a thorough examination by a thoroughly competent person, will be of more value than the information which I could give as to the mineral character of the different localities.

As a great influx of prospectors and investors is expected next season, I add to my report a list of the localities in which lode mines have been located or worked during the season, together with a description of the means of access to the office of each division mentioned. I consider that the district has a good number of useful trails; they have not always been located to the best advantage, but they are being gradually and systematically improved, and in laying out new trails, the question of gradual gradients is kept in view, and where advisable the trails are built on a location fit for a waggon road.

MEANS OF COMMUNICATION, ETC.

In this district, the Mining Recorder for each division, has his office in the town from which the division is named.

Fort Steele is centrally located for its division, and is a good point for the purchase of supplies. It can be reached from Golden, B. C., on the C. P. R., and from Jennings, Montana, on the Great Northern Railroad, by steamer during the season of navigation, and by stage during the rest of the year, and by the Moyie trail from West Kootenay *via* Goat River, and by the St. Mary's trail from Kootenay Lake *via* Pilot Bay. The trunk road from Golden to Fort Steele is in good order, and fit for the transportation of heavy loads; waggon roads radiate from Fort Steele to Cranbrooke, to a point on the St. Mary's River near Mark Creek, to the placer mines on Wild Horse Creek, and to the International Boundary Line at Tobacco Plains. With the exception of the last, these roads are in good order.

Windermere is situated on the trunk road on the line of navigation from Golden. It is in a good farming country where produce can be purchased at reasonable prices. The northern part of the division situate at the head of the Kootenay is, from want of trails, difficult of access, though not distant from stations on the C. P. R. in Alberta.

Golden is on line of the C. P. R., and is well supplied with stores. All supplies for points south are sent from this place by boat or waggon, to the different landings from which the trails diverge.

In the Donald division, the trails are built from the different railway stations. The northern part of the division is almost unexplored.

How access can be obtained to the different localities mentioned in the above list:—

Fort Steele Mining Division.

MARK Creek is reached by a waggon road, from the North Star steamer Landing, on the Kootenay. This road will serve as the outlet for many claims with which it can be connected at a small expense. The mouth of Perry Creek is not far from the end of the St. Mary's waggon road, and it is intended to continue this road some distance up the creek in 1897. The other tributaries of the St. Mary's, can be reached by a good trail, completed in 1896, from the end of St. Mary's waggon road to the head of Lansdowne Creek. This new trail was located with easy gradients, and enables horses to carry a good load; at the summit it connects with a West Kootenay trail from Pilot Bay. The Moyie claims are near the old Walla trail, and can be reached either from Fort Steele or from Rykerts. Weaver Creek can be reached by a trail from Cranbrooke. All the claims on the east side of the Kootenay are reached from the steamer landings and the trunk road by comparatively short trails.

Windermere Mining Division.

Some of the claims on Findlay Creek are easy of access, others are situated beyond the trails.

A good cattle trail was completed in 1896, from the Columbia River, along Toby Creek and its North Fork to Hauser Lake in West Kootenay; there is also a trail up the South Fork to the summit of the Selkirks.

The claims on Horse Thief Creek are difficult of access at present. Short trails to Windermere mountains diverge from the trunk road.

Vermillion River, at the head of the Kootenay, is very difficult of access for reasons given above.

Golden Mining Division.

Bugaboo Creek is reached by a trail from Spillimacheen Landing, 50 miles by river from Golden. A trail from Carbonate Landing, 20 miles by river from Golden, reaches the claims on the three forks of the Spillimacheen; there is also a sleigh road from Vermont Creek on the South Fork to the North Fork Trail, and thence to Wells Landing on the Columbia River, 30 miles above Golden. There is a trail up Fifteen Mile Creek, from its mouth. A trail was constructed in 1896, from Golden Landing to a point on Canyon Creek, above the Canyon, and thence upward.

All these trails lead into the McMurdo Country, and will be a great help to the numerous prospectors who are likely to enter this division in 1897, as supplies can be packed in on horses to the very summit of the Selkirks.

Trails from the C. P. R. line, lead to the claims on the Kicking Horse and its tributaries.

Donald Mining Division.

A good trail, eight miles in length, was constructed in 1896, from Donald to Bald Mountain. The trail to Porcupine Creek, from a point on the C. P. R., between Donald and Beavermouth, is not in good order, but passable.

A trail is being constructed by yearly instalments from Bear Creek Station to Prairie Mountain. It is now practicable for men on foot with heavy packs, and it is intended to make it passable for horses in 1897.

A short trail from Beavermouth Station leads to the claims in that vacinity.

An expensive trail on the east bank of the Columbia leads from Donald to Kinbasket Lake. It has been little used lately, as prospectors have given very little attention to that section of the division.

MINING OPERATIONS IN EAST KOOTENAY, 1896, AS PER RECORDS.

Locality.	Locations recorded.	Certificates of work issued.	Mines held under Crown Grants.	Nature of Ore.
FORT STEELE MINING DIVISION.				
Mark Creek, St. Mary's River	34	33	4	Galena.
Perry " "	90	3	.....	Gold.
Redding " "	3	4	.....	Galena and copper.
Black Currant " "	5	.....	.....	"
South Fork, "	18	1	.....	"
St. Mary's Lake, "	9	5	.....	"
Middle Fork, "	8	6	.....	"
West Fork, "	20	21	.....	"
Lansdowne " "	2	.....	.....	"
Lapointe " "	6	.....	.....	"
Pyramid " "	14	1	.....	"
Hell Roaring " "	5	2	.....	"
Office " "	10	.....	.....	"
Moyie Lake	9	7	.....	Galena.
Moyie River	6	1	.....	Gold.
Weaver Creek, tributary of Moyie River	13	9	.....	"
Sheep " " Kootenay River	2	.....	.....	Copper, galena.
Lewis " " "	22	9	.....	Galena, copper.
Wild Horse " " "	21	35	.....	Galena, gold copper.
Maus " " "	16	9	.....	Grey copper, gold.
Lost " " "	12	8	.....	"
Bull River, " "	9	9	.....	Galena, copper, iron.
Land Creek, " "	8	4	.....	Copper.
Elk River, " "	3	2	.....	"
WINDERMERE DIVISION.				
Findlay Creek, western tributary of Kootenay	12	2	1	Galena, gold.
Toby " " Columbia	12	3	1	Copper, gold, galena.
Horse Thief " " "	3	1	.....	Copper, galena.
Windermere Mountain, east of "	6	.....	.....	Copper.
Vermillion River, head of Kootenay River	5	.....	.....	Ochre, copper.
GOLDEN MINING DIVISION.				
Bugaboo Creek, western tributary of Columbia	3	5	3	Galena, gold.
South Fork of Spillimacheen, " "	3	1	4	Galena, bismuth.
Middle Fork, " "	23	10	10	Gold, galena.
North " " "	25	2	.....	Gold, galena, copper.
Fifteen-Mile Creek, " "	5	.....	.....	Copper.
Spillimacheen Mountain, near western bank, Columbia	3	3	4	Copper, galena.
Jubilee Mountain, " "	8	.....	6	Galena, copper.
Steamboat Butte, " "	.....	2	.....	Gold.
Kicking Horse River, near C. P. R	19	5	1	Galena.
DONALD MINING DIVISION.				
Bald Mountain, south of Donald	17	.....	.....	Gold.
Porcupine Creek, "	.....	2	.....	"
Prairie Mountain, east of Glacier	7	1	.....	"
Beaver River, "	4	.....	.....	Not reported.
Beavermouth, near C. P. R	3	.....	.....	Gold.
Kimbasket Lake, 30 miles north of C.P.R	.....	2	.....	Galena.
Blaeberry Creek, eastern tributary of Columbia	1	.....	.....	Not reported.
Total for East Kootenay	504	208	34	

WEST KOOTENAY.

(*See* Bulletins at end of Report.)

THE REVELSTOKE, ILLICILLIWAET, TROUT LAKE AND LARDEAU MINING DIVISIONS.

BY J. D. GRAHAM, GOLD COMMISSIONER, REVELSTOKE.

RETURNS FROM MINING RECORDERS.

	Revelstoke.	Illicilliwaet.	Trout Lake.	Lardeau.
Mineral claims recorded	135	64	208	128
Placer claims "	3	...	1	...
do re-recorded	1	...	...	...
Placer leases held	26	...	1	...
do applied for	9	...	1	...
Certificates of work recorded	28	33	93	20
Bills of sale recorded	77	39	80	28
Gold Commissioners' permissions recorded	24	3	...	...
Payments in lieu of assessment	...	...	...	1

REVENUE COLLECTED.

Free Miners' Certificates	$1,507	$275	$ 535	$271
Mining receipts	3,701.35	506.50	1,244.45	676.75

REVELSTOKE DIVISION.

PLACER CLAIMS—FRENCH CREEK AND CONSOLATION CREEK CLAIMS.

This property laid idle during a portion of the year, through a dispute amongst the partners, but this has been settled, and since re-commencing work they have averaged about $200 a week in gold dust; a good showing when taking into consideration the fact that only one man is employed drifting out of the five men employed at the mine. Quantity of gold taken out since report, $1,600.

Honduras, *Nugget*, *Gold Hill*, *Chicago* and *Royal*.—These properties have been acquired by the French Creek Mining Co., registered, incorporated under the laws of the State of Michigan; capital, $2,000,000. No work has been done beyond testing the ground, with a view to installing a large hydraulic plant next year. A saw-mill plant is at present stored at Revelstoke for this company, having been received too late to be forwarded on to its destination.

The owners of this property took advantage of the amendment to the Placer Act, and paid in the amount in lieu of doing the necessary work, and they are sanguine that they are in possession of a good property, and intend installing a very large hydraulic plant next year.

Fairhaven, *Bellingham Bay* and *True Blue*.—These properties have had no work done on them this year beyond testing the ground, to find out the necessary plant required. The owners have notified me that they intend taking advantage of the amendment to the Placer Act, and pay in the amount in lieu of assessment work. They are very wealthy Chicago gentlemen, and intend installing a large plant this next spring, or working it with the French Creek Mining Co., which would be more advantageous to both parties on account of dumping ground.

Little Falls (creek claim).—This is considered to be good property, being an extension of the Consolation Mine.

McCULLOCH CREEK.

Ophir Bed Rock Flume Co. (creek diggings).—This company have sunk a shaft through solid rock, 8 by 8 by 32 feet deep; run a tunnel 6 by 6, 72 feet in length, through solid rock; cross-cut through solid rock for 22 feet, and run up stream on vein rock for a distance of 75 feet; 8 men have been employed all the year, and about $400 in gold have been taken out. This company is at present on the bed rock of the creek, and it is expected will be repaid for all their trouble and expense in opening up this claim.

North Star (creek diggings).—This claim will be worked all this winter. No gold has been taken out.

CAMP CREEK.

Imperial, Unique, Senate.—The owners of the Imperial claim sank a shaft on their property about 15 feet deep, but were driven out by the quicksands. The owners of the Unique and Senate have been working sinking shafts and putting in flumes, etc., with a view of opening up next season.

GOLDSTREAM.

Hidden Treasure.—Eight men were employed on this claim last winter, and took out about $400 in gold; since worked out.

Big Hole.—Four men were employed on this claim last winter, and took out about $800 in gold; since worked out.

COLUMBIA RIVER.

Columbia Hydraulic Mining Co. (Reg.).—This company installed an expensive hydraulic plant this year, which has proved a success; amount of gold taken out, $1,427.

Mr. Nason has been employed for two seasons superintending the work of the Columbia Hydraulic Mining Co.; at the same time he has devoted a good deal of his attention examining the various creeks as to their condition for hydraulic mining, etc.

SMITH CREEK.

Several claims were worked on this creek during the summer. No gold was taken out.

Four new leases were issued lately on this creek, and application made for seven more.

The British Columbia and United States Mining Co., an incorporated company, have made arrangements with holders of the various leases to work this creek as an hydraulic bedrock flume proposition, and have arranged to install a very extensive plant next spring. This will, no doubt, depend on transportation facilities; at the present time it is very unsatisfactory packing up supplies, but it is hoped that a steamer will be placed on the river from Revelstoke to Death Rapids, which will leave only about 20 miles of packing, instead of 60 to 70 as at present.

MINERAL CLAIMS.

McCulloch Creek, Ground Hog Basin.—This season the old time interest in the Big Bend country was partially revived, on account of the location of veins carrying free gold.

Thirty one claims in this basin were recorded during the season, in addition to ten others located late in the fall of 1895.

Assessment work was done on a few of the claims, and by all reports they have improved as depth was attained.

Many of the claims in this basin have been bonded to English capitalists, particulars of which are more fully set out later on.

Orphan Boy Mining Co.—The Orphan Boy mineral claim is situated on McColloch Creek, Big Bend district, and lies south-east of the Last Chance mineral claim, about 65 miles north of Revelstoke.

The officers of the company for the year 1897, are: Pres., J. W. Haskins; Vice-Pres., H. N. Coursier; Secy.-Treas., H. A. Brown; Directors, C. P. Carlyon and T. C. Whitney.

The company has sunk a shaft 45 feet, and run a drift 117 feet, the face of the drift is in solid ore, and shows up a lead of 10 feet in width, the assay value and mill tests of which are:—

		Gold.	Value.
No. 1	Assay, sulphurets of iron	7 ozs.	$ 140 00
" 2	" talc or casing	½ "	10 00
" 3	" decomposed quartz	3.6 "	72 00
" 4	" quartz showing no free gold	⅓ "	6 60
" 5	" cream quartz	64 "	1,280 00
" 6	mill test	1.96 "	39 20
" 7	" cyanide (silver, 2½ ozs.)		41 00
" 8	" tunnel rock		61 80
" 9	" "		29 60

The estimated quantity of ore on the dump now is 1,200 tons, average value of which is calculated at from $20 to $25 in gold per ton. The company are employing 9 men at the mine, at an average daily wage of $3, and intend, and have made arrangements, to vigorously prosecute the work with this staff all winter.

Negotiations are on with the Merrall Mill Company of San Francisco, for the erection of a 20-ton hydraulic quartz mill, as soon as it can be placed in the spring.

Ole Bull, Rosebury, C. and D., Big Bend Belle, O. K., Golden Hill and *Golden Eagle.*—The above claims have been bounded to Messrs. Erbsloh and Ferguson of London, England, the representatives of some English capitalists, for a very good figure; 5% was paid down, and with the balance to be paid by the 1st November, 1897.

It was the intention of Mr. Erbsloh to have proceeded with development work this winter, but on account of the lateness of the season, Mr. LaForme the packer, could not manage to pack in their supplies, having all he could arrange to get up before the snow fell, which unfortunately, falling earlier than was expected, compelled Mr. LaForme to shoot all his pack train of over 30 horses, which was caught out in a very severe storm that formed a bad ice-crust on the snow; a very serious loss to him, being the second time this has occurred in four years.

Mr. Erbsloh and his associates intend to push development work as soon as navigation opens, with a view of testing the properties. Two assays from the Big Bend Belle gave $42 and $34 in gold. Development work was done on six of the above claims, which show a good vein carrying free gold.

Beaver, Holy, Magnet, Seattle, Little Lake, Bennett and *Mammoth.*—The above claims are situate in Ground Hog Basin, and are bonded to the B. C. Exploration Co. of London, England, for a good round sum, and development work will be pushed as soon as supplies can be got in.

FRENCH CREEK.

Bella, Golden Curry, Eric, Rose, Pearl and *Silver King.*—These claims are all free gold propositions, and were bonded this fall at very good figures, to Messrs. McCallum and Potts, who intend pushing the development as soon as the spring opens up communications with the Big Bend.

DOWNIE CREEK—KEYSTONE MOUNTAIN.

Thirty-four claims were recorded this year in the vicinity of this mountain, which lies about 5 miles east of Boyd's Ranch, on the Columbia River, and about 4 miles south of the mouth of Downie Creek.

The claims on this mountain are covered with an iron capping, and on two claims upon which work was done, assays were obtained, one of 30½ ounces silver, 62% lead, and on another of a trace of gold, 41 ounces silver and 43½% lead. This is supposed to be an outcropping of the leads at the head of Downie Creek, which run in a north-westerly direction.

HEAD OF DOWNIE CREEK.

In my report last year, I made mention of some new discoveries at the head of the north fork of the Illicilliwaet, which turn out to be at the head of the south fork of Downie Creek. These properties, numbering 21, have turned out to be fully equal to what was expected. Mr. John Grant, of Detroit, Mich., has bonded 19 of these, and he is at present in London, England, making necessary arrangements to work them next year, while at the present there are seven men up there at work opening up two of the claims.

I enclose a copy of a report furnished me by Mr. Leak, M. E., who examined this property this year, and from inquiries I have made, he has not exaggerated the value of the properties.

Twelve claims were recorded this year in this vicinity, and assessment work was performed on seven claims.

CARNES CREEK.

Homestake, *Hard Pan*, *Aberdeen*, *Roseberry*, *Salisbury*; *Arsenic* and *Imperial*.—The above claims are owned by parties in Revelstoke, who have done considerable development work on them. Assays made this year show the quality of the ore as improving with depth, and running as high as $45 in gold, besides in silver. Most of these properties have been bonded to an English syndicate, and no doubt will be opened up next spring. There are other claims owned by parties in Seattle, which show up favourably with development work, and eight claims were staked and recorded on this creek this year. Carnes Creek has an advantage over many of the other claims in the Big Bend, in that the distance is only 28 miles from Revelstoke.

JORDON CREEK.

Considerable development work has been done on the claims on this creek; they will doubtless be heard from next summer.

NEAR REVELSTOKE.

Early in July this year quite an excitement was raised by discoveries made on the hill at the back of Revelstoke of rock carrying gold, where 10 claims were recorded as located on the mountain, but the excitement soon died out, and little or no work was done on any of them.

I would beg to point out that lack of transportation facilities so far has acted as a detriment to the Big Bend country. This season opened very late, in fact the snow was on the mountains till July, then came the floods, that practically cut off all communication with the Bend for about 5 weeks by trail. This could be avoided by a steamboat running up as far as Death Rapids, by which it would be an easy matter to transport supplies to the various creeks flowing into Goldstream, that flows from the east into the Columbia above the rapid, above which point the trails follow the higher benches. There is a possibility of a steamer being put on the Columbia next season, to run above Revelstoke.

Considering the excitement in the Rossland District, which has been the Mecca of all mining men, this section has done fairly well when the shortness of the season is taken into consideration, and I have every confidence in this section. It is but a question of a short time when it will be found that the north end of West Kootenay is equal, if not superior, to any part of it, but as before stated transportation facilities are wanted for the rapid opening up of this part of Kootenay.

The section has not even as yet been prospected, alluvial diggings alone having been the principal thing looked for by the placer miner, for whom there is no fascination in quartz leads, only in the small particles of gold buried in the rivers and streams.

LARDEAU MINING DIVISION.

This division has not made as much progress as I had expected, considering the surface indications on the claims in this division, most of which carry gold, silver, copper and lead.

It is to be hoped that parties owning claims will open them up, or dispose of them at reasonable figures, to others who are willing to do so.

SABLE CREEK.

There are eight claims located on this creek, four of which are owned by the Sable Creek Mining Co., on which development work was done on the Agnes, the average assay of the ore being $21 in gold, 16% copper and about 60 ounces silver.

BOYD CREEK.

There are about 20 claims located on this creek, on four of which assessment work was done, assays of these averaging 200 ounces in silver per ton, and a little copper.

POOL CREEK.

There are about 14 claims located on this creek. On the *Black Bear* a shaft has been sunk about 10 feet, showing a large body of ore. On the *Hunter* and *Trapper* a cut has been opened up for about 16 feet, which shows up a good body of ore carrying grey copper. *Wise West*, a cut on this claim, shows up a large body of ore of low grade.

LEXINGTON CREEK.

There are about 15 claims located on this creek. There are 9 claims on the Lexington lead; assessment work was done on 5 claims, and shows up a large body of low grade ore about three feet wide. The Silver Bow claim shows up a small body of very high grade ore.

On N. E. Arm.—There are about 20 claims recorded on this arm of Upper Arrow Lake. Assessment work has been done on the *Young Canuck* and *Great Western*, which are concentrating propositions, and their ore is improving. This property is on the water front and easy of access.

Trout Lake Waggon Road.—Ten claims have been staked on this road. Assessment work has been done on the *Lucky Four*, which shows up pretty well.

On the east and west side of Upper Arrow Lake, about 21 claims have been located, they are all iron-capped and carry values in gold. On the *Mammoth* and *Haldon*, assessment work has been done, and they seem to improve with depth.

Galena Bay.—Eight claims are located on the Bay, all carrying gold, an assay of $44 in gold having been obtained from the *Royal Canadian*, while from two other claims, assays went $34 and $40 in gold respectively. No development work has been done on any of these claims.

ILLECILLEWAET MINING DIVISION.

Since my last report this section of the West Kootenay District has made a good deal of progress, more especially in the properties controlled by the Lillooet, Fraser River and Cariboo Gold Fields, Ltd., who are operating very extensively in this division, and the following is a detail of the operations of this company:—

THE LANARK.

At the *Lanark* mine previous to 1896 the vein had been tapped at three levels above the lowest or 400-foot level, though very little ore was shipped, owing to lack of facilities for getting it to the railroad, the ore shipped being packed at great inconvenience and expense down the mountain. Late in July a cross-cut was started in the lowest or 400-foot level, and about the middle of September the vein was struck. Owing to lack of room for storing ore, nearly every available space having been packed full in the mine from the development work, and it not being expedient to dump ore outside owing to snowslides, but very little work has been done in the vein at this level. A tunnel was driven in the vein sufficient to show that it is in excellent condition at this level, and an upraise was started to connect with the levels above, and has been driven up 120 feet along 3½ feet of solid galena of very high grade. The vein here is 25 feet thick or wide, out of which nothing has been taken except for the necessary opening for the upraise. In the No. 3 level the tunnel is being extended to connect with the upraise just mentioned, and at this point the entire face of tunnel is in solid galena.

At the *Isabella* mine, about the beginning of December a shaft was started about 100 feet from the mouth of the lowest tunnel, and by the end of the year will be down 35 feet, the ore from which runs 69 ounces silver per ton and 30 % lead. There is now in course of construction, and soon to be finished, an aerial tramway to be 6,550 feet in length, with a fall of 2,640 feet. The capacity of tramway at first will be 100 tons in 10 hours, to be increased to 150 tons in 10 hours by the addition of more carriers or buckets, and the capacity per day will then be 375 tons in 24 hours with 30 carriers of 500 pounds capacity, each running at a speed of 5 feet per second. The tramway is divided by an intermediate station into two sections of the same length and fall, and running by gravity develops a surplus of 11 h. p. The ropes in use, which have been specially made, are—

1 stationary carrying cable 1 $\frac{1}{16}$ diameter, 3,300 feet long, loaded side.

1 stationary carrying cable $\frac{7}{8}$-in. diameter, 3,300 feet long, empty side.

1 endless traction rope $\frac{5}{8}$-in. diameter, 6,600 feet long.

The longest span between towers is 2,900 feet. Breaking strain of ropes, 200,000 pounds per square inch.

There is also under construction a concentrator plant, the building of which is 50 by 130 feet. The machinery consists of rock breaker, three sets of rolls, elevators, revolving screens, with ten jigs, and four 6-foot Frue vanners. The power is furnished by two 8-inch and two 16-inch horizontal turbines, developing 200 h. p., and are connected to a 4-foot by 7-foot flume, giving 40 feet head; length of flume, 2,600 feet, running from a dam across the Illecillewaet River. The mode of ore treatment is known as coarse concentration, to which the Lanark ore is particularly favourable, sizing and separating. The nominal capacity of this mill is 100 tons in 24 hours, but the features of the Lanark ore are so favourable that this will be about doubled. Of the power mentioned above, 40 h. p. will be used for electric lighting and 60 h. p. for Lanark mine by electric transmission, to be used for mining operations as well as lighting the underground workings. A well equipped plant, with dynamos, is under construction. The whole concentrator plant has been constructed with a view to doubling the present capacity without disturbing any existing conditions, or without any additions to the tram or power plants. An assay office is being built, with a commodious laboratory and every convenience for assaying and analyzing the ore of the district. There is constructed and in operation a well equipped saw-mill, cutting lumber from the large quantity of good timber on the property. There is under construction, and nearly completed, a commodious store building, eight commodious 8-roomed cottages, an ample bunk-house for workmen; also office building to accommodate the different departments have been erected, and a boarding-house or hotel is being built which will have dining-room accommodation for workmen, as well as officials and other boarders. At the Lanark mine there is estimated to be in sight somewhere in the neighbourhood of 100,000 tons of ore, which will concentrate about three and one-half tons into one.

ROUND HILL.

On this claim, Crown-granted, there is a shaft 24 feet deep, showing in the bottom 8 to 9 feet of galena and carbonates, the assay values of which are, taking samples across the vein, (*a*) galena, $82.43 per ton of 2,000 pounds and 74 % lead; (*b*) oxides and clay containing carbonates, $16.43 per ton. Galena from another shaft 45 feet deep assayed $62.04 in silver with 62 % lead, all ore containing strong traces of gold. Still further north 150 feet a tunnel has been driven southward 40 feet on the vein of quartz and galena, and at the north end of this tunnel a shaft has been sunk 45 feet upon a vein, which at the bottom of the shaft shows a good foot-wall and hanging-wall 6 feet apart, while the ore is of a mixed character or pyrrhotite, chalcopyrite, blende, and galena. There is ample water power in the vicinity of this claim, which is less than a mile from the C. P. R. and about six miles from Illecillewaet in a north-westerly direction. There is plenty of timber on the claim for mining purposes; and lower in the valley the timber is of excellent quality for milling purposes.

DONALD.

On this claim, adjoining the Round Hill on the south, a shaft has been sunk to a depth of 84 feet, on which at the bottom are galena, pyrrhotite and blende, assays of which varying from $20 to $75 in lead and silver. A tunnel has been run in 165 feet, and will, when continued 250 feet further, cross-cut all the veins and meet the shaft at a depth of 208 feet.

FISH RIVER.

The *Dunvegan* mineral claim shipped 48 tons of ore to the smelter in San Francisco this season, the ore assaying 90 ounces silver and 72 % lead to the ton, netting a good profit to the owners, who have bonded the property for $15,000 with a probability of a sale being accomplished, as this is a good property.

The *Alma* mineral claim is a southerly extension of the Dunvegan, and will be developed next summer. It has a good surface showing, samples assaying 90 ounces silver and 72 % lead.

The *Scotia*, *Elizabeth*, and *Edinburgh* mineral claims, on the south-east side of Fish River, owned by the Fish River Copper and Silver Mining Company, have a good surface showing, and a tunnel has been run in 160 feet to tap the vein, but more work is to be done upon this

property next season. There are ten tons of shipping ore ready for shipment, assays from which run from 175 ozs. to 320 ozs. silver, 80% lead; carbonates having assayed 1,207 ozs. silver, and $12 in gold per ton.

The *Annie* mineral claim is the southerly extension of the Scotia mineral claim, and a tunnel has been run 150 feet along the vein, with a fair showing of mineral, a good dump of shipping ore having accumulated, assaying 80 ozs. silver per ton, and 72% lead.

The *Agnes* mineral claim, the southerly extension of the Annie, also has good surface showings, assays from which giving 80 ozs. silver per ton, and 72% lead.

The *Heronback* mineral claim, the southerly extension of the Agnes, has a good surface showing of mineral, assaying 80 ozs. silver, and 72% lead.

On the *Salmon*, the southerly extension of the Heronback, there are also good surface prospects of mineral, assaying 80 ozs. silver, and 72% lead.

The seven claims as above mentioned are good properties, and are located upon a strong vein about 8 feet wide, carrying ore along the hanging wall, and there is a plentiful supply of timber and water.

On the *Blue Bell* mineral claim, situated about one mile south-east from Illecillewaet, and owned by Benjamin Green, the vein is 3 feet wide, in which a shaft has be sunk 45 feet deep in mineral, which assays 120 ozs. silver, and 72% lead, and this property is bonded, and will be developed next spring as soon as the snow disappears.

The *Silver Bow*, *Copper Crown*, and *Copper Hill* mineral claims, situated seven miles northerly from the C. P. R. R. at Flat Creek, and owned by the Fish River Copper and Silver Mining Company. A tunnel 90 feet has been driven in on the vein at one place, and a second tunnel, 70 feet long, lower down the mountain. The hanging wall is quartzite, the footwall green slate. Eighteen tons of ore were shipped in 1894, and netted the owners a good sum. Assays from this group gave 66% copper, $25 in gold, and 8 ozs. silver per ton. The company intend developing this property largely next summer.

On the *Sanquhar* mineral claim, situated about two miles from Illecillewaet, on the north fork slope, a shaft has been sunk 30 feet at one place, and about 12 tons of ore are on the dump, while at another point another tunnel is in 75 feet in a greenish rock, highly charged with copper pyrites and grey copper, carrying $1.50 per ton in gold. The galena from this property carries 111 ozs. silver, and 72% lead.

On the *Summit Lode* claim, the southerly extension of the Sanquhar, a tunnel has been driven in 75 feet, and in about another 20 feet will tap the hanging wall of the vein, the face of the tunnel being now in a greenish rock highly charged with copper pyrites and grey copper, the rock carrying $1.50 in gold per ton. Assays from the property give 111 ozs. of silver and 72% lead.

The *Jumbo* mineral claim, situated on the north fork slope, has an outcrop of a large vein, showing 9 feet of quartz at one place, in which one tunnel has been driven 130 feet upon a vein showing in the face 6 feet of quartz, highly mineralized, while another tunnel further down the mountain has been run 110 feet, showing a well mineralized face. Assays from this property of concentrates give 320 ozs. silver and $5 in gold per ton. There are good water power and plenty of timber adjacent to the property. There are supposed to be 180 tons of concentrating ore on the dump.

The *North Star* mineral claim, situated in Ground Hog Basin, about one mile from the Jumbo, has a good showing of Galena ore, and 10 tons of shipping ore lie on the dump, and a tunnel is being driven to tap the vein at a considerable depth. This property has been bonded to a Vancouver gentleman, who will commence work next spring as soon as the snow disappears. Assays of ore from this claim give 125 ozs. in silver, and 72% lead.

The *Georgie* and Reggie mineral claims situated about 19 miles from Albert Cañon on the north fork, and about 600 feet from the trail built this summer to Downie Creek, are owned by David and Emily Woolsey, and have been bonded for $10,000. Six men are working driving a tunnel 160 feet to tap the vein at a considerable depth. An assay of the ore from these claims gave 2 ozs. 17 dwt. in gold, 1,155 ozs. in silver per ton, and 13.9% copper.

The above information was furnished, as regards the Lanark and Isabella, by Mr. Brooks, local manager of the Lillooet, Fraser River, and Cariboo Gold Fields Co., Ltd., and, as regards the other claims, by Mr. Walter Scott, the present Mining Recorder at Illecillewaet.

TROUT LAKE MINING DIVISION.

Since my last report I am pleased to be able to state that this section has taken a step forward, and by all indications will be one of the best mining sections in the Province. Experts who have examined the section all express themselves well pleased with the leads, which they state are equal to anything in the lower Kootenay country.

I enclose copy of Mr. Tom Taylor's (the Mining Recorder) report, which I think will give a very clear description of affairs in this camp during the season.

MR. TAYLOR'S REPORT.

Much outside capital has been interested in mining operations here, and considerable valuable work has been done during the last few months, but owing to the lateness of the season's opening-up, it was very late before operations could be commenced with any degree of activity. Nevertheless, it appears from the results already obtained that the bright future so often anticipated is on the eve of realisation.

The properties already taken up have been sold at very liberal figures, and several more changes are about to be consummated. Altogether, judging from present appearances we may safely predict that with the opening of communications in the spring this division will rank as another of Kootenay's producers.

Placer mining seems to have been almost entirely neglected, owing, no doubt, to the fact that a keener interest is being taken in quartz mining.

One of the greatest detriments to the camp has been the lack of transportation facilities. To partly overcome this, a sleigh road was projected and partially completed, connecting with Arrow Lakes at a point called Rosenheim, on Galena Bay. On the completion of this road, which is being constructed on railroad grade, a much shorter and better route will be laid open to the public, and will, for a time at least, answer the requirements of the camp. To the Lillooet, Fraser River, and Cariboo Gold Fields, Limited, is due the credit of this enterprise. As the company has ample means and are the possessors of some very rich and encouraging looking properties, which they are now developing, it is not at all unreasonable to suppose that, as their properties develop and as a speedier means of communication becomes an absolute necessity, they will ultimately connect their mines with navigation by rail; in fact, to this end engineers are now engaged making surveys.

Of the properties that are actually engaged in development, the Great Northern ledge seems to have taken the advance.

THE GREAT NORTHERN GROUP.

On this ledge there are eight locations, as follows:—*Silver Queen*, *True Fissure*, *Great Northern*, *Hillside*, *Broadview*, *Old Sonoma* and *Banff*.

The *Great Northern* and *Hillside* claims are bonded to a Montana Company. They have done during the past season about 300 feet of tunnelling, tapping the lead at different depths, and a splendid showing has in every instance been the result, with ore running from 18 to 200 ounces of silver per ton, 1 to 14% copper, and $2 to $12 in gold. About 200 tons of ore are now being forwarded to the smelter.

The *Broadview*, *Old Sonoma*, and *Phillipsburg* are bonded to the Lillooet, Fraser River and Cariboo Gold Fields Co., Ltd., which company is confining development work to the Broadview at present, where they have in the last five months expended $10,000. A shaft has been sunk to a depth of 85 feet on the ore, and levels are being extended to tap the vein in depth; but actual development work has only just begun, it being the intention of the company to keep a large force of men at work during the winter months.

Several hundred tons of ore are ready for shipment, the average value of which is about $100 per ton.

The old Sonoma has a cross-cut 60 feet, tapping the ledge, the average assay of the ore being 145 ozs. in silver, 7% copper, and $4 in gold per ton.

The *True Fissure* has had considerable surface development, the lead having been stripped and ore quarried 150 feet by 80 feet by 2½ feet deep, with some 600 tons of ore on the dump. Camps, outhouses, etc., are erected.

The *Silver Queen* has no development further than the annual assessment required, and looks extremely well on the surface.

The *Silver Cup.*—This mine has just forwarded a consignment of 20 tons to Tacoma Smelter; the average assay from which at the mine is about 400 ozs. silver and $18 in gold per ton. From 60 tons shipped some time since, the net result was $175 per ton.

A force of nine men has been employed since 1st October. The shaft in the ore has been sunk to 110 feet, and a 400-foot tunnel is now being driven to tap the vein at a depth of 100 feet below the present bottom of the shaft, 130 feet being now completed. Seven new buildings have been erected, and a new shaft-house and about three miles of rawhide trail and three miles of sleigh road completed. This property, also the Free Coinage adjoining, is the property of Messrs. Farrel and Dunn, of Vancouver.

The *Sunshine* and *Towser* claims are 1st and 2nd extensions on the Silver Cup, and have remarkably fine showings on the surface. The claims have recently been bonded to the Lillooet, Fraser River and Cariboo Gold Fields Co., Ltd., who are at present erecting winter quarters, etc., and when this work is completed a large force of men will be employed, and it is confidently expected that by next spring these claims will be in shipping shape. Samples of the ore taken from the surface, on the average, assaying in silver about 200 ozs. to the ton.

The *Badshot Group* consists of five claims situated in the lime belt and on the head-waters of Gainer Creek, and is a very promising group; on the Badshot claim a shaft has been sunk 100 feet, and a tunnel to tap the bottom of the shaft is now being extended. About 60 tons of ore, averaging in assay 225 ozs. silver, 75% lead and a small percentage of bismuth, are now ready for shipment. The vein at the bottom of the shaft is about 3 feet wide, with a rich pay-streak of 8 inches. Three men are engaged in developing.

The *Black Prince*, near the Badshot, has a tunnel about 200 feet long. The vein is from 9 to 18 inches wide, of a very high grade ore, and adjoining the Black Prince are the *Contact* and *High Grade* claims; good prospects, but with no development work done.

Gainer Creek empties into the South Fork of the Lardeau Creek, about ten miles from Trout Lake, and has its source at the foot of the lime belts, in which are located the Badshot Group, Black Prince and other well-known properties. South of this belt, for about four miles, is a succession of contacts, every thousand or two thousand feet, in each of which is a vein clearly defined for miles, making surface prospecting very easy, the formations being lime schists. The ore on the surface is galena, with some iron carbonates and oxides, but it is all of a rather low grade, and no development work has been done to demonstrate its value underground. About fifty locations were made in and about this creek during the past season.

The *Wagner Group*, near the head-waters of Haley Creek, has opened up very encouragingly for the amount of development work done. The ledge has been tapped in depth, and a solid vein of ore exposed two feet wide, assays from which run very high in silver, but, owing to lack of easy access, this group and the surrounding country have not had the attention that the surface showings and formations merit; however, on the opening up of other properties in the vicinity, no doubt, at no very distant date, better transportation facilities will be effected.

Francis Jewell Group, of four claims, is situated at the head-waters of Hall Creek and near the Wagner Group. No development work of any account has yet been done, but this and the Wagner Group are under bond to a Spokane syndicate.

Abbott Group consists of seven claims near the head-waters of Haley Creek. The Lillooet, Fraser River and Cariboo Gold Fields Co., Ltd., have a bond on these properties, on which they have drifted 400 feet, to tap a ledge at depth, but owing to its situation and inaccessibility (at this season of the year) development work for the present season has been suspended.

Duncan River above Hall Creek, which has been hitherto almost neglected, has, during the past season, been the scene of much active prospecting, and many good finds have been made, in all sixty locations having been placed on record in this office.

The *Pool Group* between the north and south forks of Lardeau Creek, consist of seven claims. During the past year very little has been done in the way of developing, but the ledge can be traced for a distance of two miles verying from twenty to forty feet in width, and is very heavily capped with iron. At a depth of 25 feet or 30 feet on the May Bee claim, some very rich specimens of native copper were obtained, the galena carrying from 20 to 40 ounces in silver and $6 to $12 in gold per ton. Negotiations are under way for the bonding of this group to an English company.

On the *Seven Mile Group* there are five locations, and on the *Black Eagle* about 60 feet of open cut and tunnelling have been done, the vein being about 14 inches in width, with average assays of 100 ounces in silver per ton.

North Fork of Lardeau Creek.—Several locations have been made on this creek during the past season, but the old locations have remained undeveloped, with the exception of the *Pilot Knot Group*, which has been tapped in depth by a tunnel 160 feet long. The vein has been exposed with about 18 inches of width, carrying 150 ounces in silver and some copper. Of the new locations on this creek, probably the most promising is the *Big Five Group*, consisting of five claims, negotiations for a bond on which are now pending. Some very high copper-glance ore has been secured near the surface, and the lead is well defined and traceable for several thousand feet.

The *Horne Ledge* has 13 old locations and several recent ones. The lead is a very strong one, and very strongly capped with iron, and is traceable for miles, but it remains as yet entirely undeveloped.

The *Glengarry*, near the head-waters of the north fork of Lardeau Creek, is a very strong and well-defined ledge, and with an average assay value of about 140 ounces silver per ton and a fair percentage of copper, and on the same lead are the *Edna*, *Alice*, *Victory*, *Jim Dandy* and others, all very promising prospects.

The American is situated about 14 miles down Trout Lake from Trout Lake City, and has a vein of solid shipping ore of about 12 inches wide exposed. Considerable development work has been done, and a quantity of ore is now sacked for shipment, the grade being about $100 per ton. A bond is being put through with a Vancouver syndicate.

Trout Lake.—Several locations have been made near the shores of the lake, on veins carrying gold and copper.

Canyon Creek, at the foot of Trout Lake, has attracted considerable attention this year; eight locations have been made, and the ore from surface assays 160 ounces in silver per ton and 75% lead. The ledge is well-defined in the formation of granite and slate.

NORTH FORK OF THE ILLECILLEWAET.

By P. LEAKE, M. E., REVELSTOKE.

Previous to the year 1896, not much attention had been paid to this part of West Kootenay; but owing to the discovery of the Downie Creek properties, now owned by Mr. J. Grant, the Government has built a trail from Albert Canyon to the head waters of this creek.

On this trail several rich and extensive ore deposits have been discovered, among which we may mention, the *Grant Group* of claims on the head-waters of Downie Creek; the *Sir Walter* and adjoining claims, owned by Mr. T. McPherson; the claim owned and worked by Mr. Ben Green., etc.

Geology.—Proceeding along the trail in a north-easterly direction up the Ilecillewaet River, we pass over an extensive belt of compact limestone, and continue in this formation until we reach the properties on Downie Creek. As we pass up the valley, large boulders of granite can be seen. To the east of the limestone a belt of granite traverses more or less the whole range, and the cropping can be found possessing various dimensions from Upper Kootenay Lake to the Big Bend.

The formation on both sides of this granite belt contain highly mineralized quartz veins; the granite is evidently intrusive, and appears to have had an intimate connection with the occurrance of the metalliferous deposits found in the adjacent areas on both sides of it.

The mineral belt, which passes from Kootenay Lake through Illecillewaet, Downie Creek, and north to the Big Bend, is extremely well-defined, and evidences of its existence occur throughout the entire distance. It is also a high grade belt, containing silver, gold, copper, lead, and as you proceed further north, nickel.

The Downie Creek properties occur in the stratified limestone a small distance west of the transition of the granite. This is a similar case to many of the Cornwall mines, where almost the whole of the mineral wealth of that country occurs within a distance of some two or three miles on each side of the junction of granite and killas, and to a marked degree is this seen near St. Just and St. Ives.

The veins found on the Waverly and Montague and adjoining claims on Downie Creek, are inclosed in walls of calcite, and a tunnel has been driven on the *Waverly* close to the

hanging wall, showing a continuous body of highly mineralized ore (at this point about 6½ feet wide), composed of quartz, galena, tetrahedrite (grey copper), with some hydrous ferric oxide, resulting from the decomposition of iron pyrites, and occasionally stephanite (brittle silver) and cerargyrite (horn silver). Of six samples taken from this portion of the vein, the average amount of silver per ton was 104 ounces, some picked specimens running as high as 1,400 ounces per ton. The total width of the vein is about 40 feet, containing 9 feet of good ore, 6 feet on hanging wall and 3 feet on footwall, the vein, in conformity with others found in this district, having a north-westerly and south-easterly trend, and an easterly underlie of about 2 feet to the fathom. The cropping can be traced for many claims showing it to be continuous and following its natural course; and about 1,600 feet west of this vein is also found a parallel vein, having the same course and dip, the ore being much of the same character, containing, however, more gold but a less percentage of copper. The *Tangier Claim* is on this vein, and assays taken went 100 ounces of silver and 1⅓ ounces gold per ton.

Owing to the richness of the ore found in such considerable quantities, the district is without doubt destined to become one of the most active camps in the Province.

From the *Sir Walter* and adjoining claims (16 miles from Albert Canyon) some very high silver assays have been obtained, viz:—300 and 1,000 ounces; the veins, however, are not so wide as the Downie Creek ones.

TRAIL CREEK DIVISION.

By Mr. Jno. Kirkup, Mining Recorder.

Mr. Kirkup submits the following information with reference to records, etc., for this division during the year ending December 31st, 1896, as follows:—

Records of Mineral Claims	2,588
Bills of Sale, Bonds, etc.	2,690
Certificates of Work	1,211
Certificates of Improvement	93
Free Miner's Certificates	4,200
Number of claims working, about	175
Number of miners employed	1,500
Output of mines not obtainable	

SLOCAN DIVISION.

By Mr. A. Sproat, Mining Recorder.

The following are the statistics of the Slocan Mining Division for the year ending 31st December, 1896:—

Number of Records (location)	1,179
" Certificates of Work issued	749
Money paid in lieu of work on 12 claims	
Number of Bills of Sale recorded	1,170
" Bonds and Agreements recorded	106
" Certificates of Improvement issued	27
" abandonments recorded	25

NAKUSP SUBDIVISION.

BY MR. F. S. FARQUIER, MINING RECORDER.

The following are the statistics of the Nakusp Record Office for the year ending 31st December, 1896:—

Number of placer locations	1
" quartz "	254
" transfers recorded	169
" claims or interests transferred	264
" abandonments recorded	1
" Certificates of Work recorded	127
Average number of men engaged in mining	110
Amount of revenue from Mining Receipts	$1,428 50
" " Free Miner's Certificates	1,052 00

AINSWORTH DIVISION.

BY MR. JNO. KEEN, MINING RECORDER.

KASLO, B. C., 1897.

The following are the statistics from this office for the year ending December 31st, 1896:—

Number of Mineral Claims recorded	813
" Certificates of Work	458
" paid $100 in lieu of assessment work	5
" documents recorded	571
" abandonments	21
" Free Miner's Licences issued	929

NELSON DIVISION.

BY MR. J. H. RASHDALL, MINING RECORDER.

The following are the statistics of the Nelson Record Office for the year ending December 31st, 1896:—

Number of Locations recorded	2,544
" Transfers	807
" Certificates of Work	323
" Free Miner's Certificates	1,138

GOAT RIVER DIVISION.

BY MR. J. G. RYKERT, MINING RECORDER.

There have been ninety (90) new locations made since January 1st, 1896, divided almost equally in Duck Creek, White Grouse and Sutter Districts in this division. There has been little more than assessment work done on any of these. On the locations made previous to this year nothing but assessment work has been done.

Cause.—The prospects are nearly all mined by parties unable to control capital, and having to work out to get money enough to do their work. There is no doubt that some of the richest ore found in West Kootenay has been found in this division. One claim I speak of as personally knowing carries ore assaying $72 in gold and 18 % copper to the ton, and no telling how wide the ledge is.

The ore all through the Duck Creek country so far worked carries gold in more or less quantities, and copper and silver.

It has been a very quiet season, as nearly all new comers went through to the Slocan or Trail country, and we have had very poor steamer facilities—one boat in two weeks.

I do not look for anything better until the Crow's Nest Pass Railway is built, as we are, as you might say, cut off from everyone and everywhere.

REPORT BY CAPT. FITZSTUBBS, GOLD COMMISSIONER.

A long and carefully prepared report on this district was forwarded by Capt. Fitzstubbs, and also very full statistics on the mineral output, but as descriptions of these mining divisions are contained in Bulletins Nos. 2 and 3, and the data of the mine production had already been obtained, his report has not been embodied in this Report, except the statistical information from the offices of the Mining Recorders.

LILLOOET.

BY F. SOUES, GOLD COMMISSIONER.

SIR,—I have the honour to inclose herewith the Mining Statistics for Lillooet District, and my annual report for the year 1896:—

The total yield of gold from the district (ascertained from reliable sources only) is $33,665, showing a decrease from the annual returns for the last seventeen years, at least. The total ascertained district yield for the past 17 years is $1,185,023; an annual average of $69,707. It should be borne in mind that the above amount is really the returns of desultory work done by Chinese and Indians. There certainly have not been over half a dozen white gold-producing miners in the district during the year.

I attribute the low point reached in production to the discovery of rich gold-bearing quartz on Cayoosh Creek in April last, which caused a great influx of the mining element, all apparently having the one aim in view, the discovery and location of mineral claims, and as such were non-producers. With reference to the mining leases at and near Lillooet, reported last year as bonded to the Lillooet, Fraser River and Cariboo Gold Fields Co., I believe the whole of them have been abandoned.

Placer Mining.

Placer mining has been entirely neglected, and the same may be said in regard to hydraulic mining leases, with one or two exceptions. The mining claims on Scotty's Creek, referred to in my last report, were worked in the early summer, but as they have not been re-recorded I infer they are abandoned. Doubtless the boulder element to be contended with in that creek has again proved too strong for limited means and appliances.

Quartz.

Much excitement in this class of mining has prevailed since the location of a rich gold-bearing claim on Cayoosh Creek in April last, followed by the location of several claims on Poole Creek, Pemberton Portage, in June last, alleged to carry gold, silver and copper. I append sketch plans of the locations on both creeks, courteously furnished me by Mr. P. Burnet, Provincial Land Surveyor, who has been on the ground the greater part of the season, and may be taken as correct, and will serve to illustrate and locate my remarks in reference to the claims on both creeks. Dealing first with Cayoosh Creek:—

CAYOOSH CREEK.

The whole of the claims recorded on this creek during the past year may, with the exception of the "Ample," "Whale," and "Gold Eagle," be dismissed with brief reference, as there has been no development work, except of the most superficial kind, done on any of them.

I regret to say that several of the latter class have been sold and re-sold. Speculation of this nature is not to be desired. We have world-wide proof, if proof were wanted, that it can only result in disaster to an infant industry in this district, not only to claims utterly worthless, but also to those that have proved their title to merit by development.

The present "Mineral Act" requires every one recording a mineral claim to *make oath* before the Mining Recorder that he has found "mineral in place." Let us have *value in place* also, proved by development, then sale or speculation.

THE GOLDEN CACHE MINES CO.

With reference to the "Golden Eagle." In a personal interview with Mr. Noel, the Manager of the mine, he informs me that there are at present twelve men at work, and have been engaged in running a tunnel on the ledge, which is now in 66 feet. The tunnel is 6 feet wide by 7 feet, and is all in gold-bearing ore, uniformly distributed throughout its entire length. About 300 feet of the ledge has been uncovered, and taking this as a basis of calculation, and estimating it to contain similar gold-bearing ore to that in which the tunnel has been run, mining experts and others, I am informed, claim that there is at least a million dollars in sight. The gold in the "Gold Eagle" is contained in a matrix, exactly the same as that in several places in the "Bonanza" Group on the opposite side of Cayoosh Creek, and is described by Dr. Dawson in his report of 1895, page 99, as "the greater part of the rocks met with in the cross-section afforded by Cayoosh Creek may be described as black or blackish argillites, often lustrous, sometimes much wrinkled and corrugated, and occasionally micaceous with very fine mica. Many of them are more or less distinctly calcareous. Near the 'Bonanza' Mine a rather notable development of black and probably slightly graphitic argillites occurs."

The company now owning the "Golden Eagle" group of five claims, I am informed, have a ten-stamp mill ready to erect as soon as the road, which they are constructing from the end of the Government Road up Cayoosh Creek to their mine, can be finished.

THE BONANZA.

Unfortunately the very severe snow-storm early in last month put a full stop to all work of that nature, and with little chance of it being resumed before March at least, as the snow-fall was deep and we are liable to similar storms during the next two months. The other claims on this creek, which may be referred to, are the "Bonanza" group of six claims, located in the fall of 1887, and the "Ample" and "Whale." On these claims a considerable amount of development has been done, notably on the "Bonanza" group. The Lillooet and Fraser River and Cariboo Gold Fields Co. had a prospecting and development bond on the three lower claims of the "Bonanza" group last year, which is fully reported on by their manager, Mr. Hughes, in my last annual report.

This company's operations were confined to the lower claim, through which the creek runs, and were continued up to this spring, when the forces were withdrawn and put to work on the "Ample" and "Whale," and continued there the greater part of the summer, when work was stopped on them also. The time limits of the prospecting bonds with that company have expired with regard to both properties, without coming to further arrangements

HISTORY OF CAYOOSH CREEK.

A brief review of the history of Cayoosh Creek may not be out of place at this time. The miners arriving in this Province in its early mining history, 1858 and onwards, were largely from California, and the best of them with but a limited knowledge of placer mining, acquired in the previous decade from the discovery of the placer mines in California. Quartz mining was unknown then to the great majority of them.

They brought with them the erroneous impression that gold would never be found in payable quantities in the granite masses of the Cascade Range. In fact, gray-haired veterans can be found in the Province to-day who still hold that prejudice. Hundreds of these miners wintered in Lillooet, and thousands of them have passed by Cayoosh Creek to and from Cariboo. The gigantic mass of Mount Brew, to the south-west of the Town of Lillooet, and the granitic talus scattered from its base across Cayoosh Creek, and extending out to the north shore of Seaton Lake, there to be met by a similar formation, was sufficient evidence to the early gold-hunter in this Province to avoid Cayoosh Creek as worthless. Whether I am correct in this hypothesis is immaterial, the fact remains that it continued untouched and in a state of nature until the spring of 1886, when a flock of Chinese quietly settled down on it, and Mr. Phair, Mining Recorder, reported to me in December of that year that he had recorded for them 190 claims, and for white miners 16, and Mr. A. Smith reported to me at the same time that during that year he had bought 725 ounces of Cayoosh Creek gold, adding his belief that there was as much more in the hands of the Chinese miner. In 1887, parties here grub-staked two miners, and sent them out to endeavour to locate the sources of the gold found in the creek. They left here in August of that year, and followed the north-west side of the creek some 15 or 20 miles miles above the Chinese claims, but without finding anything, either in the creek or mineral in place. They returned by the south-east side of the creek, and at a point within the lines of the "Mary Ann" claim, on Mr. Burnet's plan, discovered a large boulder, composed of quartz and slate, which had evidently been broken off the mountain-side high above them. Without appliances to break the boulder, they built a fire on it, and after heating it well, poured water on it, and thus broke it up, when gold was easily to be seen in it. It was an easy matter then to trace the line of descent, and after a little search the place was found on the "Bonanza" ridge, at a point between the second and third location up from the river, and where gold-bearing specimens could be found here in abundance.

The prospectors returned here, and the six claims were recorded on the 12th September, 1887. The find soon leaked out, and the next claim recorded was on the 26th October of that year, about 2,000 feet above the creek, and nearly opposite the "Bonanza," and afterwards abandoned. From that time on to spring of this year a few claims were annually recorded, as a rule only to be abandoned, without any attempt at development or exploration. In December, 1887, Mr. A. W. Smith reported his purchases of gold for that year at $65,696, a large proportion of which was from the Chinese claims on Cayoosh Creek. In 1888 his purchases amounted to close on $60,000, seven-eighths of which was estimated to be from Cayoosh Creek. In 1889 the amount bought by Mr. Smith dropped to $39,000, with the exception of about $100 worth, all bought from the Chinese miner. Summed up, the Chinese were the discoverers of gold in Cayoosh Creek. From Mr. Smith's accurate returns, we find that he bought from them in three years gold amounting to, in round figures, say $103,000. To be well within the mark, allow one-half of that amount as carried away by them, and we have a total of $154,500 for the three years. The whole of this was taken from, say five miles of the creek, and all below the line of the "Bonanza" group.

Resultant on the discovery of the river claims was a lease issued to the Vancouver Enterprise Co., situated below the limits of Mr. Burnet's plan. This company was formed for the purpose of diverting the river from the present bed, and working it and its surroundings to bed-rock. Numerous obstacles to this plan came in the way, the company spent a large amount of money in various plans for development, and finally bonded their lease to the Lillooet, F. R., and Cariboo Gold Fields. This company spent a good deal of time and money in exploration and development, and put in powerful pumps to enable them to reach bed-rock, but failed in the undertaking. That part of the creek bed, ancient and modern, is still unknown.

This is the history of the creek from its discovery to the present time. From my observations, there are three kinds of gold in the creek, the finer kind uniformly distributed through the ore found in the "Golden Eagle." The coarser and richer specimens, found in the

"Bonanza" group, and the still coarser specimens found in the river bed workings by the Chinese, some of them going as high as $70. It is a well established fact, I think, that coarse gold, released by whatever agency from its rocky matrix, moves but a short distance, even in swift-running rivers. In the "Golden Eagle" and "Bonanza" group are the sources of at least a portion of the two first named kinds. In my opinion, the source of the third kind has not yet been located, and most likely will be found below the line of Cottonwood Creek.

FACILITIES FOR MINING.

I have referred to the *geological disturbances*, that are in striking evidence everywhere on Cayoosh Creek, in former reports, and again draw attention to them. Mr. Hughes, in his report to me last year, also refers to them particularly.

I would infer that quartz mining on this creek will be beset with many difficulties, which will require careful thought and skilled management in dealing with and overcoming them. The blanket ledge will be in evidence, possibly rich, but suddenly vanishing or twisted out of shape and lost for a time. Wide areas of the numerous small quartz veins and auriferous schists may be worked profitably, on the open face or quarry system, and in turn they will be blocked by intrusive dykes of worthless material. It is evident that if the infant industry of quartz mining on this creek, beset as it is by the numerous natural obstacles as indicated, is to be placed on a remunerative and lasting basis, the whole matter cannot be too carefully dealt with now. I need not point out that the reckless speculation, to give it the very mildest term, indulged in for the past few months, aggravated by the almost total absence of development, will never accomplish this, and, if continued, will inevitably result in adding another name to the long list of mining failures in this Province.

With the modern application of electricity to mining, the value of Cayoosh Creek, as a motive power, cannot be overestimated. Timber for mining purposes and fuel, in the neighbourhood of the mines is none too plentiful, and, from the very rugged nature of the country, will always be difficult to get at, and form a very large item of expense, in any undertaking there. The Cascade Range, locally known as the Cascades but in reality the eastern margin of the "Coast Range" of mountains, is here broken by a deep valley commencing at Lillooet and ending at the junction of Fraser and Harrison Rivers, approximately about 160 miles in length. Cayoosh Creek has its source in Duffy Lake, a small sheet of water situated in a deep gorge on the eastern side of the valley described, and almost in the centre. (A mile or two west of Duffy Lake, the water-shed flows to the west, falling into Lillooet Lake, and finally reaching the Fraser River at Harrison mouth). From the lake it flows through a narrow and winding lateral valley of the eastern Cascades, falling into the Fraser below the town of Lillooet, at an elevation of 692 feet above sea level. Where it passes through the "Bonanza" group the elevation is 1,300, shewing a rise of say 600 feet in 10 miles. From a point a short distance above the "Bonanza," the rise would not average as high in the next 10 miles. In August, 1863, I made the ascent to the summit of the Cascade Range, to a point west and immediately above Duffy Lake, and from the amount of piled and apparently perpetual snow, that late in the season, I have no hesitation in saying that the supply of water in Cayoosh Creek will never fail.

POOLE CREEK, PEMBERTON PORTAGE.

The discoveries of minerals on this creek were made in June last, and all come within the provisions of the "Mineral Act" of last session of the Legislature.

The first recorded claims are said to be on ledges, with a seam width of from 40 to 60 feet; hanging wall, slate; foot wall, granite; and reported to Mr. Phair, Mining Recorder, as being wonderfully rich in gold, silver and copper. I am not aware that there has been any development work of any moment, done on any of these locations, the width of seams and the nature of hanging and foot walls may therefore be taken with reservations. "Poole Creek" or more properly "Birkenhead River," is situated on the old Pemberton Portage, and about 50 miles south-west from Lillooet, and is situated on the western slope of the Cascades, the waters of Birkenhead River falling into the upper Lillooet River, and thence into Lillooet Lake. I note that Mr. Burnet in his sketch plan, has given the name of "Blackwater" to the group of claims already recorded, and for the sake of brevity in future, that name, perhaps, should be adhered to. I am not aware that any geologist of note has ever visited this section. My own

recollection of it, after 30 years, is a confused mass of granite mountains, towering aloft to the line of perpetual snow. Ingress to Blackwater, at present, is from Lillooet, *via* Seaton and Anderson Lakes and Pemberton Portage. It can also be reached from Howe Sound by a very rough trail.

BONAPARTE VALLEY.

Mineral Claims.—The first claim located in this valley was recorded in July of last year. Mr. Ahearn, the owner of that location, reports to me that he has run a tunnel 35 feet by 5 feet by 7 feet, the greater portion timbered, the nature of the ore, sulphide, iron chlorides, sulphur, arsenical iron and silicates, carrying gold, silver and copper. The character of the formation generally diorite and porphyry. Between walls 51 feet, contacts dolomite, lime and quartzite. Assays made from the ore gave gold, $1.20; silver, 3 to 78 ounces; copper, 6 per cent. Mr. Ahearn proposes running in one hundred feet, and then cross-cutting to walls. A group consisting of 8 claims, situated further down this valley, were located in July last, by the British Columbia Development Co.; and Mr. Ogilvie, the resident manager, furnishes me with the following information:—"The claims are situated on what may be termed a large blow-out of porphyry and quartz. The ore is tetrahedrite and galena. Active development commenced at the end of August last. Tunnel No. 1, driven in 101 feet; tunnel No. 2, 65 feet; Humming Bird tunnel, 191 feet; shaft sunk, 44 feet. We have struck a vein in the Humming Bird tunnel, in the "Avoca" claim, and also the same ore in shaft. The sample of the former gave 42 ounces of silver, and copper 18.04% per ton, and the sample of the latter, 50 ounces silver, and copper 22.80% per ton. A good bunk-house, magazine and blacksmith's shop have been erected, and everything in good shape for the winter, and indications seem to be improving as work progresses on the mines."

The development work done on this group of mines is in marked contrast with that of a similar nature in any other portion of the district during the past year. Dr. Dawson, in his report for 1895, page 85, describes at length the geological conditions existing in the above portion of Bonaparte Valley.

BIG SLIDE QUARTZ MINES.

This property has changed hands during the past year. Seven claims have been located on the supposed line of the lode in the Big Slide, late in the season, but no development work has been done on them.

On Bridge River eight mineral claims were located during this month, but no work has been done on them.

HYDRAULIC MINING LEASES.

With the exception of the Bridge River Gold Mining Co.'s claims on the Horseshoe Bend, Bridge River, and the Mulholland & Co. claim on the South Fork of that river, no work has been done on any of the leases in the district.

DREDGING LEASES.

In my report of last year I stated that this class of mining in my district was "an unsolved problem," and I regret that I must again repeat it. One company only commenced work early in the season at a point on the river immediately below the bridge near Lillooet, and were met by numerous difficulties, the most serious of which was the wire cable required to span the river was found to be short, necessitating a new cable 1,100 feet in length, which had to be brought from Eastern Canada, and caused great delay. Their plant is worked by a 12-horse power engine. Having made a start it was then found that the belts slipped as soon as the load of gravel was lifted above the surface of the water, and they were again compelled to stop work until they can procure a chain belt to run in cogs, with which appliance the company believe the plant will work satisfactorily. So far they have been unable to prove that there is gold in the river bed where they have commenced work.

BRIDGE RIVER.

I have for years past, notably in 1886 and 1889, endeavoured to draw attention to this (in my opinion) the richest, and at the same time most neglected, portion of the district, and may at this time and place be permitted to refer to it at length. Referring to the very

imperfect Provincial map, a line drawn from the junction of Big Creek with Fraser River to the headwaters of Jervis Inlet, would form the centre of the locality to which my remarks will refer. I also append sketch plan of Bridge River from Fraser River to the South Fork, the data for which is furnished me by Mr. McDonald, District Road Superintendent, who is well informed as to that portion of the river. I am not aware that this portion of the Province has ever been visited by any of our eminent geologists, and trust that Mr. Carlyle, Provincial Mineralogist, may be able to pay it a visit in August next (the best time), and give us the benefit of his scientific knowledge.

From a personal residence of 34 years in the district, at Pemberton, Lillooet and Clinton, and during the whole of that time, with exceptional opportunities of learning the amount of gold obtained and the localities, I may be supposed qualified to deal with the matter intelligently and correctly. With the decade ending 1869 official public reports, with regard to mines and mining in this district, are conspicuous only by their absence. The early miners into this Province, 1859-60, worked their way up the Fraser River, testing all the tributaries for gold. Bridge River in those years was located and worked, and from that time on to the present, by white, Indian and Chinese miners, year by year, with varying success. The richest finds and largest nuggets were obtained in the decade referred to. With the decade ending 1879, we have official mining statistics, commencing in 1874, in some of which annual reports place has been found for Lillooet District and the estimated returns. In others the district has been entirely ignored.

From 1860 to the discovery of Cayoosh Creek, Bridge River has been the principal source of the gold obtained. If the old mercantile books of Mr. Smith, Mr. Foster, and other traders doing business in Lillooet in the sixties, and the records of the now almost forgotten Dietz & Nelson express line, then carrying express and treasure between Victoria and Lillooet, could be now examined, the result would be a very startling array of figures of the amount of gold obtained from Bridge River and the Fraser River benches and bars in the immediate neighbourhood of Lillooet. In the early sixties the principal workings were from the mouth up to the head of Deep Canyon, from which point the river flows through a long marshy section some 50 miles. The river bed here is smooth, sandy, with fine gravel, in which only fine colours have been found. Above this stretch, Tyaughton Creek has produced considerable coarse gold. Gun Creek so far has produced only fine gold, and in limited quantity. Coarse gold is found in Cadwallder Creek and the South Fork. Mr. A. W. Smith showed me a sample of 6 ozs. of very coarse gold, which he bought from an Indian last week, whose claim is located at a point above Gun Creek, and below Cadwallder Creek. The lower 13 miles of the river is now covered by an Indian reserve, sketch plan of which I append, and the wisdom of thus practically locking up so much of a well-known auriferous stream may be questioned. The valley of Bridge River for a considerable distance is paralleled by the valley in which are situated Seaton and Anderson Lakes, and at one point on Seaton Lake the distance to Bridge River, at Jack's Landing, is only about six miles. The division between these two valleys is a high and much broken up ridge of mountains, with numerous streams (not shown on the Provincial map), falling into the above-named lakes.

The whole of the creeks, notably McGillavray Creek, are auriferous. The ridge of mountains referred to widen out to the south-west, reaching a summit, on the south side of which the watershed is to the head of Birkenhead River, on which the "Blackwater" claims have been recorded this year. In 1864 I was shown gold by an Indian, which he found at the headwaters of Lillooet River. On the north-western side of the line first referred to, gold has been found in various places. (*See* my report for 1886.)

It will be noted from the foregoing brief and imperfect references that Bridge River and its tributaries have been in places highly auriferous, with a possibly barren zone above the deep canyon, and further that it has a wide-spread surrounding of mineralized rocks. The gold found in the river is unmistakably different to that found in the Fraser River bars and benches, and in form and size of the pieces bears a strong resemblance to the gold found in the placer workings in Bendigo, Victoria, in the early fifties, with this difference, that Bridge River gold shows much more recent release from its rocky matrix, in fact, at least one-third of the pieces still hold imbedded pieces of quartz.

In other lands, placer mining has, with few exceptions, whether in wide areas of alluvial deposits, in ancient or modern river beds, led up to the discovery of the rocky matrix, from which the alluvial gold was obtained. Placer deposits, in a few years, led to the discovery of the famous Comstock lode. Placer deposits located the Treadwell mine on Douglas Island.

The fabulously rich placer mines of Ballarat and Bendigo, discovered in 1851, in two years located the reefs, some of which on Bendigo, have "lived down" over 3,000 feet, and been continuously worked for over 40 years. The experience on Cayoosh Creek, shews that in little more than one year, the matrix, of at least a portion of the gold found in the creek, was located.

I have shewn that the bed and tributaries of Bridge River have added to the golden wealth of the District and Province for the past 36 years, and after all these years, we are yet unable to show from whence this annual supply has come. It must be borne in mind that the great majority of the miners working on the river for the past quarter of a century, have been Indians and Chinese, and whose efforts are invariably directed to the river banks and adjacent benches. A limited number of white miners have annually been at work, but their energies have been persistently directed to the river bed, schemes for diverting its course for a short distance, and hydraulic mining, involving a large expenditure, with, too often, no results. During the mining season, it will always be a difficult stream to deal with, on account of the volume of water it carries, and as a rule, a heavy fall along the line of all known auriferous portions of the bed and banks. The topography of the river and its water-shed need hardly be referred to here, a repetition of Cayoosh Creek, on a larger scale, the greater portion is at a high attitude, all more or less subject to summer frosts, and unfit for agriculture. The usual broken up and rugged nature of the Cascades prevails, access to it is by the primitive and often dangerous trail from the mouth of the river, or by trail from Seaton Lake, over a high divide to Jack's Landing. Doubtless this want of easy access, has, in the past, been an obstacle to the development of that part of the District.

INDIAN RESERVE ON BRIDGE RIVER.

I have no hesitation in asserting that, for every dollar obtained from the bed of the Cayoosh Creek, twenty dollars have been taken from Bridge River, and would indicate for careful prospecting for the matrix which undoubtedly has furnished the supply found in the lower river from its earliest history, a radius taking in from the head of the deep canyon, the lower portion of the North Fork and Horse-Shoe Bend, down to the line of the Indian Reserve. Of course, time and energy need not be wasted on the 13 miles of the Indian Reserve, as under the present Mineral Act, the locator of a mineral claim must make oath, that it is not situated within "any Indian Reservation." The history of the river up to the present, is, that there is a long sluggish stretch from the head of the deep canyon, for nearly 50 miles in which nothing but fine colours of gold have been found. Above this is a wide spread zone, embracing Tyaughton, Gun and Cadwallder Creeks, and the South Fork, all auriferous and yielding a quality of gold identical with that found in the lower river, and I would infer that, within this zone, careful prospecting should be made for the lodes, which undoubtedly have furnished the supply found in the beds of the above-named streams. In addition to gold, I have already shown that silver and galena have been found in the neighbourhood. Copper and float pieces of cinnabar have also been found at different times. In brief, the whole of that portion of the district, from Blackwater Camp on the south-east, to Chilco River on the north-west, thence by the Chilcotin River to Fraser River, with the latter as a base line, is practically unknown territory from the prospector's point of view, with the exception of portions of Bridge River, one of the main central arteries. Of the existing geological conditions nothing whatever is known, so far as I know.

Five mineral locations were made on Cadwallder Creek in October last, and three others this month, in the neighbourhood of the Horseshoe Bend, but all too late for any development at this season. The Horseshoe Bend is under lease to the Bridge River Gold Mining Co., who propose commencing a tunnel, as soon as the season will permit, to run from the lower to the upper caulk of the shoe. The tunnel will be about 800 feet in length, and, when the river is diverted into it, will lay bare and dry the curve of the shoe, about $\frac{5}{8}$ of a mile. The river benches at this point are covered by hydraulic mining leases, from the upper part of the Indian Reserve to the North Fork. Although not within my province, I may be permitted to urge the necessity of a road as a means of ingress to the Bridge River Valley, and as a base to fall back on, and I believe there are no engineering difficulties in the way to the construction of a waggon road from the mouth of the river to the North Fork, a distance of about 16 miles.

COAL.

In this class of mining there has not been anything done, and no prospecting licences have been issued for the district this year.

The following abstract shows the mining transactions in Mr. Phair's office at Lillooet, and my office here, for the year:—

Recorded	Mineral Claims	220
Conveyances of	"	87
Abandonments	"	3
Certificates of Work	"	16
Water Grants for	"	3
Recorded	Placer Claims	9
Re-recorded	"	7
Conveyances	"	10
Water Grants recorded	"	8
Dredging Leases in force		13
Hydraulic Mining Leases in force		34
" " applied for		7
Free Miner's Certificates (Revenue)		$1,067 00
Mining Receipts, general	"	4,408 65

NANAIMO DISTRICT.

MARSHAL BRAY, GOLD COMMISSIONER.

I have the honour to submit my first annual report for the Nanaimo Mining Division for the year ending 31st December 1896, with the customary statistics.

The information is rather meagre at this early stage of development, as nearly all the mineral claims in this district were located in 1896. I only had 22 records of mineral claims in this office at the end of the year 1895, and in August, 1896, Texada Island records were transferred to this office from New Westminster office, and 100 records were so transferred.

For the first year this Mining District has made a good showing, which is as follows:—

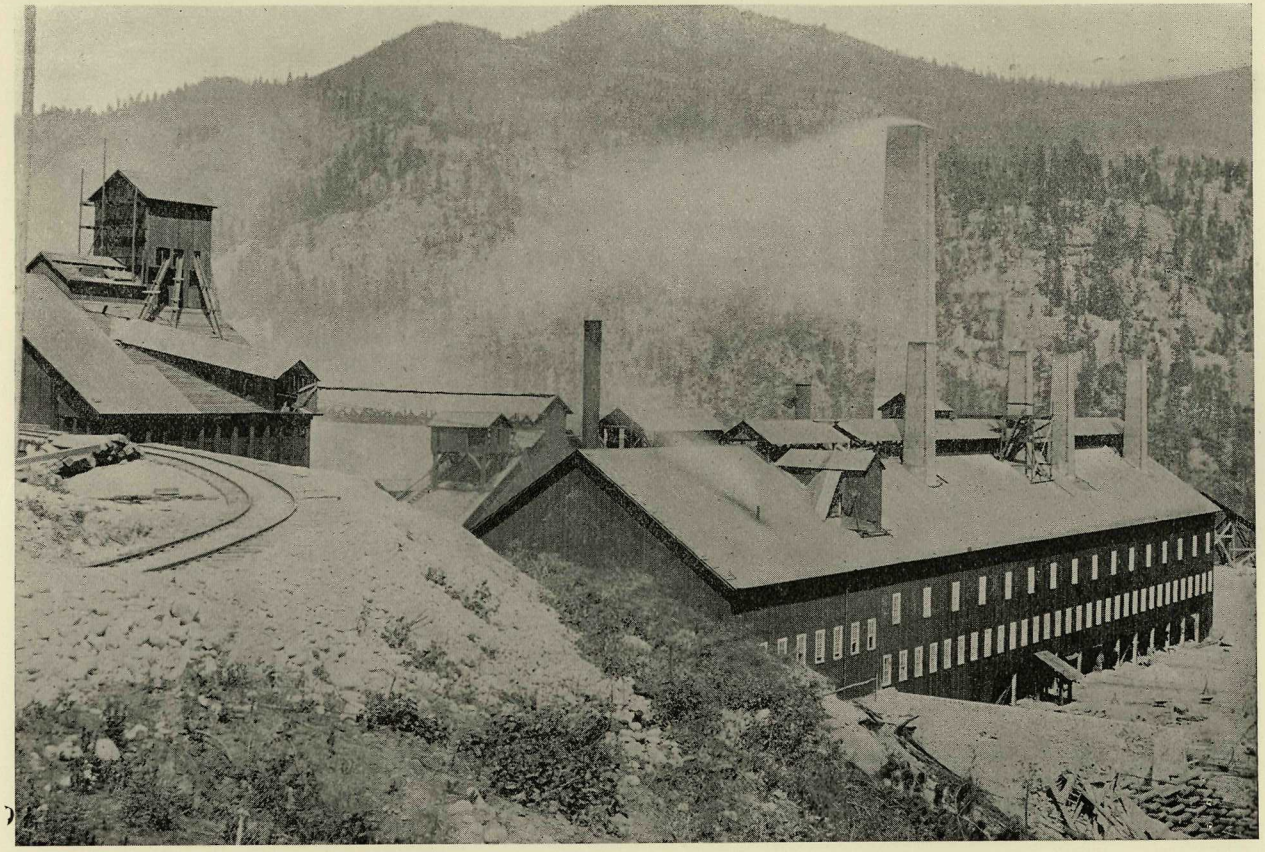
303 mineral claims recorded.
367 free miner's certificates issued.
34 certificates of work recorded.
3 certificates of work issued.
95 conveyances of mineral claims recorded.
3 water grants issued.
2 leases of mining lands for hydraulicing issued.
1 placer mining claim recorded.

The assays from the rock taken from many of the claims show gold and silver in paying quantities, and a few claims show copper and lead, but, as 1896 being the first year, not much development work has been done; in fact, on most of the claims no more has been done than the necessary assessment work required to hold the claims; but no doubt the year 1897 will record the development of many valuable gold and silver mining properties in this district.

The following mineral claims have done considerable development work during the year 1896:—

The Van Anda, on Texada.—A shaft has been sunk 60 feet to first level, and the level has been run 100 feet, and the shaft has been sunk 30 feet below the first level, and they are now stoping out rock for shipment. This claim is about one-half mile from Sturt Bay, which is a good safe harbour, and is connected with the mine by a good road. The company are preparing to put up a wharf. The company has shipped a few tons of ore to Tacoma to determine the value of the ore, and it has run from $25 to $50 per ton.

The *Victoria* group of claims, on Texada Island.—A shaft has been sunk 50 feet on the ledge, and it assays well.



SMELTING WORKS AT TRAIL, B. C.

(See page 18, Bulletin No. 2.)

The *Raven*, on Texada Island, are running a tunnel, with good results.

The *Silver Tip*, on Texada Island.—A shaft sunk 60 feet on good ore.

The *Lorindale*, on Texada Island.—A shaft sunk 35 feet, and another shaft sunk 20 feet, both being on good ore.

The *Nutcracker*, on Texada Island.—A shaft sunk 18 feet on good ore.

The *Bobby Burns*, on Valdes Island.—They have run 80 feet of tunnel on good ore.

The *Hetty Green*, on Valdes Island.—They have run 100 feet of tunnel on good ore.

The *Daniel Webster*, on Valdes Island.—They have a shaft 40 feet deep on good ore.

The *Poodle Dog*, on Channe Island.—They have run 80 feet of tunnel on good ore.

The above-named claims on Valdes and Channe Islands show a vein of about 6 feet wide running through them, and a shipment to the Tacoma smelter gave returns of $31.20 per ton, and they will soon be steady shippers.

The *White Pine*, on Thurlow Island.—They have run 125 feet of tunnel on good ore.

On the *Alliance* group, in Dunsmuir District, they have sunk one shaft 50 feet deep, and one shaft 16 feet deep, and run 35 feet of tunnel, all in good pay ore.

There are two other companies in Dunsmuir District who have taken out tools and provisions, and intend putting in the winter in developing their properties. This portion of the district badly needs a trail from the east end of the Nanaimo Lakes and along the north shore of said lakes, and thence on to the Nitinat River; the distance is between 25 and 30 miles. You will perceive by my statement enclosed that there are 82 mineral claims recorded out there, and there is no trail to take in provisions and tools.

Mr. Dick, the Inspector of Mines, intends making a personal inspection of many of the mineral claims in this district, and he will be able to give you in his report a more detailed and satisfactory report as to the nature of the rock, ores, etc., etc., than I am in a position to give, as I have not been able to spare the time to make a personal inspection, and have had to get my information from the owners of the claims and others who have seen the several claims I have mentioned.

VICTORIA MINING DISTRICT.

VICTORIA DIVISION.

By W. S. Gore, Gold Commissioner.

I have the honour to hand you herewith a report upon the mining transactions which came within my jurisdiction during the last year. This is the first report of the kind that I have had the pleasure of presenting. Heretofore there have been but very few mining locations made on the coast, and the claims which had been recorded were not prospected with any very satisfactory results; it is therefore gratifying to note the comparative magnitude and importance of the past year's transactions. I have also appended a complete detailed list of all the Crown Grants for mineral claims which have been issued by the Government up to the date of this report, which will be a matter of public interest and convenience, as will also be the list of Gold Commissioners and Mining Recorders, which is annexed.

No. of Free Miner's Certificates issued	690
" Mineral Claims recorded	342
" Placer " "	25
" Certificates of Work	60
" Certificates of Improvement	1
" Grants of Water Right	13
" Lay-overs	11
" Placer Leases	22
" Conveyances	83

REVENUE DERIVED.

From Free Miner's Licences	$3,460 00
" Mining receipts generally	3,117 10
Total	$6,577 10

The mineral claims above referred to, are situated principally in the vicinity of Phillips Arm and Loughborough Inlet, and at various other points on the coast of the Mainland, also on the southern portion of Vancouver Island, and consist chiefly of gold, silver and copper, in combination of varying proportions. Nearly all of the mining locations in Victoria District are easy of access by water, and the prospects for successful mining at these places during the ensuing season are bright.

NEW WESTMINSTER DIVISION.

Heretofore this has not been regarded as a mining district of any importance, and the number of claims taken up has been small. Notwithstanding the transfer of Texada Island from this to the Nanaimo District, the number of claims recorded at the office of Mr. Robson, Mining Recorder, during the past year, has been beyond all precedent, and the other business in connection with the office has correspondingly increased, as will appear from the following comparative statement:—

	1895.	1896.
Free Miner's Certificates issued	468	1,150
Mineral Claims recorded	182	518
Certificates of Work issued	12	37

Conveyances, from 1889 to 1896, 81; during 1896, 81.

As a majority of these claims have been located during the latter part of the year, very little development work has been done yet, and one cannot speak with any certainty respecting the actual value of these mining properties. Generally the rock is low grade, but reports of assays in several cases have been very encouraging; some of the claims located on Harrison Lake having shown over $200 in gold to the ton. The Mineral locations are spread over a large area, including Harrison Lake and River, Glacier Lake, Mission, Chilliwhack, Sumas, Stave Lake, Pitt Lake, Burrard Inlet, Howe Sound, Squamish River, Malaspina Strait, Jarvis Inlet, Powell Lake, and elsewhere adjacent to the Straits of Georgia and Fraser River. The amount of prospecting done during the summer has been very large, and there is every reason for expecting that a considerable amount of development work will be done during the coming summer.

For some time negotiations have been going on, looking to the establishment of a smelter and refinery at Vancouver or New Westminster, but no definite arrangement has yet been concluded. Such an establishment would greatly tend to stimulate the development of local mines, as it would probably reduce the cost of treating the ores. A large proportion of the claims located in this district are adjacent to navigable waters, and the ore could be laid down at very small cost, either on Burrard Inlet or Fraser River; and if a smelter were in operation at either of these points, the low grade ores could be worked at a profit. The mining outlook in this division for 1897 is very hopeful.

CROWN GRANTS ISSUED FOR MINERAL CLAIMS TO JANUARY 1st, 1897

ALBERNI.

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Golden Eagle	Alberni	H. Saunders	51.65	Section 198	31st Oct., 1895
Okolono	"	"	51.65	" 199	" "
Sechart	Clayoquot	F. J. Claxton *et al*	20.66	" 3	30th Mch., 1892

CARIBOO.

American	Cariboo	B. C. M. & M. Co	19.88	Lot 92, G. 1	1st Nov., 1889
Burns Mountain M. Co.	"	Burns Mountain M. Co	61.98	" 62, 63, 64, "	25th Feb., 1885
Cariboo	"	B. C. M. & M. Co	20.60	" 93 "	1st Mch., 1889
Consolidated	"	C. D. Rand	.....	" 200 "	11th Dec., 1894
Eureka	Richfield	"	20.66	" 201 "	" "
Gifford	Cariboo	"	20.66	" 198 "	" "
Quesnelle Quartz M. Co.	"	Quesnelle Quartz M. Co	113.30	" 52, 53, 54, 55, 56, G. 1	16th Sept., 1884
Rand	"	C. D. Rand	20.66	" 117 "	16th April, 1890
St. Laurent	"	B. C. M. & M. Co	2.00	" 94 "	1st Mch., 1889
Victoria	"	C. D. Rand	20.66	" 199 "	11th Dec., 1894
Wilkinson	"	B. C. M. & M. Co	20.66	" 177 "	25th May, 1893

EAST KOOTENAY.

Atlanta	.....	E. B. Osler *et al*	19.47	Lot 134, G. 1	9th Sept., 1889
Agnes	Golden	M. Drainard	20.66	" 764 "	18th April, 1895
Buckhorn	Fort Steele	North Star M. Co	19.47	" 679 "	17th May, "
Black Horse	Golden	M. Drainard	18.90	" 763 "	18th April, "
Constance	.....	E. B. Osler *et al*	19.42	" 135 "	9th Sept., 1889
Diamond E	Golden	Carbonate Mountain M. Co	20.66	" 543 "	16th May, 1893
Dreadnaught	Fort Steele	North Star M. Co	51.65	" 660 "	17th " 1895
Horse Shoe	.....	A. Granger	20.66	" 266 "	15th Dec., 1891
International	Golden	J. F. Armstrong	20.66	" 661 "	11th Nov., 1895
Jumbo	Windermere.	Wm. Rosamond	20.66	" 293 "	7th June, 1892
Juanita	Golden	D. Oppenheimer *et al*	20.66	" 652 "	29th Oct., 1894
Monarch	"	Geo. deWolf	20.66	" 551 "	30th May, 1893
Maud S	"	Geo. Gore	20.66	" 649 "	15th Sept., 1893
Mountain Daisy	"	S. Redgrave	19.80	" 647 "	" "
Monitor	"	F. Dick	20.66	" 651 "	" "
Mill Site	"	R. Fotheringham	5.00	" 1091 "	10th Feb., 1896
Midnight	Fort Steele	Geo. Hoggarth	41.50	" 1381 "	15th Dec., "
Number One	Golden	Carbonate Mountain M. Co.	20.66	" 542 "	11th May, 1893
North Star	Fort Steele	North Star M. Co	51.65	" 657 "	17th " 1895
Nugget	Golden	H. E. Foster	51.65	" 777 "	5th Dec., "
O. K	Fort Steele	North Star M. Co	51.65	" 658 "	17th May, "
Rothschild	Golden	S. Redgrave	20.56	" 136 "	27th Sept., 1889
Robert E. Burns	"	R. Fotheringham	51.65	" 1002 "	5th Dec., 1895
Southern Cross	"	Carbonate Mountain M. Co.	20.08	" 544 "	16th May, 1893
Silver King	"	S. Redgrave	16.00	" 648 "	15th Sept., "
Standby	"	Wm. D. McKay	20.45	" 761 "	29th Oct., 1894
Syenite Bluff	"	H. G. Low	20.66	" 672 "	19th Mch., 1895
Thunder Hill	Windermere.	Jas. Brady	20.66	" 253 "	16th Nov., 1891
Tiger	Golden	Jno. McKay	20.66	" 650 "	15th Sept., 1893

WEST KOOTENAY.

Name of Claim.	District.	Name of Grantee	Acres.	Description.	Date of Grant.
American Flag	Nelson	Chas. Hall *et al*	6.55	Lot 142, G. 1	1st Dec., 1890
Ayesha	Ainsworth	E. W. Herrick *et al*	16.47	" 143 "	13th Feb., 1891
Arkansas	"	B. Roberts *et al*	14.00	" 173 "	7th Feb., 1891
Annie	Nelson	H. Selous	14.00	" 407 "	20th Mar., 1893
Antelope	Slocan	Jno. King *et al*	49.93	" 452 "	5th Dec., 1893
Alpha	"	Wm. Brady *et al*	51.67	" 562 "	1st Nov., 1894
Amazon	Ainsworth	A. V. Westly	20.66	" 713 "	10th Dec., 1894
Alamo	Slocan	N. D. Moore	33.12	" 737 "	4th Jan., 1895
Arcade	Ainsworth	A. B. Hendryx	18.00	" 722 "	28th Mch., 1895
Abbott	Trout Lake	H. Abbott	51.65	" 765 "	14th Jan., 1896
Adams	Slocan	Adams & Brandon	50.78	" 750 "	26th Jan., 1896
Annie	Trail	D. J. Burke *et al*	30.20	" 730 "	20th May, 1896
Alberta	"	D. M. Drumheller	43.71	" 973 "	3rd July, 1896
Alice	"	Ema R. Rugh	43.71	" 945 "	27th July, 1896
Atlantic Cable	"	Wm. Caldwell	29.61	" 1206 "	25th Sept., 1896
Attended	Ainsworth	A. W. McCune	18.37	" 978 "	3rd Dec., 1896
Blue Bell	"	W. A. Hendryx	20.60	" 50 "	15th Feb., 1888
Banker	"	A. D. Wheeler	20.65	" 147 "	3rd Sept., 1890
Black Bird	"	A. W. McCune	20.66	" 174 "	23rd Jan., 1893
Blue Bird	Slocan	J. A. Whittier	51.65	" 540 "	8th April, 1893
Best	"	D. Porter *et al*	20.66	" 451 "	4th Sept., 1893
Bobtail	Ainsworth	Shafer G. & S. M. Co	30.00	" 556 "	21st Nov., 1893
Blue Jay	Slocan	R. E. Lemon *et al*	17.42	" 482 "	8th May, 1894
Buffalo	"	A. Sproat *et al*	33.16	" 674 "	6th April, 1894
Britomarte	"	R. C. Adams	44.52	" 698 "	10th Aug., 1894
Black Chief	Ainsworth	Columbia M. Co	20.13	" 569 "	12th Nov., 1894
Bon Ton	"	W. H. Brandon *et al*	44.08	" 636 "	17th May, 1895
Black Bear	Trail	Le Roi M. Co	49.15	" 538 "	6th Feb., 1895
Badger	Goat River	C. M. Reese *et al*	19.70	" 785 "	11th Feb., 1896
Brandon	Slocan	Brandon & Adams	35.30	" 751 "	26th Feb., 1896
Bid	Nelson	Hall Mines Co	14.50	" 901 "	18th Mar., 1896
Buckeye	Trail	Schmidt *et al*	15.00	" 534 "	30th April, 1896
Blue Bird	"	E. Bousquet	29.53	" 1053 "	"
Beechwood	"	H. Bostock	47.40	" 938 "	28th July, 1896
Boomer	"	Caledonia C. M. Co	0.25	" 961 "	14th Oct., 1896
Big Chief No. 2	"	McCraney *et al*	45.42	" 1284 "	7th Dec., 1896
Bugaboo	Ainsworth	A. W. McCune *et al*	15.52	" 979 "	3rd Dec., 1896
Comfort	"	Geo J. Ainsworth	20.35	" 12 "	9th Dec., 1884
Crow Fledgling	"	A. D. Wheeler	20.66	" 146 "	3rd Sept., 1890
Corbin & Kennedy	Illecillewaet.	D. W. Corbin, *et al*	20.66	" 200 "	7th Dec., 1891
Crystal	"	"	20.66	" 203 "	"
Copper King	Nelson	E. D. Ainsworth	12.27	" 417 "	1st April, 1893
Centre Star	Trail	O. Durant *et al*	20.66	" 558 "	27th Nov., 1893
Cumberland	Slocan	M. Clair *et al*	32.74	" 478 "	20th Mar., 1894
Chamblet	"	R. C. Adams	41.77	" 699 "	12th April, 1894
Crescent	Ainsworth	Columbia M. Co	20.66	" 568 "	12th Nov., 1894
Calcium	"	A. B. Hendryx	2.25	" 721 "	16th Mar., 1895
Currie	Slocan	J. H. Currie	26.50	" 744 "	30th Aug., 1895
Cons. St. Elmo	Trail	J. R. Cook *et al*	14.52	" 924 "	11th Feb., 1896
Cliff	"	"	15.55	" 921 "	15th Jan., 1896
Crown Point	"	C. Dougherty	30.45	" 981 "	21st July, 1896
Columbia	"	Trail M. Co	16.00	" 694 "	25th Feb., 1896
City of Spokane	"	Ed. Haney	19.80	" 804 "	6th Mar, 1896
C. & C	"	J. C. Gore	12.50	" 992 "	27th May, 1896
Crown Point	Slocan	Wm. Braden	7.60	" 586 "	20th Oct., 1896
California	Trail	Chas. Warren *et al*	51.65	" 956 "	24th Sept., 1896
Cumberland	Nelson	Ed. Mahon	20.24	" 904 "	19th Aug., 1896
Commander	Trail	Commander M. & S. Co	51.65	" 960 "	25th Sept., 1896
Cariboo	"	Kendrick & Ogilvie	46.82	" 1205 "	"
Caledonia	"	Caledonia Con. M. Co	20.29	" 734 "	14th Oct., 1896
Clifton	Slocan	J. M. Harris *et al*	41.21	" 517 "	22nd Oct., 1896
Dandy	Nelson	Fox, Kelly & Cook	19.30	" 141 "	12th Sept., 1891
Democrat	"	M. D. Mahoney	8.75	" 236 "	"
Dictator	Ainsworth	Empire Con. M. Co	20.66	" 243 "	22nd Dec., 1891
Danira	"	J. C. Rykert, Jr	14.35	" 259 "	31st Dec., 1891
Dellie	"	S. S. Bailey	18.50	" 241 "	23rd Jan., 1893
Dardanelles	Slocan	Jno. King, *et al*	47.61	" 453 "	5th Dec., 1893

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Deadman	Slocan	R. M. Sherman	40.72	Lot 613, G. 1	29th Oct., 1895
Deerborn	Nelson	Wm. Strachan	20.66	" 390 "	5th Dec., "
Deer Park	Trail	F. A. Mulholland	51.65	" 932 "	12th Feb., 1896
Daylight	Nelson	Hall Mines Co	39.30	" 907 "	20th May, "
Delaware No. 1	Trail	Delaware M. & M. Co	51.65	" 1225 "	28th Oct., "
Evening	Nelson	Geo. W. Coplin	20.66	" 103 "	27th Feb., 1891
Etna	"	C. Van Ness	4.02	" 414 "	19th Oct., 1893
Eden	Ainsworth	Columbia M. Co	19.80	" 567 "	12th Nov., 1894
Echo	Slocan	Grady, Briggs & Latz	51.60	" 719 "	11th Feb., 1895
Early Bird	Ainsworth	J. L. Retallack	10.63	" 566 "	14th Aug., "
Evening Star	Trail	D. M. Drumhellar	18.37	" 801 "	5th Nov., "
Enterprise	"	S. St. Onge *et al*	20.65	" 695 "	17th Jan., 1896
Eddie J	"	D. C. Corbin	44.00	" 803 "	27th Feb., "
Elanore	"	Argonaut G. M. Co	24.00	" 951 "	30th April, "
Excelsior	Nelson	W. Dainard *et al.*	51.65	" 1107 "	27th May, "
Elgin	Slocan	Minnesota S. Co	51.65	" 742 "	21st July, "
Ellen	Ainsworth	Jno. H. Fink *et al*	14.20	" 980 "	4th Dec., "
Eric	Trail	Eric G. M. Co	43.19	" 1277 "	1st Dec., "
Forest	Nelson	J. R. Cook *et al*	14.00	" 233 "	4th Sept., 1891
Fourth	Ainsworth	Geo. C. Howe	17.75	" 301 "	1st June, 1892
Freddie Lee	Slocan	Freddie Lee M. Co	15.11	" 475 "	13th Aug., 1894
Ferne	Nelson	F. Fletcher *et al*	51.65	" 374 "	23rd April, 1896
Franklin	Slocan	E. O. Carpenter	44.90	" 588 "	22nd July, "
Fergus	Ainsworth	A. J. Marks	20.66	" 977 "	4th Dec., "
Freeburn	Trail	Freeburn M. Co	25.90	" 957 "	" "
Grizzly Bear	Nelson	R. A. and A. C. Fry	20.25	" 105 "	2nd June, 1891
Golden Wreath	"	Cottonwood G. M. Co	20.66	" 495 "	23rd Mar., 1893
Golconda	Ainsworth	Kootenay M. & S. Co	22.00	" 726 "	15th " 1895
Golden King	Nelson	Cottonwood G. M. Co	20.66	" 496 "	23rd " 1893
Great Western	Slocan	Thos. McGovern	20.66	" 548 "	29th May, "
Grand View	Nelson	A. H. Kelly	19.49	" 685 "	4th Mar., 1895
Golden Drip	Trail	T. M. Dormitzer	9.00	" 539 "	2nd " "
Gertrude	"	A. Beamer	16.80	" 690 "	4th Oct., "
Gold Hill	"	R. C. Daniel	51.65	" 640 "	10th Dec., "
Golden Chariot	"	A. Jackson	46.00	" 691 "	9th Mar., 1896
Great Western	"	"	12.08	" 692 "	" "
Great Eastern	Slocan	W. C. Yawkee	46.49	" 753 "	30th April, "
Georgia	Trail	H. H. R. Chapman	41.48	" 928 "	9th May, "
Gem	"	A. B. Campbell *et al*	37.31	" 984 "	22nd " "
Grey Copper	Slocan	J. A. Whittier	17.68	" 580 "	27th July, "
Goodenough	"	J. H. Thompson *et al*	8.30	" 581 "	14th Aug., "
Giant	Trail	G. W. Coplin	42.00	" 997 "	28th Sept., "
Golden Queen	"	Jas. Garrison	39.00	" 994 "	" "
Gold King	"	D. M. Lennard *et al*	38.05	" 1061 "	" "
Gold King	"	L. J. McAter	11.80	" 1229 "	8th Dec., "
Goldendale	Nelson	O. Bordau	13.47	" 915 "	15th " "
G. R. Sovereign	Trail	G. W. Peterson *et al.*	42.85	" 1226 "	14th " "
Happy Find	Illecillewaet.	Corbin, Kennedy *et al.*	20.66	" 202 "	7th " 1891
Highland	Ainsworth	J. C. Rykert *et al*	15.26	" 258 "	31st " "
Hendryx No. 1	Slocan	Kootenay M. & S. Co	20.96	" 461 "	1st Aug., 1895
Hendryx No. 2	"	A. B. Hendryx	21.50	" 462 "	15th Mar., "
Hidden Treasure	Nelson	Colwell *et al*	17.57	" 411 "	20th " 1893
Highlander	Ainsworth	M. Stevenson	20.66	" 557 "	14th Nov., "
Hannah	Nelson	W. Strachan	20.14	" 371 "	4th Jan., 1895
Homestake	Trail	S. M. Wharton *et al*	19.87	" 936 "	27th Feb., 1896
Henry	Ainsworth	Harman & Hendryx	10.71	" 724 "	6th Mar., "
Hattie Brown	Trail	Meade & McLaren	35.00	" 1047 "	16th " "
Highland	"	M. S. Thompson *et al*	50.65	" 1049 "	30th April, "
High Ore	"	High Ore M. & S. Co	24.40	" 641 "	" "
Hattie	"	E. Bousquet	32.00	" 1054 "	" "
Iroquois	Nelson	J. E. Boss	15.13	" 234 "	14th Sept., 1891
Ivanhoe	"	W. R. Will *et al*	14.02	" 416 "	20th Mar., 1893
Idaho	Trail Creek	Durant & Tarbet	19.56	" 559 "	27th Nov., "
Idaho	Slocan	Behne *et al*	50.24	" 472 "	27th April, 1894
Ivy Leaf	"	R. McFerran	7.33	" 738 "	4th Jan., 1895
I. X. L	Trail Creek	G. Pahl *et al*	19.47	" 679 "	12th July, "
Iron Horse	"	S. St. Onge	18.00	" 795 "	16th Jan., 1896

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Ida	Trail Creek	C. Schmidt *et al*	19.00	Lot 989, G. 1	21st May, 1896
Iron Mask	"	Pat. Clark	11.60	" 688 "	18th Mar., "
Ida Fraction	"	C. Schmidt *et al*	12.27	" 990 "	6th Aug., "
Ivanhoe	Slocan	Minnesota Silver M. Co	29.24	" 743 "	24th July, "
Ida No. 2	Trail Creek	J. A. Mulrony *et al*	44.8	" 1060 "	28th " "
Josephine	Ainsworth	Josephine M. Co	20.66	" 552 "	20th Nov., 1893
Jay Gould	"	Shafer G. & S. M. Co	19.88	" 554 "	21st " "
Jim Crow	Nelson	E. Mahon	17.38	" 409 "	14th Feb., 1894
Josie	Trail Creek	F. C. Loring	14.00	" 536 "	11th Jan., 1895
Jessie	Nelson	E. Mahon	15.60	" 686 "	20th May, "
Jumbo	Trail Creek	J. A. Finch *et al*	20.66	" 965 "	12th Nov., "
John W. McKey	Slocan	E. H. Thomlinson	51.65	" 968 "	4th Mar., 1896
Jim Fair	"	"	30.17	" 969 "	" "
Josie Mac	Trail Creek	Sam. T. Arthur	35.80	" 1230 "	4th Dec., "
Kootenay Chief	Ainsworth	Geo. J. Ainsworth	18.40	" 11 "	9th Dec., 1884
Kootenay Bonanza	Nelson	Chas. Hall *et al*	20.66	" 140 "	1st " 1890
Krao	Ainsworth	A. D. Wheeler	20.66	" 93 "	15th Jan., "
Kootenay	Trail Creek	P. Aspinwall	20.45	" 697 "	23rd Dec., 1895
Koo-i-noor	Nelson	Hall Mines Co., Ltd.	10.24	" 245 "	13th Nov., "
King William	Trout Lake	H. Abbott	51.65	" 766 "	14th Mar., 1896
Kaslo	Ainsworth	Jas. Smith *et al*	50.56	" 822 "	Not issued.
Kalmar	Slocan	Wm. Lardner	48.38	" 1012 "	8th Dec., 1896
Kalispell	"	Wm. Lardner *et al*	37.2	" 1011 "	" "
Lulu	Ainsworth	G. J. Ainsworth	19.30	" 13 "	9th Dec., 1884
Little Donald	"	J. F. Stevens *et al*	20.66	" 92 "	16th Jan., 1890
Let-her-go, Gallagher	"	A. D. Wheeler	20.66	" 87 "	15th " "
Le Roi	Trail Creek	Le Roi M. & S. Co	20.29	" 240 "	23rd Dec., 1891
Libby	Ainsworth	A. W. McCune *et al*	20.66	" 178 "	4th May, 1892
Last Chance	Nelson	E. Mahon	10.20	" 410 "	14th Feb., 1894
Lulu	"	E. Ramsay	18.20	" 247 "	4th April, "
Little Phil	Ainsworth	Thos. McGovern	4.1	" 477 "	3rd Oct., "
Last Chance	Slocan	E. H. Tomlinson	16.32	" 717 "	25th Feb., 1895
Loudoun	"	J. M. Harris *et al*	35.80	" 727 "	5th Oct., "
Lizzard	Goat River	J. H. Field *et al*	20.66	" 786 "	11th Feb., 1896
La Belle	Trail Creek	J. B. Jones *et al*	9.96	" 729 "	30th April, "
Londonderry	"	Argonaut G. M. Co., Ltd	17.00	" 952 "	" "
Last Chance	"	A. B. Campbell *et al*	31.00	" 986 "	22nd May, "
Lake Side	Nelson	Hall Mines Co., Ltd	45.18	" 906 "	20th " "
Lilly May	Trail Creek	O. Bordau *et al*	11.89	" 1052 "	21st July, "
Lost Boy	"	H. Bostock	29.00	" 942 "	28th " "
Little Pittsburg	"	"	43.50	" 940 "	" "
Long Tom	Nelson	E. A. Powys *et al*	48.03	" 386 "	15th Dec., "
Lucky Queen	Trail Creek	Paul Blackmar	2.48	" 1184 "	14th " "
Lanark	Illecillewaet		16.35	" 294 "	Not issued.
Maestro	Ainsworth	A. D. Wheeler	20.66	" 90 "	15th Jan., 1890
Majestic	Nelson	Jno. Miles	20.66	" 402 "	5th Sept., 1892
Minnie	"	John McDonald	.87	" 246 "	23th Jan., 1893
Mountain Chief	Slocan	S. S. Bailey	8.17	" 498 "	17th Mar., "
Maid of Erin	"	"	9.97	" 500 "	" "
Mile Point	Ainsworth	Julia A. Wright	20.00	" 214 "	14th July, "
Mountain Chief No. 2	Slocan	W. H. Smith	51.65	" 474 "	19th Sept., "
Mill Site (Rattler)	Trail Creek	E. D. Carter	5.00	" 560 "	3rd Nov., 1894
Mountain View	"	E. S. Topping *et al*	15.65	" 682 "	11th May, 1895
Mountain Boomer	Slocan	E. & H. Mahon	47.86	" 740 "	23rd Sept., "
Mill Site	"	N. D. Moore	5.00	" 736 "	20th " "
Monte Cristo	Trail Creek	S. St. Onge *et al*	16 53	" 802 "	17th Jan., 1896
Mill Site	Slocan	Byron N. White Co	5.	" 590 "	9th April, "
Morning Star	Trail Creek	A. Cessford *et al*	38.63	" 955 "	3rd " "
Mammoth	"	A. B. Campbell *et al*	20.10	" 985 "	22nd May, "
Magnolia	"	H. Bostock	25.40	" 943 "	28th July, "
Mill Site	Nelson	The Hall Mines Co., Ltd	5.00	" 910 "	30th Sept., "
Monita	Trail Creek	Monita G. M. Co. of B. C.	16.80	" 689 "	" "
E. W. R	Ainsworth	T. J. Lendrum *et al*	19.14	" 716 "	10th Dec., 1894
Morning	Nelson	Geo. W. Coppen *et al*	18.85	" 104 "	27th Feb., 1891
Number One	Ainsworth	Revelstoke Mining Co.	20.66	" 89 "	25th Jan., "
New Jerusalem	"	J. Frank Collom	19.00	" 144 "	1st Sept., "
Newmarket	Nelson	J. R. Cook *et al*	12.65	" 235 "	14th " "

WEST KOOTENAY.—*Continued.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Neosho	Ainsworth	Neosho Mining Co	14.89	Lot 302, G. 1	8th July, 1892
Nickel Plate	Trail Creek	E. Haney *et al*	18.80	" 537 "	3rd May, 1895
No. 1	"	A. H. Sonneman *et al*	16.38	" 687 "	27th Dec., "
Northern Belle	"	J. A. Finch	29.50	" 644 "	30th April, 1896
North Star	"	Frank Barnard *et al*	25.00	" 797 "	6th Aug., "
Nest Egg	"	Nest Egg M. Co., Ltd	45.37	" 1048 "	10th Nov., "
Novelty	"	Thos. F. Wren *et al*	19.61	" 958 "	30th Sept., "
New Denver	Slocan	Jno. M. Harris *et al*	28.75	" 612 "	22nd Oct., "
Ollie	Nelson	Kelly *et al*	21.04	" 412 "	20th Mch., 1893
O. K	Trail, B. C.	John J. Cole *et al*	31.18	" 678 "	20th April, 1895
Old Abe	Goat River	John H. Field *et al*	14.39	" 782 "	11th Feb., 1896
Olla Podrida	Trail Creek	Frank C. Loring	34.47	" 799 "	2nd April, "
Ohio	Ainsworth	R. S. Howard *et al*	9.4	" 974 "	9th April, "
Ontario	Trail Creek	G. E. Pfunder *et al*	49.27	" 1057 "	21st July, "
Old Timer	Ainsworth	Rich. Ashworth	11.73	" 250 "	29th July, "
Pataha	"	A. D. Wheeler	20.66	" 148 "	3rd Sept., 1890
Poorman	Nelson	C. Hussey *et al*	20.66	" 101 "	7th Feb., 1891
Payne	Slocan	S. S. Bailey *et al*	12.56	" 499 "	17th Mch., 1893
Paradise	Nelson	John Miles	20.66	" 728 "	29th Aug., 1895
President	Goat River	John H. Field *el al*	17.17	" 782 "	11th Feb., 1896
Poorman	Trail Creek	P. Clark *et al*	2.37	" 925 "	21st July, "
Paris Belle	"	Paris Belle Mining Co	31.28	" 531 "	Not issued.
Perhaps	Ainsworth	A. W. McCune	17.38	" 971 "	28th Feb., "
Phœnix	Trail Creek	Phœnix G. M. Co	25.17	" 953 "	16th Mch., "
Pacific	Nelson	Ed. Mahon	15.06	" 903 "	19th Aug., "
Pittsburg	Trail Creek	J. R. and A. Stussi	47.90	" 1150 "	Not issued.
Palo Alto	"	Palo Alto G. M. Co	51.44	" 950 "	21st Sept., "
Pott	"	Caledonia Con. M. Co	10.15	" 733 "	14th Oct., "
Pauper's Dream	Ainsworth	Arabella Coy	51.65	" 1163 "	15th Oct., "
Queen Bess		Wm. Glynn *et al*	37.72	" 215 "	22nd Sept., 1893
Queen Victoria	Nelson	J. J. Baker *et al*	20.66	" 368 "	27th May, 1896
Royal Charter	"	A. H. Kelly	18.20	" 232 "	16th Nov., 1891
Round Hill	Illecillewaet	A. E. McCallum	20.66	" 201 "	5th Sept., 1892
Rand	Ainsworth	D. F. Strobeck	51.65	" 675 "	13th Feb., 1895
Ruby Silver	Slocan	W. P. Russell	17.34	" 515 "	22nd " "
Rockingham	Trail Creek	D. J. Burke *et al*	10.13	" 731 "	21st July, 1896
R. E. Lee	Slocan	G. and L. Alexander	18.85	" 579 "	10th Sept., "
Red Mountain	Trail Creek	Chas. Sweeny	39.13	" 1000 "	28th " "
Ruecau	Slocan	J. M. Harris *et al*	29.04	" 624 "	21st Oct., "
Silver King	Ainsworth	W. A. Hendryx	20.00	" 49 "	15th Feb., 1888
Silver King	Nelson	Chas. Hall *et al*	19.3	" 141 "	1st Dec., 1890
Skyline	Ainsworth	A. D. Wheeler	19.50	" 137 "	3rd Sept., "
Sweden	"	E. W. Herrick	16.95	" 145 "	11th Nov., "
Spokane	"	Pacific Bullion M. Co	13.15	" 212 "	21st July, 1893
Silver Queen	Nelson	R. A. and A. C. Fry	20.25	" 105A "	29th Jan., 1891
Sunrise	"	Ed. Dempsie	8.20	" 238 "	15th Dec., "
Slocan Star	Slocan	Byron M. White	20.6	" 545 "	27th May, 1893
Slocan Boy	"	E. J. Hale *et al*	20.66	" 626 "	5th Sept., "
Storm Cloud	Ainsworth	Geo. C. Howe	17.96	" 300 "	4th Nov., "
Shafer	"	Shafer G. & S. M. Co	30.00	" 556 "	21st " "
St. John	Slocan	A. Behne *et al*	50.24	" 472 "	11th April, 1894
Starlight	Nelson	A. H. Kelly *et al*	20.66	" 684 "	5th Mch., 1895
Shunieau	Slocan	M. Grady *et al*	51.30	" 718 "	12th Feb., "
Standard	"	"	51.65	" 564 "	11th " "
Surprise	"	"	15.66	" 563 "	11th " "
Stranger	Ainsworth	J. A. Whittier *et al*	31.55	" 512 "	15th " "
Surprise No. 2	Slocan	Slocan Surprise M. Co	31.18	" 514 "	22nd May, "
Silver Cup	"	Chas. Holten	20.66	" 768 "	26th July, "
Selkirk	Goat River	J. H. Field *et al*	50.65	" 784 "	11th Feb., 1896
Southern Cross	Trail Creek	Thos. Smirl *et al*	40.43	" 964 "	16th Mch., "
Sunset	Ainsworth	R. E. Lemon *et al*	43.43	" 970 "	10 Feb., "
Slater	Slocan	Walter C. Adams	1.52	" 752 "	18th Mch., "
St. Louis	Trail Creek	Jos. Brown *et al*	51.65	" 935 "	30th April, "
St. Elmo	"	F. C. Loring	20.66	" 923 "	27th May, "
Spotted Tail	"	Chas. Schmidt *et al*	37.5	" 988 "	21st " "
Silver Star	"	H. Bostock	46.56	" 939 "	28th July, "
Snap	Slocan	Jno. Elliott *et al*	32.09	" 911 "	25th " "

WEST KOOTENAY.—*Concluded.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
San Francisco	Trail Creek	Martin Salmon *et al*	39.77	Lot 1056, G. 1	25th Sept., 1896
Silverine	"	Silverine G. M. Co	42.66	" 732 "	14th Oct., "
St. Paul	"	W. A. Campbell	39.58	" 1208 "	15th " "
San Joaquin	"	San Joaquin G. M. Co	51.06	" 1174 "	3rd Dec., "
Sunset	Ainsworth	Jno. L. Retallack	51.65	" 1164 "	8th " "
Tough Nut	Nelson	Fitch *et al*	11.86	" 186 "	5th " 1891
Tenderfoot	Ainsworth	W. W. Sprague	19.64	" 179 "	2nd June, "
The Dandy	Nelson	Fox, Kelly *et al*	19.00	" 231 "	12th Sept., "
Tam O'Shanter	Ainsworth	Montreal-Kootenay M. Co	16.52	" 401 "	24th Jan., 1893
Try Me	Nelson	Harold Selous	00.75	" 415 "	10th April, "
Tiger	Ainsworth	J. M. Squire	20.66	" 88 "	20th Mch., "
Two Jacks	Nelson	S. S. Bailey	8.69	" 497 "	17th " "
Trinket	Ainsworth	Pacific Bullion M. Co	19.26	" 213 "	15th Sept., "
Twin Lakes	Slocan	Alamo Min. Co	36.23	" 747 "	27th Feb., 1896
Tiger	Trail Creek	A. B. Campbell *et al*	26.30	" 926 "	21st May, "
True Fissure	Trout Lake	Thos. Downs	47.52	" 1097 "	21st July, "
Thompson	Trail Creek	Ross Thompson	5.45	" 948 "	25th Sept., "
Trilby No. 2	"	Beaver G. M. Co	49.48	" 1207 "	" "
Texas	Slocan	J. M. Harris *et al*	51.65	" 589 "	22nd Oct., "
Tornado	Trail Creek	B. C. Syndicate *et al*	29.24	" 1156 "	4th, Dec., "
United	Ainsworth	Revelstoke M. Co	20.00	" 172 "	13th Feb., 1891
Union	"	Fitch *et al*	11.86	" 186 "	5th Dec., "
Uncle Sam	Trail Creek	A. B. Campbell *et al*	33.64	" 983 "	21st May, 1896
Union	"	H. McGlynn *et al*	51.65	" 944 "	24th Aug., "
Victoria	Nelson	Hall Bros. *et al*	18.54	" 248 "	29th Nov., 1894
Virginia	Trail Creek	Jos. Bourgeois *et al*	18.80	" 681 "	5th April, 1895
View	"	Jno. A. Finch	11.55	" 645 "	30th " 1896
Victor	"	W. J. C. Wakefield	46.54	" 1062 "	9th Dec., "
Washington	Slocan	Wm. Lynch *et al*	14.76	" 541 "	26th May, 1893
Wanacott	"	S. S. Bailey *et al*	44.21	" 404 "	23rd Mch, "
Whitewater	Nelson	W. G. Goepel	20.66	" 529 "	25th Feb., "
Wonderful	Slocan	N. E. Lay *et al*	24.50	" 481 "	23rd Sept., "
Wellington	"	Koot. & Col. Pros. M. Co	50.5	" 553 "	11th April, 1894
Wakefield	Ainsworth	Canadian Pacific M. Co	43.	" 712 "	30th Aug., "
Western	Slocan	H. Mann *et al*	51.65	" 565 "	25th Jan., 1895
War Eagle	Trail Creek	J. Bourgeois *et al*	18.58	" 680 "	5th April, "
White Bear	"	J. J. Cole	30.83	" 1149 "	25th Sept., 1896
Yankee Girl	Nelson	H. Selous	19.41	" 406 "	20th Mch., 1893
Young Dominion	Slocan	J. E. Boss	40.50	" 458 "	17th Jan., 1894
You Know	Trail Creek	W. G. Benham	7.88	" 982 "	18th Mch., 1896
Yorkee Joke	Nelson	E Mahon	18.57	" 905 "	19th Aug., "
Zilor	Slocan	Ed. and H. Mahon	48.46	" 741 "	23rd Sept., 1895
Zilor	Trail Creek	W. Perdue *et al*	12.77	" 1051 "	21st July, 1896
Sunlight	Ainsworth	H. Miller *et al*	20.66	" 715 "	13th Feb., 1895

LILLOOET.

Brown Extension	Lillooet	Foster Gold M. & M. Co	20.60	" 103 "	10th Nov., 1887
Bell Location	"	E. Bell	20.66	" 127 "	28th Sept., 1889
Drake "	"	M. W. T. Drake	20.66	" 128 "	28th " "
Foster "	"	F. W. Foster	20.60	" 101 "	10th Nov., "
Henderson	"	Geo. Henderson	20.60	" 102 "	10th " 1887
Iron Clad	"	J. O'Brien	20.66	" 289 "	28th " 1895
Lone Prospector	"	Jno. O'Brien	20.66	" 288 "	28th " "
McB. Smith	"	Jas. McB. Smith	20.66	" 123 "	5th Dec., 1888
Ward Location	"	P. H. Ward	20.50	" 125 "	9th Feb., 1889
Hiram "	"	Hiram Gould	20.60	" 124 "	9th " "
Harvey "	"	H. W. Harvey	20.66	" 126 "	28th Sept., "

NEW WESTMINSTER.

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Elsie	New West'r.	Geo. deWolf	51.65	Lot 1648, G. 1	1st Mch., 1895
Kemptville	"	H. Abbott *et al*	20.66	" 1608 "	10th April, 1893
" Extension	"	G. Bower *et al*	20.66	" 1609 "	" "
" No. 2	"	Thos. Tompkins	20.66	" 1607 "	" "

SAYWARD AND COAST.

Bobby Burns	Victoria	Channe M. Co	45.40	Lot 201*a*	2nd Dec., 1896
Daniel Webster	"	"	28.70	" 203*a*	3rd " "
Hetty Green	"	"	35.33	" 202*a*	2nd " "
Moss & McKay	"	McKay & M. Moss	.....	Sec. 9, Blk. 1	20th Oct., 1882
Poodle Dog	"	Channe M. Co	51.65	Lot 204*a*, R. 1	2nd Dec., 1896

YALE.

Amelia	Osoyoos	Jas. Monaghan	15.50	Lot 273, G. 1	14th May, 1889
Alice	"		17.50	" 271 "	12th June, "
Azela	Kamloops	Wm. Palmer	20.66	" 692 "	27th Sept., "
Argen	Osoyoos	J. A Mara	20.66	" 343 "	2nd June, 1891
American Boy	Kettle River.	R. L. Rutter	51.65	" 619 "	4th Sept., 1895
Anarchist	Osoyoos	R. G. Sidley	51.65	" 647 "	23rd April, 1896
B. C. Copper M. Co	Similkameen	B. C. Copper M. Co	41.00	" 59, 60 "	16th Mch., 1887
Belle Scott	Kamloops	Nicola M. & M. Co	20.40	" 590 "	" "
Batouche	Vernon	Hidden Treasure M. Co	20.66	" 256 "	28th Jan, 1889
Big Sandy	Kamloops	D. J. Buchanan	20.66	" 637 "	23rd July, 1888
Brown Bear	Osoyoos	Wilkinson *et al*	20.60	" 385 "	17th June, 1892
Bonanza Queen	Similkameen	Thos. Rabbitt *et al*	20.66	" 72 "	5th Sept., 1893
Black Diamond	Osoyoos	S. Mangott *et al*	20.58	" 578 "	22nd May, 1894
Cole, Geo. W	Yale	Geo. W. Cole	22.70	" 26 "	25th Oct., 1878
Christina	Kamloops	Nicola M. & M. Co	20.66	" 587 "	16th Mch., 1887
Cariboo	Osoyoos	J. Monaghan	18.75	" 272 "	14th May, 1889
Copper Queen	Kettle River.	E. J. Roberts	19.25	" 387 "	1st June, 1892
Copper Mine	Vernon	Jno. Moran	20.00	" 456 "	7th April, 1894
Cornicopia	Kettle River.	Jno. Douglas	41.25	" 608 "	23th Jan., 1895
City of Paris	"	Jno. Stevens *et al*	18.24	" 622 "	4th Nov., "
Comet	Osoyoos	Jno. Stevens	15.50	" 624 "	18th Jan., 1896
Cordick	Kettle River.	R. C. Adams *et al*	51.65	" 625 "	13th Mch., "
Dark Horse	"	R. Wood	35.15	" 597 "	18th Jan., "
Eureka G. M. Co	Yale	Eureka G. M. Co	19.20	" 24, 25 "	7th July, 1875
Eureka	Kettle River.	Jno. Douglas	19.90	" 242 "	12th April, 1888
Emma	Osoyoos		20.66	" 270 "	12th June, 1889
Eagle	Kettle River.	F. Richter *et al*	20.64	" 577 "	30th May, 1894
Empire	Osoyoos	F. R. Kline	51.65	" 611 "	21st " 1895
Enterprise	Kettle River.	J. E. Boss *et al*	15.75	" 617 "	4th Sept., "
Emma	"	Wm. T. Smith	48.49	" 591 "	25th " 1896
Gentle Annie	Kamloops	Nicola M. Co	20.66	" 589 "	16th Mch., 1887
Gold Cup	"	Jno. Hepburn	20.28	" 675 "	15th Oct., 1888
Golden Crown	Kettle River.	W. J. Porter	51.65	" 600 "	29th July, 1896
Great Hopes	"	Jno. P. Harlan	43.30	" 602 "	28th Sept., "
Joshua	Kamloops	Nicola M. Co	16.90	" 588 "	16th Mch., 1887
Jenny Long	"	Thos. J. Jones	20.66	" 718 "	16th Jan., 1890
Joe Dandy	Osoyoos	E. Hammond	20.60	" 447 "	6th Sept., 1893
King William	Kamloops	Nicola M. Co	20.50	" 592 "	16th Mch., 1887
Kamloops	Osoyoos	Jno. Moran	17.27	" 275 "	9th May, 1890
King Solomon	Kettle River.	E. J. Roberts	20.60	" 388 "	1st June, 1892
Knob Hill	"	C. J. Lundy *et al*	19.09	" 590 "	24th Feb., 1896
Lake View	Osoyoos	Jno. Stevens	20.66	" 575 "	4th April, 1894
Last Chance	"	H. White *et al*	20.66	" 584 "	10th Sept., "
Lincoln	Kettle River.	Jno. Stevens *et al*	18.13	" 621 "	4th Nov., 1895
Murphy, C. & J	Yale	Murphy, C., *et al*	1.80	" 27 "	3rd Dec., 1878
Mary Reynolds	Kamloops	Jno. Hepburn	20.66	" 674 "	15th Oct., 1888

YALE.—*Concluded.*

Name of Claim.	District.	Name of Grantee.	Acres.	Description.	Date of Grant.
Morning Star	Osoyoos	S. Mangott	20.60	Lot 443, G. 1	26th May, 1893
Mabel	Kettle River.	Jno. Douglas	15.65	" 609 "	14th Dec., 1894
Mill Site	"	C. Vacher	5.00	" 667 "	6th Mch., 1896
McKay & Murphy	Yale	McKay & Murphy	1.80	" 27 "	3rd Dec., 1878
McIntyre	Vernon	D. McIntyre	20.60	" 194 "	18th Feb., 1887
No Surrender	Kamloops	Nicola M. Co	19.50	" 591 "	16th Mch., "
Nevada	"	Thos. Rabbitt	20.66	" 79 "	1st Oct., 1895
New York	Kettle River.	Jno. Douglas	14.46	" 610 "	14th Dec., 1894
Number 7	"	J. Schofield	20.66	" 623 "	29th Oct., 1895
Okanagan	"	S. Mangott	19.93	" 274 "	13th June, 1889
Okanagan	Vernon	J. D. Shorts	20.66	" 557 "	25th July, 1894
Ontario	Osoyoos	E. D. Reynolds	17.77	" 573 "	6th April, "
Old Ironsides	Kettle River.	Jno. Stevens	20.18	" 589 "	24th Feb., 1896
Oro Denoro	"	W. A. Corbett	51.65	" 692 "	9th Dec., "
Planet	Kamloops	F. S. Barnard	20.66	" 652 "	27th June, 1890
Providence	Kettle River.	R. Lewis Rutter	51.30	" 618 "	4th Sept., 1895
Riske	Vernon	L. W. Riske	20.60	" 195 "	18th Feb., 1887
Riske (older ledge)	"	Silas Field	20.60	" 192 "	" "
Robert Dunsmuir	Kamloops	Wm. Wilson	20.66	" 673 "	3rd Aug., 1888
Royal	Vernon	Hidden Treasure M. Co	20.66	" 255 "	28th Jan., 1889
Roddick	Yale	Jno. P. Roddick	16.02	" 78 "	4th May, 1895
Rattler	Osoyoos	E. D. Reynolds	20.60	" 445 "	20th Mch., 1893
" Millsite	"	"	5.00	" 446 "	" "
Republic	Kettle River.	E. J. Roberts	20.21	" 446 "	22nd May, 1894
Roderick Dhu	"	Margaret J. Wood	51.65	" 598 "	28th Sept., 1896
Stemwinder	Osoyoos	Sheehan *et al*	20.60	" 384 "	16th June, 1892
Snowdon	"	Thos. Elliott *et al*	20.66	" 583 "	28th Aug., 1894
Smuggler	"	"	51.67	" 582 "	4th Sept., "
Silver Crown	"	Ed. Hammond	20.60	" 442 "	10th Jan., 1895
Stemwinder	Kettle River.	F. Farrell *et al*	13.87	" 588 "	24th Feb., 1896
Tubal Cain	Kamloops	Nicola M. & M. Co	20.66	" 586 "	16th Mch., 1887
True Blue	Vernon	Hidden Treasure M. Co	20.66	" 254 "	18th Jan., 1889
Victoria S. M. Co.	Yale	Victoria S. M. Co.	3.00	" 23 "	7th July, 1875
Vernon	Vernon	F. C. Vernon	20.60	" 193 "	18th Feb., 1887
Victoria	Osoyoos	C. B. Brash	20.60	" 218 "	21st July, "
Vancouver	"	Jno. Irving	19.00	" 344 "	2nd June, 1891
Withrow Location	Vernon	L. W. Riske	20.66	" 306 "	16th April, 1890
Wide West	Osoyoos	E. D. Reynolds	20.60	" 444 "	20th Mch., 1893
Wynn, M	"	"	19.25	" 554 "	3rd Jan., 1894
Western Girl	"	Jno. Stevens	16.05	" 574 "	4th April, "
Winnipeg	Kettle River.	D. McIntosh	26.70	" 599 "	16th Mch., 1896

GOLD COMMISSIONERS AND MINING RECORDERS.

Mining Divisions.	Name of Recorder.	Address.	Name of Gold Commissioner.	Address.
Cassiar, Etc.—				
Stickeen	James Porter	Laketon, B.C	James Porter	Laketon, B.C.
Liard	"	"		
McDame	"	"	W. S. Gore	Victoria, B.C.
Laketon	"	"		
Skeena	John Flewen	Port Simpson		
Cariboo—				
Omineca	Ezra Evans	Manson Creek	W. S. Gore	Victoria, B.C.
Richfield	Jno. Bowron	Barkerville	Jno. Bowron	Barkerville, B.C.
Quesnelle	W. Stephenson	Quesnelle Forks	"	"
Victoria	W. S. Gore	Victoria, B.C	W. S. Gore	Victoria, B.C.
Yale—				
Kamloops	G. C. Tunstall	Kamloops	G. C. Tunstall	Kamloops, B.C.
Yale	Wm. Dodd	Yale	"	"
Similkameen	H. Hunter	Granite Creek	"	"
Vernon	L. Norris	Vernon	C. A. R. Lambly	Osoyoos, B.C.
Osoyoos	C. A. R. Lambly	Osoyoos	"	"
Kettle River	W. G. McMynn	Midway	"	"
East Kootenay—				
Donald	J. Stirret	Donald	J. F. Armstrong	Donald, B.C.
Golden	F. C. Lang	Golden	"	"
Windermere	G. Goldie	Windermere	"	"
Fort Steele	C. M. Edwards	Fort Steele	"	"
"	M. Phillips	Tobacco Plains	"	"
West Kootenay—				
Revelstoke	J. D. Graham	Revelstoke	J. D. Graham	Revelstoke, B.C.
Illecillewaet	R. J. Scott	Illecillewaet	"	"
Lardeau	C. Minhennick	Lardeau	"	"
Trout Lake	T. Taylor	Trout Lake	"	"
Slocan	A. Sproat	New Denver	N. Fitzstubbs	Nelson, B.C.
Ainsworth	John Keen	Kaslo	"	"
Nelson	R. F. Tolmie	Nelson	"	"
Trail Creek	J. Kirkup	Rossland	"	"
Goat River	J. C. Rykert	Rykert's	"	"
Nanaimo	M. Bray	Nanaimo	M. Bray	Nanaimo, B.C.
Alberni	Thos Fletcher	Alberni	Thos. Fletcher	Alberni, B.C.
Clinton	F. Soues	Clinton	F. Soues	Clinton, B.C.
Lillooet	C. A. Phair	Lillooet	F. Soues	Clinton, B.C.
New Westminster	D. Robson	New Westminster	W. S. Gore	Victoria, B.C.

YALE DISTRICT.

KAMLOOPS AND YALE DIVISIONS.

BY G. C. TUNSTALL, GOLD COMMISSIONER.

I have the honour to submit the annual mining report for the Kamloops and Yale Divisions of Yale District, to which is attached a statement of the particulars connected with the Harrison Lake mines, kindly forwarded by Mr. J. R. Brown, of the Harrison Hot Springs, to whom, and also to Messrs. S. McCartney, of Savona; W. Dodd, Mining Recorder at Yale, and H. Cancellor, of North Bend, I am deeply indebted for information supplied on this and former occasions.

KAMLOOPS DIVISION.

PLACER MINES.

Tranquille River.

I regret to say but little placer mining was prosecuted the past summer on Tranquille River, which is the principal producer of alluvial gold in this division.

A few Chinese and white men find employment, with small returns for their labour. These placers have been steadily worked for a period of thirty-six years, and it is surprising they should still be able to attract the few miners who work on this stream.

Gilbert Smith, who has a leasehold at the junction of the North and South Forks, has finished the construction of his ditch, but was unable to work any ground, owing to the dry season, which caused a scarcity of water.

The Thompson River Hydraulic Mining Co. obtained a leave of absence from their property last summer. I understand it is their intention to resume piping next season.

Some seven or eight Chinese, who have resided on this creek for a number of years, manage to make a comfortable living by combining mining with gardening.

J. Russell, whose claim paid $3 per day to the hand, has had it included in a mining leasehold of eighty-one acres, which will be worked by the hydraulic process, the increase in the height of the bench of gravel rendering ground-sluicing no longer profitable.

Scotch Creek.

About ten or twelve Chinese worked on this Creek the past summer, with what result I have been unable to learn.

Thompson River.

Messrs. Bellamy, Macdonald and Jones have two leases of mining ground at the Horseshoe Bend. A grant of water has been obtained for hydraulic mining, with the intention of actively prosecuting work in the spring.

Salmon River.

Messrs. James and Ross Mahon have two mining leaseholds on this river, which have, so far as known, yielded no profitable returns.

The yield of gold for the past year is estimated at $3,500, of which amount the Bank of British Columbia purchased $3,100.

The mining receipts are as follows:—

Free Mining Certificates	$1,467 00
General Mining Receipts	1,898 25
	$3,365 25

The above figures exceed the revenue from the same source for 1895 by $2,169.10.

MINERAL CLAIMS.

Coal Hill Mines.

Coal Hill derives its name from a deposit of excellent coal found a few years since, about three miles south of the town. A tunnel was run a considerable distance, but the broken up condition of the seam and an insufficient thickness led to its abandonment.

This was the first discovery of mineral of any kind made on the mountain, which is probably destined to become one of the principal mining camps in the Province.

It is situated in the midst of a pastoral country which, since the advent of the first white settlers, was only deemed valuable for pasturing cattle. Starting from Kamloops a constant succession of grassy, rolling hills, dotted with pine trees, ascend to an elevation of 3,300 feet above the level of the sea. From every point of view the scenery is of the most pleasing and picturesque character, which never fails to attract the admiration of the beholder.

The mountains of the Gold Range are here clothed about two-thirds of their height with bunch-grass, the support of numerous herds of cattle. Above that the timber line intervenes, embracing within its limits an abundant growth of pine and fir, principally the latter.

The country is everywhere accessible to persons riding on horseback, and an excellent waggon road already exists, to which an extension of about a mile will intersect some of the principal claims, and afford all the facilities that will be required for transportation.

The Veins.

The general trend of the veins is east and west. They lie in a diorite formation, and exist under similar conditions to those found in the Rossland District, accompanied by the characteristic iron capping, which is a prominent feature of those deposits. The ore is also of the same character, being chalcopyrite, assaying from five to thirty per cent. in copper, and from $4 to $8 in gold. The vein matter is diorite. The lodes average in width from 4 to 20 feet, and the locations now extend over an area of about 20 square miles. Fuel is abundant, and an unrivalled climate, in addition to short railway communication, completes the advantages which very few mining camps possess. Two hundred claims have been recorded to date.

The first discovery was made in June by Louis Bennett, who brought some of the ore to Kamloops, and described in a vague manner the situation of the vein from which it was taken. Unaware of its value he left shortly for the mica mines at the headwaters of the Thompson River, without taking any steps to locate. This led to a search on the mountain, which resulted in the mineral claim known as the Python being staked and recorded. The richness of the deposits soon spread, and within two or three weeks numerous prospectors were roaming in every direction in quest of mineral wealth.

Messrs. Cobbledick and W. T. Newman, two gentlemen possessed of great mining experience, who are acting for capitalists in England and the Dominion, have inspired general confidence by becoming interested in some of the most important mines. The latter is the author of "Hidden Mines, and How to Find Them," a work which has attained an extensive sale, and is considered indispensable to every miner and prospector. The following is a summary of the particulars connected with some of the most important locations, on which more or less work has been accomplished:—

The Python.

A vein can be traced on the surface a considerable distance, exhibiting in some places a width of from 20 to 30 feet, with an average width of 8 to 9 feet. A shaft 60 feet deep has been sunk, from which about 30 tons on the dump will average from 15 to 18 per cent. copper, and $5 in gold to the ton. Four men are employed.

The Guerin, or Lucky Strike.

The Guerin Fractional claim, adjoining the Sunrise on the north, has a hole about 8 feet deep, showing a mass of ore 5 feet wide, which assays 22 per cent. in copper. This claim has been bonded to Mr. Cobbledick for $13,000.

The Chieftain.

This claim is situated near Sugar Loaf Mountain. The ore is of the same character as that found in the claims previously mentioned, and averages from 5 to 15 per cent. copper,

and from $4 to $5 to the ton in gold. A shaft is down 30 feet, in ore the whole distance. The vein varies from 4 to 10 feet in width. Work will be prosecuted during the winter.

The Iron Mask.

The Iron Mask is situated about four miles south-west of Kamloops. Two cross-cuts have been run across the lode for distances of 20 and 30 feet, respectively, without encountering the hanging wall. The foot wall is a trap dyke. The direction of the vein is north and south. The average value of the ore is $60 in gold and copper. From 18 inches to 4 feet adjoining the hanging wall is clean ore. A full force of men will be employed during the winter.

The Canada.

This claim belongs to the King Mining Co. It is situated on Jocko Creek, about 7 miles south-west of Kamloops. A shaft, 27 feet, has been sunk, showing a vein 6 feet wide. The company has bonded the mine for $4,000 until the 1st July, with a cash payment of $400.

Thora H.

The Thora H. adjoins the Python on the south. The croppings on the surface assay $8 in gold and 8 per cent. copper. The lode can be traced on the surface 500 feet; it averages 30 feet in width. A shaft has been sunk to a depth of 15 feet in low grade ore, containing pockets and stringers of a high grade character. Messrs. Hoare and Keiper are the principal owners. The former is connected with the Everett Smelter, Everett, Washington.

Sunrise No. 2.

Is about two miles west of Kamloops, at the foot of the mountain, and about 200 yards from the railway track. Two veins of mineral intersect this property—one of asbestos, from 8 to 12 inches wide, of first-class quality, exhibiting a tough fibre capable of being manufactured into textile fabrics. The other lode is composed of diorite, assaying from $8 to $12 in copper to the ton.

NORTH THOMPSON RIVER.—GYPSUM.

About 20 miles north of Kamloops, on the east bank of the Thompson, a large deposit of gypsum of excellent quality can be distinctly traced for a couple of miles up the mountain side. It is within a mile of the river, and will therefore admit of cheap transportation to the Canadian Pacific Railway, which is an important factor, to allow of profitable returns.

GLEN IRON MINING CO., CHERRY CREEK.

This company is engaged completing a contract to supply the Tacoma smelter with 500 tons of ore.

ADAMS LAKE GROUP.

After a series of exhaustive tests made by the owners of this group of mines, some six or seven in number, with the object of determining the value of the ores, and ascertaining the most economical and efficient process for working them, no doubt exists as to the profits that will accrue from their treatment. A company has been incorporated, with a capital of $400,000, for the active prosecution of development next spring. Fifty thousand dollars is to be expended in the construction of a cyanide plant with a capacity of treating from 50 to 60 tons per day. These mines exhibit immense bodies of ore, and their wealth will add to the material prosperity of the district.

STUMP LAKE MINES.

Many of the vacant locations which had been recorded ten or eleven years ago have been relocated, with additional new ones. It is stated that work will be commenced on some of the mines on which large amounts were expended in former years.

ROCKFORD GROUP.

An important mining discovery was made last fall at Rockford, in the Nicola Valley, a short distance east of the waggon road. The find consists of three quartz veins, running

parallel to each other, which possess a width of 17, 5, and 3 feet, respectively. The assays from surface croppings show returns of $10.50 in gold and 7½ ounces of silver to the ton. These locations are situated about two miles south of the Stump Lake silver mines. The results obtained are very encouraging, and undoubtedly prove these deposits to be richer than any yet found in that section of the country. The rock is free milling, and that feature will greatly add to its value.

GRAND PRAIRIE GROUP.

About twelve claims have been taken up at Grand Prairie, at the rear of the settlement. The F. C. Jones Mining Co. have four locations, named the Alice Hay, Henrietta, Forest Queen and Key. The vein is from 1½ to 2½ feet wide in the Henrietta, and extends through the other claims, on which more or less work has been accomplished. A shaft, 30 feet deep, has been sunk on the Henrietta. The assays range from $15 to $20 in silver, gold and copper. The proportionate value of each metal I have not been able to learn.

COPPER CREEK CINNABAR MINES.

The Cinnabar Mining Co. have prosecuted development with diligent activity under adverse conditions with a force of twenty men. In the early part of last summer the work was confined to the Yellow Jacket, in which about 550 feet of tunnelling has been completed and 200 feet of upraises. Prospecting with the diamond drill was also carried on, and the results have proved very satisfactory to the company. By this means large bodies of low grade ore have been discovered which can be worked to profitable advantage. The superintendent, Mr. Veatch, has now turned his attention in the Rose Bush claim to what is known as the Big Dyke, the tunnel being in some distance in good furnace ore. Should the present prospects continue this supply alone will provide for present requirements. There is every indication the deposit is permanent and will increase in size with depth.

Cinnabar mining in this section of the country is destined to become an important and profitable industry, and the company deserve credit for the perseverance they have exhibited under great difficulties.

A furnace, with a capacity of 25 tons, is ready for erection, and will be in operation before the spring. The facilities for delivering the ore from the mine are completed.

HARDIE MOUNTAIN CINNABAR MINES.

The cinnabar locations at Hardie Mountain exist in a similar formation to that which prevails at the mines previously mentioned, and are situated about three miles distant in a northerly direction. The work performed has been of a superficial character, owing to a lack of means and difficulties imposed by surface water. Mr. Irving is pushing a tunnel in the Columbia, one of the group of claims taken up in this vicinity. It has reached a distance of 135 feet. The prospects are improving every day, and the ore shows up better as the work proceeds. This tunnel will prospect the deep ground, and also assist the drainage. Assessment work on the other claims show good bodies of ore, averaging from 1 to 2½ per cent. These properties are attracting attention, and it is probable a good company will be formed to proceed with development in the spring.

DEADMAN'S CREEK CINNABAR MINES.

Deadman's Creek lies about eight miles east of Copper Creek. The same deposit of cinnabar shows up again on this creek. A number of claims, which yielded favourable assays, have been recorded. The Cariboo, Lillooet and Fraser River Gold Fields Co. own most of the locations which are favourably situated, being within a comparatively short distance of the C. P. Railway and easy of access.

CHRIS CREEK CINNABAR MINES.

Chris Creek is a tributary of Deadman's Creek. Several locations were made on this creek last summer. Very little work has, however, been effected. The ore is precisely the same as that at Hardie Mountain, and is evidently a continuation of the lead at Copper Creek. The assay value is from 1 to 2½ per cent.

THE TOWN OF TRAIL, B. C.

(See page 18, Bulletin No. 2.)

SHOWING SMELTING WORKS, COLUMBIA RIVER, STEAMBOATS, ETC.

COPPER CREEK COPPER MINES.

Very little outside of assessment work has been done last season on this group of copper claims near Kamloops Lake. Development work has been delayed pending the result of arrangements with a view of their being bonded, the present owners not being in a position to undergo the expense involved in prosecuting the necessary mining improvements. The latest reports state that the deal is about completed, and work will be in active progress next summer.

YALE MINING DIVISION.

PLACER CLAIMS.

Hill's Bar.

The Columbia Co., owing to scarcity of water, did little more than prospecting the past summer, the yield of gold being $800. The ground is reported rich. It is the intention to utilise a larger and more permanent supply of water to permit of more extensive operations.

Siwash Creek.

This creek is a tributary of the Fraser, and empties into that river 4½ miles above Yale. It is situated on the left bank, and is reached by means of a cable. A good trail leads to the mines. A large amount of gold was taken from this stream in early days, where sufficiently favourable conditions existed for its extraction. The heavy flow of water encountered in sinking has prevented the deep ground from being bottomed, notwithstanding many attempts to overcome this obstacle. However, a few miners still persist in attempts to reach the bedrock. Most of the mining leaseholds have had little or no work done on them for the same reason as above stated—too large a quantity of water to handle.

Five Mile Creek.

A large camp of Chinese miners are working here, obtaining moderate wages.

Eight Mile Creek.

Messrs. Hogar and Gardner have undergone considerable expense in bringing water on their property, which is an hydraulic mining leasehold of about 10 acres. The summer's work has proved to be unprofitable; but little gold was obtained, although a large amount of gravel was washed.

Spuzzum.

Indians and Chinese, also a few whites, were rocking in this vicinity.

Boston Bar.—Ottawa Mining & Milling Co.

This company was prepared to wash about the end of June last, but in consequence of the exceptionally dry season, and accidents to the flume by land slides, the monitor was kept at work for only about three weeks. The washes-up amounted to $1,830, which is a very good return, considering the disadvantages encountered. The company is fully satisfied with the richness of its ground.

Wendell Co.

This company's property is close to 4-Mile Creek, whence the necessary supply of water is obtained. They were engaged in ground-sluicing for a short time, but had to shut down owing to shortness of water.

North Bend.

Two mining leaseholds have been granted in the vicinity of North Bend, one opposite Salmon River, the other near Keefer's. The gravel in the last mentioned is reported as being rich. The gold found is coarse.

Mining has been carried on to a limited extent between North Bend and Lytton.

Keefer's, Cisco, Kanaka Bar and Lytton are localities mined principally by Indians with rockers.

Lytton.

Mr. T. Earl has secured a lease of ground formerly in the possession of the Van Winkle Hydraulic Mining Co.

Sual Claim.

This property, situated opposite Lytton, has been leased by Mr. Feason, who is experimenting with the Newman Gold Saving machine, a device for saving the fine particles of gold which are usually carried through the sluice boxes and lost.

RIVER DREDGING.

Dredging on the Fraser River has so far been attended with no favourable results. The large dredge belonging to the B. C. Gold Mining & Dredging Co. lay idle last summer at Ruby Creek, and the one at Lytton, owned by the Fraser River Mining & Dredging Co., worked above that point for a few days and then suspended operations.

The Beatty Co. are constructing at Boston Bar a scoop dredge, provided with powerful machinery. This is a kind of dredge much used for harbour excavations. The shovel, which is under perfect control of the machinery, can be swung around and submerged anywhere within a certain radius, and is capable of bringing up at each hoist ten tons of gravel. This is deposited in sluice boxes and washed. The large boulders are to be hoisted on scows and dumped at a distance down stream. By this means the scoop will be able to perform its work in a much more efficient manner. This scheme seems to possess more features capable of attaining success than any of the others, where the strong current can be avoided.

After a two years' test of the dredges at present in use for obtaining gold from the bottom of the Fraser River, provided with centrifugal pumps (which are utter failures) and buckets, and equipped with the best machinery and appliances that experience and ingenuity could suggest, the only reasonable conclusion that can be arrived at is, they are unable to surmount the obstacles presented by a powerful current and an accumulation of large boulders.

I may remark these disadvantages do not exist in the Clutha River, New Zealand, the only stream known where this branch of mining has yielded profitable returns, which have encouraged similar enterprises in this Province and elsewhere.

The following is the yield of gold the past year for the Yale Division of Yale District, which is perfectly reliable, being the respective amounts purchased by the merchants at the different points mentioned:—

Agassiz	$ 500	
Hope	112	
Yale	13,350	
Spuzzum	3,042	
North Bend	2,912	
Keefer's	3,200	
Lytton	14,939	
Spences Bridge	1,240	
Ashcroft	14,391	
Shipped direct to Victoria by Ottawa Hydraulic and Wendell and Columbia Companies	2,922	
Taken away in private hands and unaccounted for	5,000	
		$61,608
Free Miner's Certificates issued	$ 971 00	
General Mining, Receipts	3,032 15	
		4,003 15

MINERAL CLAIMS.

Hope.

At Hope considerable attention has been paid to prospecting for mineral claims, with the result that a number of claims have been staked off and recorded.

Yale Creek Group.

The favourable reports of mining experts on these mines, have resulted in the forming of a company for their further development.

A large amount of work was performed on these mines in former years. The necessary steps have been taken to obtain Crown grants in favour of the Gold Queen and other adjoining claims, preparatory to making arrangements for working them.

THE CINNABAR MINING CO., LTD., OF BRITISH COLUMBIA.

BY J. A. VEATCH, SUPERINTENDENT, SAVONAS.

Mercury.

The Cinnabar Mines is situated on the north side of Kamloops Lake, about six miles from the west end, in Kamloops Division, Yale District.

The present company acquired the *Rose Bud*, *Blue Bird*, *Hill Side*, *Lake View* and *Yellow Jacket* by purchase early in 1895, and since have located two adjoining claims.

Development work was commenced immediately after the property was acquired, and in August, 1895, two retorts were erected under the superintendence of Mr. H. L. Lightner. They were only operated a few weeks when the high grade ore of the Rose Bud was exhausted, that process not being suited for the reduction of the lower grade of ore, but in the short time they were operated more than 100 flasks of quicksilver were reduced and shipped from the mine. The present reduction works under construction are a granza (coarse ore) furnace of between 25 and 30 tons daily capacity, of modern pattern, and a system of transporting and handling the ore that will enable us to mine, transport and reduce it at a minimum cost.

The exploratory work consists, on the "Rose Bud" claim, of a tunnel 340 feet in length, cross-cuts aggregating 260 feet, an upraise to the surface, with drifts at different levels aggregating 150 feet, and a stope of considerable size, from which stope a large proportion of the ore reduced was extracted.

On other parts of this claim several small drifts and surface excavations have been made; the workings known as the Big Dyke and No. 8 tunnel are also on this claim, or at least in part, and here a tunnel has been run 120 feet, with two cross-cuts just commenced, an upraise to the surface 80 feet in height. Here there are also comparatively extensive surface excavations, and present operations are confined to this part of the mine. On the "Yellow Jacket" there have been run two tunnels, one 90 feet in length, the other 260 feet, with four cross-cuts, aggregating 330 feet in length; two connections with the surface, 80 and 100 feet respectively, the latter having two levels, with drifts amounting to 220 feet in length.

In the face of this tunnel and beneath the level of it more than 1,200 feet in all have been drilled with a Sullivan diamond drill, while there has also been a considerable amount of surface exploring done in the same vicinity, and on the remaining claims a small amount of surface work.

Geology.

The country rock is "picrite," a dark green highly acidic rock of Tertiary volcanic origin. It is rent by fissures of varying width, the smaller filled with a dolomite gangue and containing the high grade ore, the larger with a rock graduating from tufa to rhyolite, much of it containing disseminated minute crystals of cinnabar. This ore-bearing rock is highly ferrated on the surface, and usually completely serpentized beneath. The deposits are everywhere badly faulted and dynamically crushed, but to treat on this subject completely would require a volume alone.

HARRISON LAKE GROUP.

By John R. Brown.

Trout Lake Mines.

Discovered October, 1895. Formation of country rock, syenite and ferruginous slate, in the contact between which is a belt of highly silicious schist intermixed with quartz, both impregnated with iron and copper sulphurets, forming a mineral zone of considerable width, and carrying gold and silver values averaging on the Black Diamond claim, where it is shown up to advantage, about $4 per ton, a capital concentrating proposition being capable of reduction from 15 to 20 to 1, with probably greater values when more depth is reached. The general direction of this belt is north-west and south-east.

In the ferruginous slate the country rock lying to the north of the syenite are to be found belts of serpentine, metamorphic slates. Very large lodes of mineralized quartz, all having the same general direction, north-west and south-east, and extending for a great distance in this belted manner, occasionally, however, showing on the surface traces of disturbance in the shape of folds, breaks, etc., sometimes in waves. I do not think that there has been much glacial action at this point, and consequently more work is left for the miner.

Since the discovery of these prospects last year about sixty locations have been made, and of these about twenty have been secured by development, the rest being probably abandoned.

This is, however, no test of the value of the camp as a future mining centre, for while it may prove it to be no poor man's camp I feel confident that it will eventually turn out to be a very large producer of perhaps low grade ore, but with a fair margin of profit between cost of extraction and treatment and value of ore.

Development.

On the Discovery claim, located by Geo. Black, an open cut of about 20 feet in length and a tunnel of about 40 feet

This work cross-cuts the vein, or more properly speaking, a portion of it, as the breast of the tunnel is still in vein matter, rock very easy to work. The work, however, has been done in a bad place, no dump, while much better results in depth could have been gained at other points. The showing is very satisfactory, however, and from this point I obtained my samples for assay, etc.

This property has been to some extent assisted by natural forces in the shape of a water-fall, which has cut down the country rock overlying the vein. This water-fall, with a very large head, offers great advantages in the future working of the property.

The Empress group of claims, six in number, about one mile north-west of the Black Diamond. While this group is not quite so close to the syenite, it was known that a shaft of some depth would strike the vein of the Black Diamond, while the outcroppings in the overlying belts in the ferruginous slate or iron capping gave promise of the discovery of valuable ore shutes, similar from the character of the outcrop to the Rossland mines; hence the selection of these locations offering, as they do, a double advantage. A tunnel, which is now in about 100 feet, and a cross-cut about 20 feet long, starting near the breast of tunnel, is so far the amount of development work. The rock has from the start been very hard, and while encouraging, inasmuch that almost from the start bunches and stringers of mineral have been found, they have in most cases been of too low a grade for shipment. That ore shutes of considerable value and size will be found eventually, judging from the outcroppings, I think is very probable, while the success of the other properties lying above and below these, on the contact already described, will also justify the owners in holding these claims, as this contact can be reached, as before stated, by sinking. As to other development work in this camp, the owners of a consolidation of several claims, under the direction of Mr. Cecil Smith, have done several hundred dollars' worth of tunnelling and sinking, but the work was not sufficient to demonstrate anything. A few other claims have had assessment work done on them, but in many instances without regard to location, but simply to hold the claims.

As to other portions of your district in the neighbourhood of Harrison Lake, very favourable reports are coming in. At Silver Creek a large quartz vein has been discovered

and located on for two miles. Vein, 17 feet wide in slate; surface assays $26 in gold to ton. A rich section extends from this point to Yale, about thirty miles distant, the country rock being diorites, serpentines and slate.

In prospecting over a large extent of country during the past summer and fall, embracing parts of both Yale and New Westminster Districts, I was astonished at the superficial evidences of great mineral wealth when crossing many of the different formations. Often it was no longer a question of seeking but of selection, a veritable "embarass de riches." The more I see of the coast country the more firmly am I convinced that not far in the future it will contain as many producing mines as all the combined producers of the interior.

SIMILKAMEEN DIVISION.

By HUGH HUNTER, MINING RECORDER.

I have the honour to forward my annual mining report for the Similkameen Division of Yale District for the year 1896:—

Hydraulic mining was not a success this season owing, in a large degree, to the inadequate supply of water.

The Granite Creek Mining Co. have completed the flume on their property, and had about a month's piping with a full head of water, but were unable to clean up on account of severe frost, which came unusually early for this section of the conntry.

Mr. W. J. Waterman piped on his claim at the mouth of Friday Creek for about three months, prospecting the ground, and had to cease work on account of too little water.

The Anglo-American Co., on the South Fork of the Similkameen River, had a large force of men at work for about three months, but shut down as the wash-up was not satisfactory.

The Tulameen Mining Company, whose property is about three miles below Granite Creek, had a force of five men prospecting. They worked about four months, when they were compelled to shut down for want of water.

Several placer claims have been worked out, and others were idle during the season, the owners having obtained leave of absence pending the sale of their property.

On the Tulameen River and its tributaries fifty-three mineral claims have been located. The ore is generally grey copper and galena. An assay of some ore taken from the Siberia Mineral Claim gives returns as follows:—

Lead, $7.80; silver, $55.64; gold, $2.07.

Several claims in this portion of the district have been sold, and others have been bonded. The Star Mining Co., of Terra Haute, Indiana, have acquired three locations at the headwaters of the Tulameen. A tunnel twelve feet long has been put in on the Sutter Mineral Claim, which shows a ledge of galena eighteen inches wide. This and other properties will be worked extensively next season. On the Similkameen and its tributaries thirty-one locations have been made. The ore is principally peacock copper, which assays about 60 per cent. copper, with a small proportion of silver and gold. As little work has been done on any of these, I am unable to report more fully as to their merits.

On the Iron Mountain, near the Coldwater, twenty-four mineral claims have been located. The mountain appears to be one huge deposit of mineral, and at one time it was located by a Vancouver company for its iron. A Victoria company took up three claims adjoining each other, namely, the Victoria, Charmer and Islander, and on sinking a shaft on the Charmer they found a valuable deposit of mineral, carrying gold, silver and copper. The shaft is now twenty-two feet deep, and shows a solid body of ore from top to bottom. At a depth of four feet an assay was made, which shows silver and copper to the value of $40.90, and a trace of gold. Work will be resumed on this property in the spring, as soon as the season opens.

Free Miner's Certificates issued	175
Mineral Claims recorded, 108; placer, 13	121
Transfers—Mineral Claims	22
Certificates of Work issued	11

THE OSOYOOS, KETTLE RIVER AND VERNON DIVISIONS.

By C. A. R. Lambly, Gold Commissioner, Osoyoos, B. C.

I have the honour to submit the annual mining report and statistics, for the Osoyoos Division of Yale District, for the year 1896:—

OSOYOOS MINING DIVISION.

Camp Fairview.

Work has been carried on in this camp during the latter part of the year with greater energy than at any time for the past two years, and a number of claims have been sold and bonded at prices ranging from $200 to $75,000. Of the old claims worked during the year the following are the only ones that have been worked to any extent, viz.: The "Morning Star," "Joe Dandy" Group, "Stemwinder" and "Smuggler."

The Morning Star.

In the north-east shaft, at a depth of 100 feet, a drift of 50 feet has been driven on one side of the shaft and the same on the other, and the shaft has also been continued 50 feet in depth. On the south-west shaft a drift of 20 feet has been run along the vein. Average milling test, $15 to $20 per ton.

The owners, Messrs. McEachern and Mangett, are at present engaged in sinking a shaft for the purpose of ventilating the mine.

The Joe Dandy Group.

This group consists of the "Joe Dandy," "Atlas," "Daisy," and "Belmont" claims. On the "Belmont" a tunnel of 20 feet has been run; on the "Daisy" a shaft of 30 feet has been sunk; on the "Joe Dandy" a new tunnel has been run for 60 feet to tap the ledge, and a winze sunk through to the old tunnel. This group is owned by the British Columbia Development Company. Mr. John R. Mitchell, general manager; Mr. Ballard, foreman.

Twenty-three men are at present at work, which force will be increased as room is made for more men to work in. There is about 100 tons of ore on the dump.

The Stemwinder.

On this claim an open surface cut of 12 feet has been run; altogether the development work on this claim consists of about 600 feet of tunnels and shafts. This claim is bonded to Messrs. Rhodes & Co., who, it is expected, will shortly take hold of it with a view of developing the property.

The Smuggler.

A drift of 20 feet has been run from the bottom of the 100-foot shaft along the vein, which is about five feet in width.

The following are claims which have recently been opened up, most of them being new locations:—

The *Comstock.*—A tunnel of 50 feet and a shaft of 100 feet has been sunk.

On the *Tin Horn* the work consists of two tunnels; the first of 65 feet, and the second of 50 feet.

On the *Randolph* a tunnel of 50 feet has been run, and a further contract of a 50-foot shaft has recently been commenced.

On the *Reco*, *Ocean Wave* and *Quartz Queen*, a 50-foot tunnel has been run on each.

Work is also being pushed forward on the following claims:—

California, *Ironclad*, *Fannie Morris*, *Nightingale*, *Sundown*, *Elmore*, *Shamrock*, *Highland Chief*, *Snow Bird*, *Winchester*, *Silver Bow*, *Mammoth*, *Gold Hill*, *Rob Roy*, *Grey Eagle* and *Iron Mask.* Messrs. Dier and Davidson, who have lately acquired these claims, have about 20 men steadily at work, and intend testing each of their claims.

The *Buckhorn*, owned by Messrs. Elliot and McDougall.—On this claim a shaft of average dimensions of 4 feet by 7 feet has been sunk for 38 feet, during the past year.

On the *Occidental*, owned by the same parties, a 17-foot shaft, 4 feet by 7 feet, has been sunk.

On the *Oro Fino* an open surface cut has been run for 40 feet and a shaft sunk 12 feet, by the owners, Messrs. Gwatkin and Winkler.

It is confidently expected that Camp Fairview will soon rank as one of the foremost mining camps in the District.

CAMP MCKINNEY.

On the *Cariboo* and *Amelia* the mill has been running continuously during the year, and has produced 8,743 ounces in gold, valued at $116,243, and 371,036 lbs. of concentrates, of a value of $14,980; total output of the mine for the year 1896 is $131,223.

The work consists of 540 feet of drift on the second and third levels, and 6,456 tons of ore stoped and milled. At present the work is being carried on at the third level, at a depth of 175 feet from the surface. About 30 men are constantly employed. I am informed that the owners intend shortly to increase the capacity of the mill to 15 stamps.

The Minnie-ha-ha.

This claim, which lies south and west of and nearly adjoining the "Cariboo," has one shaft sunk 45 feet, and a second of about 15 feet. The vein averages about 18 inches in width. The claim has recently been surveyed and a Crown grant applied for.

On the *Lemon* an open cut, 20 feet in length by 6 feet by 9 feet, was run on the east side of the main shaft. The cut penetrates the shaft at a depth of about 10 feet below the surface. The vein, which crosses the claim diagonally and has been traced on the surface for a distance of 1,700 feet, is a true fissure vein, running north-east and south-west, and is capped by iron to a depth of 10 feet. The east wall is quartzite and the west wall a black slate. Mr. Greevy, the owner, informs me that arrangements have been made for extensive development work during the coming season.

The Victoria Group.

This group consists of the *Victoria*, *Queen*, and *California* claims. Mr. Bash, who has charge of the development work for a Victoria company, has done a very considerable amount of surface work, having built a waggon road for about three-quarters of a mile to connect the claims with the Camp McKinney road, costing between $200 and $300; he has also erected a number of very substantial buildings on this property, and has had from 15 to 20 men continuously at work since the middle of September last. Two tunnels have been run on the Victoria, at a distance apart of about 700 feet, No. 1 in the centre of the claim and No. 2 at the extreme edge, close to the "Old England" claim. No. 1 has been driven 135 feet, and No. 2 97 feet; both tunnels are very securely timbered. It is expected to tap the ore body at a depth of about 125 feet on No. 1, and about 100 feet on No. 2. The ore lies in a talco-slate and diorite contact, running almost due north and south with the formation. Twenty-five assays have been made, giving an average of $65 to the ton.

Old England.

On this claim there are three veins running more or less parallel in a northerly and southerly direction the entire length of the claim. The dip of the veins is easterly. The main or centre vein is over 20 feet in width, and at a depth of 75 feet may be described as follows:—Commencing at the hanging wall is a gouge or salvage some 10 to 18 inches in thickness, composed of talc, impregnated with sulphides, adjoining which is a rich streak of ore some two or three feet in width, following which, towards the foot-wall, there are streaks of quartz and talc, intermixed, containing sulphides and galena, carrying gold. The shaft follows the hanging wall at a dip of about 45° for 50 feet; thence straightens to about 70°. The shaft is 6 feet by 8 feet 8 inches, securely timbered. A tunnel has been run a distance of 90 feet, with the object of tapping the vein at a depth of about 200 feet from the surface. The east vein is exposed by an outcrop of about 50 feet in length, and has been cross-cut 8 feet in ore carrying copper and iron sulphurets. This vein also crops out on the "Homestake," which is to the north of the "Old England." On the west vein a tunnel of about 30 feet has been run. The vein is 4 feet in width, and carries galena and sulphurets. The centre and east veins can be traced continuously through the claim, and the three veins are not more than 80 feet apart.

The *Homestake* adjoins the "Old England" on the north end. The centre and east veins of the "Old England" have been traced through this claim. A tunnel to tap the east vein has

been commenced and run about 60 feet about the centre of the claim. A prospecting tunnel of some 30 feet has been run lengthwise on the east vein. The character of the ore is gold quartz, containing copper.

The *Le Roi* and *War Eagle*.—Messrs. Copeland and Younkin, the owners of these claims, have sunk a shaft of about 25 feet by 8 feet by 10 feet. They have about 100 tons of ore on the dump. These claims were located in the spring of 1896. Assays average about $30.

A very considerable amount of prospecting and a certain amount of development work has been done on Keremeos Creek and along the Similkameen Valley, and at Osoyoos Lake, on Kruger Mountain. Many new location are in process of development.

Following is an abstract of the mining records and free miner's certificates issued in this Division for the year 1896 :—

Free miner's certificates issued	167
Claims recorded	303
Certificates of work issued	111
Permits to re-locate	3
Abandonments	2
Bills of sale recorded	87
Bonds and agreements recorded	25
Water grants recorded	3
Certificates of improvements issued	1

PLACER.

White's Bar, situated on the north fork of Rock Creek.

Five claims have been worked on this bar during the year 1896, but only about $700 has been taken out.

Considerable prospecting work has been done with a view of testing the bar, but as yet with no great results. Good pay, it is thought, could be had if the bottom of the creek bed were reached, but the outlay required to attain this object would necessarily be heavy.

The *Ah Mat* China Company, placering at the mouth of Rock Creek and on Rock Creek, have taken out in the neighbourhood of $6,000 during the past year, several of the partners in this concern having recently sold out and returned to China.

There are five claims belonging to the company.

KETTLE RIVER MINING DIVISION.

The following is taken from a report furnished by Mr. Wm. G. McMynn, Mining Recorder for the Kettle River Mining Division:—

The mineral development and progress generally of this division during the year 1896 has been very marked and encouraging.

During the past year there have been more free miner's certificates issued, and more location, conveyance and certificate of work records made in this district, than during the whole of the previous three years.

The following table will show at a glance the progress which has been made since the Kettle River Mining Division was established, and a Mining Recorder's office opened, in the year 1893:—

ABSTRACT.	1893	1894	1895	1896
Free miner's certificates	194	202	451	957
Location records	102	93	771	1279
Certificate of work records	66	85	140	566
Conveyance records	59	55	244	713
Certificate of improvements	.....	3	11	15
Mill site leases	.....	.....	3	1
Abandonments	6	.....	12	35
Water grants	1	3	3	3
Permits	.....	.....	3	9

The total amount of work done this year on assessments alone, valued at $100 each, would aggregate the sum of $56,600, and it is also pleasing to note the very marked increase in conveyance records, which tends to indicate that this work "pays." Of course on a great many of these claims much more work has been done than is required to hold them under the "Mineral Act," and a few of them I might mention as examples, viz.:—

GRAHAM'S CAMP.

On the *Potter Palmer* mineral claim a tunnel has been run 61 feet in length.

SMITH'S CAMP.

On the *Last Chance* mineral claim a shaft has been sunk about 65 feet in ore showing some native silver, and on the *Golconda* and *Iva Lenore* mineral claims shafts have been sunk about 40 feet each.

DEADWOOD CAMP.

On the *Mother Lode* mineral claim work was commenced about the middle of last September by the Boundary Mines Co., and a tunnel was started in the hill-side so as to cross-cut the ore body. The maximum depth that will be reached in this tunnel is about 100 feet. The tunnel is now into the hill about 135 feet, and for the last 93 feet has been continuously in ore, which seems to be gradually improving as depth is gained. The ore body at this point is probably 150 feet wide.

An option was secured last June, for nine months, on this claim by John Weir for the Boundary Mines Co. for the sum of $14,000—10% cash, 45% to be paid in six months (which has been duly paid), and the balance due in nine months, viz., next March, when, without doubt, this payment also will be made.

COPPER CAMP.

On the *Copper Mine* mineral claim (which was bonded last May for six months to the American Exploration Co., of New York, for the sum of $30,000—10% of which was cash), several cross-cuts have been run on the surface at various points to test the width of the vein. Near the lower end of the claim a shaft was sunk to a depth of 50 feet, starting on the porphyry contact, and cutting through ore into the lime foot-wall. From the bottom of this shaft a drift was run to strike the ore body, and then a cross-cut was made through the ore to the porphyry wall, a total distance of about 85 feet from the bottom of the shaft. Some very good ore was found in this shaft, assaying as high as 27% copper, but ore in the cross-cut was lower grade. So far as explored, the vein lies very flat, but may straighten with depth.

This bond was allowed to mature without being taken up by the above-named company.

PROVIDENCE CAMP.

A shaft has been sunk on the *San Bernard* mineral claim to the depth of 75 feet, and a drift of 15 feet, with cross-cut. This vein is small, but carries very rich silver-gold ore.

On the *Combination* mineral claim a shaft has been sunk 35 feet, also showing up rich silver-gold ore.

SKYLARK CAMP.

The *Skylark* mineral claim, which was fully described in my last year's report, was bonded, together with the *Denver* mineral claim (which is its northerly extension), to Mr. C. Rueger, of Butte, Montana, during the month of last May, for the sum of $15,000, viz., $7,500 cash, and the balance of $7,500 to be paid on or before the 30th day of last November. Mr. Rueger shortly afterwards started further development work on the *Skylark* claim, with evidently very satisfactory results, as the last payment of $7,500 was duly made, and Mr. Rueger still continues the work on this property.

CENTRAL CAMP

(which includes White's, Atwood's, and Douglas' Camps).

The *Number Seven* mineral claim was bonded last May to Mr. John Weir, for the Boundary Mines Co. of New York, for the sum of $13,200.

A shaft was then down on this claim about 40 feet, and since then has been continued to a depth of 140 feet. From the bottom of this shaft a short cross-cut was run to reach the ore

body, which had been left in the shaft about the 70-foot level, and, when found, a drift was run alongside of it for a distance of about 60 feet. This ore is found to be of good grade throughout. In the opposite direction, from the bottom of this shaft, a tunnel was run to cross-cut the large quartz ledge which runs parallel to the smaller ledge on which the shaft is sunk, and is on the surface, about 130 feet from it. At a distance of 115 feet in this tunnel from the bottom of the above-mentioned shaft, a quartz deposit was found, but it bears no resemblance to the surface ledge, and at the present time this tunnel is being continued in the same direction.

Provided work is continued on this claim, the bond on it is good until the 15th day of next February, when, there is little doubt, the last payment in full will be made.

On the *Gold Dollar* mineral claim, in the same camp, an incline shaft has been sunk about 40 feet, with a drift of 10 feet, and at the bottom of another shaft 25 feet deep a tunnel has been run a distance of 50 feet.

WELLINGTON CAMP.

A considerable amount of development work has been done during the past year by the individual owners of the different mineral claims, especially on the *Golden Crown*, *Winnipeg*, *Jim*, and *Buttercup*.

GREENWOOD CAMP.

On the *Old Ironsides* mineral claim a shaft has been sunk 70 feet. On the *Gold Drop* mineral claim a tunnel has been run 100 feet to cross-cut the ledge; also a shaft sunk to the depth of 50 feet, showing up a fine body of copper-gold ore. This claim was transferred during the past year by the original locator, Mr. Joseph Hetu, to Mr. Frederick C. Innes, of the City cf Vancouver, for the sum of $15,000.

The *Snowshoe* mineral claim has been prospected by a number of holes, driven by a diamond drill to a depth of over 100 feet.

On the *Stemwinder* mineral claim a new shaft has been sunk to the depth of 65 feet, and a cross-cut at the 50-foot level of 15 feet, which is said to show up a body of gold-copper ore assaying $40 per ton; also a cross-cut tunnel has been run about 75 feet in order to connect with the old workings, and a winze sunk on the ore about 30 feet.

SUMMIT CAMP.

A shaft has been sunk on the *R. Bell* mineral claim about 100 feet deep, and on the *Oro Denoro* claim a tunnel has been run about 35 feet in length.

LONG LAKE CAMP.

On the *Alice* claim a shaft has been sunk 50 feet, and on the *North Star* claim another shaft sunk 65 feet.

On the *Lake View* mineral claim a tunnel has been run in on the ledge for 100 feet.

ON THE NORTH FORK OF THE KETTLE RIVER.

A great amount of development work has been done during the past year, but chiefly by the individual owners of the different claims, although lately a number of joint stock companies have been formed to work these properties.

On the *Pathfinder* mineral claim a shaft has been sunk 30 feet, with a cross-cut of 25 feet, all in ore, which is said to assay $22 in gold and copper, and lying between a formation of diorite and porphyry.

On a claim, near the "Pathfinder," called the *Standard*, a 40-foot cross-cut in similar ore has been run.

On the *Columbia* claim, on Volcanic Creek, a drift has been run 30 feet.

On the *Napoleon Bonaparte* mineral claim, which lies between Volcanic and Boulder Creeks, a 40-foot shaft has been sunk. And on the *Bonanza* claim, lying between Cedar and Lynch Creeks, a 50-foot shaft has been sunk, and it is intended to continue development work throughout the winter on this claim.

On Pass Creek, which drains the country from Summit Camp and Long Lake Camp into Kettle River, a number of new locations have been recorded during the past year and on some of them a large amount of work has been done, with encouraging results.

On the *Iron King* and *Kupper Queen* claims 60-foot tunnels have been run.

On the *Twins* and *Blue Ridge* claims 40-foot cross-cuts have been driven; and on the *Garnet* and *King Bee* claims about $700 dollars expended in development work.

Round Christina Lake a few new locations have been recorded, and development work has principally been done by the owners themselves.

On Boundary Creek, about 10 miles north of Greenwood City, a great number of new claims were recorded this fall, and the prospects of another flourishing camp, which is now called "Kimberley," are very good.

A number of new claims have also been discovered this season around the mouth of Rock Creek and on Kettle River; further up, at James and Cedar Creeks.

Only three new placer claims have been recorded in this division this year, viz., one at Boundary Creek and two on tributaries of the Fourth of July Creek, representing in all eleven interests.

Annexed is the statement of the mining revenue for the Kettle River Mining Division for the year ending 1896:—

Mining receipts general	$7,240 45
Free miner's certificates—945 at $5, 3 at $10, 1 at $15, (substituted) 8 at $1	4,778 00

No quantity of ore has been shipped from this district during the year 1896, so far as I have learned.

VERNON MINING DIVISION.

The following is Mr. Tunstall's report, the Mining Recorder for the Vernon Mining Division:—

You will perceive that this report is one of the best since the division was created.

The outlook for 1897 is still more promising. There have been incorporated during the past year three companies, the particulars of which I attach.

Morning Glory Mining Co., Limited.—Treasury stock, 300,000 shares; nature of ore, gold-bearing quartz, with white iron.

The hanging wall or country rock is granite, with the foot-wall the same. Average width of vein, 6 feet, traceable on the surface for a distance of 400 feet, in a westerly course. A shaft 80 feet in depth has been sunk on the vein here, 4½ to 5 feet wide, and showing signs of widening, and the ore extracted has given assays of $37.60 and $39.40 in gold, and about 4% copper.

Camp Hewitt Mining and Development Co.

Incorporated in December, 1896; capital, $1,000,000 in $1 shares; working capital 500,000 shares at 10 cents. This company owns eleven claims.

The *Lake View.*—The ore on this claim is copper and iron-pyrites, carrying gold and silver, and sample assays have run $87 in gold and copper, and $10 in silver.

The *Gladstone.*—A shaft has been sunk on this claim for 15 feet, the width of the vein being 3 feet of solid ore. Assays run $67 and $45—gold, $4; silver, $8; copper, $33.

Silver Star Mining Co.—Capital, $400,000; shares at $1; shares sold, 3,700, at par. A shaft, 26 feet, has been sunk. The ledge is about 5 feet in width, with a dip of 20° south, the foot-wall being black argillites, and the character of ore galena and iron sulphides, carrying gold. Assays, silver, $50, gold, $8, from samples taken from the surface.

Bachelor mineral claims, Nos. 1 and 2.—On No. 1 a 30-foot shaft and on No. 2 a 10-foot shaft have been sunk on the dip of the vein, the foot-wall being composed of porphyry, the hanging wall of granite, and the width of the vein from 3½ to 8 feet. The character of the ore on these claims is iron sulphides, carrying gold. An assay was taken at a depth of 10 feet, which ran $22 in gold. At the surface assays run in gold $480.

I append an abstract of the mining receipts for the Vernon Division for the year 1896:—

Claims recorded	215
Certificates of work issued	50
Transfers recorded	44
Free miner's certificates issued	247

THE BOUNDARY CREEK DISTRICT.

By S. S. Fowler, A.B., E.M., Nelson, B.C.

The Boundary Creek portion of the Kettle River Mining Division of Yale, two years ago, meant a territory of about 150 square miles in extent, drained by a small stream which joins Kettle River from the north at Midway, where the river first crosses the International Boundary. To-day the term "Boundary" has lost its special significance by reason of the rapid extension of the area in which valuable minerals are found, to points far distant from the nucleus which first gave the district its reputation.

The records of the Government Office at Midway showed, on the 1st of January, 1895, that there had been staked, up to that time, about 370 claims, many of which were of course re-locations. On the 1st of January, 1896, all but 127 of these old claims had ceased to exist; but in the year 1895 771 new locations were made, and during 1896 the number was 1,279.

This sudden taking on of a new life, in 1895, was largely due to an influx of prospectors from Trail Creek; while in 1896 it may be attributed, in a great measure, to the failures experienced by the many men who rushed into the Colville Reservation after its opening, by Act of Congress, to mineral locations in February of that year.

The result has been that although the great majority of locations are in that part of the country drained by Boundary Creek, where the first claim was staked by W. T. Smith in May, 1886, many hundreds are scattered all the way from east of Christina Lake, near the eastern confines of the district, westward to the 119th meridian near the mouth of Rock Creek, a distance nearly 40 miles; and from the International Boundary northward for twenty miles, up the valleys of the main Kettle River, Boundary Creek and the North Fork (of Kettle River).

The valleys and water-sheds of these three southerly flowing streams form three natural parts of the Kettle River Mining Division, all connected by several transverse valleys. Each of these parts deserves special consideration, and each has already begun to be known by a name of its own, as its future and even present prospects demand. The central one or "Boundary," however, is the oldest and best known, and because it possesses features common to the others, as well as many peculiar to itself, it is made the subject of this article.

Topography.

The topography of the district, while it affords a considerable diversity, is not very different to that of all the great interior plateau of British Columbia. Whilst mountainous, its highest points seldom exceed 5,500 feet in altitude above the sea, and the greater number of its many well rounded mountains do not exceed 5,000 feet—Kettle River, at the mouth of Boundary Creek, being about 1,800 feet above sea level. The ruggedness and nakedness of many parts of Kootenay are not at all in evidence, for these rounded hills are splendidly forested to their very summits, with a very great variety of coniferous trees. The eastern, southern and western slopes are open and afford a prolific growth of bunch-grass, and along the valleys are many ranches which are specially adapted to diversified farming with the aid of irrigation.

Climate.

The climate the year round is all that one can desire. The mean temperature for the year ending June 30th, 1896, was 42.8 degrees, and the total precipitation was 13.3 inches.

Geology.

The geological features of this region are varied and interesting. Not having made a special study, and without assuming more than a general understanding of them, I may say that for several miles east of the North Fork there is an area of Archæan gneisses and siliceous and micaceous schists, which are the basal rocks. West of the North Fork we come into an extensive series of metamorphic schists, quartzites, crystalline limestones and some clay slates, all of which form a large part of the ridge lying between North Fork and Boundary Creek. This series is apparently repeated through a distance of three or four miles west of Boundary Creek, when these probably pre-Cambrian rocks are found to be overlain by Devonian or Devono-carboniferous limestones, which form the summit and western limit of the Boundary Creek watershed, within that part of the latter at least, which is best known. West of this summit is a series of Cretaceous sandstones and shales continuing to Rock Creek, eight or ten

miles. Through this series the last-mentioned limestones may be seen protruding at points along Kettle River; but after crossing Rock Creek the schists and quartzites again appear in the vicinity of Camp McKinney, and these in turn are succeeded, on nearing the valley of the Okanagan, by a recurrence of the Archæan rocks first mentioned.

Throughout this extent of territory these stratified rocks are found to be penetrated by, or underlain and overlain by, eruptive rocks of different ages and diverse natures. These eruptives are all more or less intimately associated with the mineral deposits of the district, and a thorough knowledge of them (to be derived only from a comprehensive and accurate geological survey) is much to be desired.

Avoiding more technicalities than are necessary, these eruptive rocks include granite, syenite (?), felsite, trachyte (both often porphyritic) and "diorite." The felsite and trachyte often pass under the name of "porphyry." The "diorite" is meant to signify all those basic, heavy, hard and dark coloured rocks which, scientifically, may properly be called by other names; the term is much burdened, as porphyry has been for many years, but it is convenient and not inexcusable.

The granites are probably the oldest eruptive rocks hereabouts. They are found in the valley of Boundary Creek, about eight miles above its mouth, and from there northward. Diorite, including the lighter coloured varieties, is the predominant eruptive rock, and occurs throughout the region in dykes of greatly varying width, with a strike somewhat north of west. These penetrate the granite and all the other rocks, except possibly the more recent limestones and porphyry, as at the head of Copper Creek.

The porphyritic rocks are prominently associated with the limestone and the Cretaceous strata.

Besides these, considerable areas are known to afford schistose rocks, essentially composed of magnesian minerals, such as chlorite, hydro-micas and talc, together with serpentine and dolomite. A large part of these rocks are probably alterations of an eruptive original, and they are especially in evidence in the southern part of Boundary Mountain, as at White's and Attwood's camps.

ORES AND ORE DEPOSITS.

The Boundary District is essentially a gold district. The great bulk of the ores is a mixture of the various iron sulphides with copper pyrites, all more or less auriferous. This class of ore is notably associated with the basic eruptive rocks, which are of so widespread occurrence in southern British Columbia, and with the older metamorphic rocks near or at the contacts of these with the former. The magnesian rocks above referred to also afford this ore. This mineral mixture occurs in bodies which at times are so elongated as to give the impression that they occupy fissures, and again at others it occurs in apparently isolated shutes of limited horizontal extent; finally what seem to be well-defined blanket deposits hold the ore. The croppings of several of these deposits consist of very large masses of (frequently polaric) magnetite, through which are disseminated copper and iron pyrites. Where denudation and wearing action have had sufficient opportunity these cappings have been removed, and calcite, specular hematite and quartz appear as the normal accompanying gangue. This class of ores has a wide range in value, but, excluding the extremes, may be said to carry about $15 in gold, with two or three ounces in silver, per ton, and five per cent. copper. It is exemplified by many of the prominent properties of the district, among which are the "Emma," and "Oro Dinero" in Summit Camp; "Stemwinder," "Gold Drop," "Knob Hill," and "Snowshoe" in Greenwood; "Winnipeg" and "Calumet" in Wellington; "City of Paris," "Lexington," "Golden Rod" and "Oro" in White's Camp, and the "Mother Lode," "Sunset," and "Great Hopes" in Deadwood Camp.

In the granites along Boundary Creek and in the siliceous rocks by which they are flanked—in other words in the more acidic rocks—fissure veins of varying width are found, which afford quartzose dry silver ores and some large bodies of presumably partly free milling gold quartz. In the former case the minerals present with the quartz include small amounts of galena, zinc blende and iron pyrites with ruby silver, &c., as in the Skylark Camp; and in the vicinity of Long Lake, beside the above, tellurium and tellurides of gold and silver, with more or less free gold at the surface, are found. All these dry silver ores contain gold. Their veins are from a few inches to five or six feet in width, and the greater part of the value is often concentrated in a narrow pay streak. An idea of the values of this material is had from the statement that in 1894 a shipment of 85 tons of sorted ore was made from one property, and the metal contents were 16,947 ounces silver, 101 ounces gold, and 7,836 lbs. of

lead. Small shipments from other claims have been made, showing gross values of about $100 per ton, but the average value of unsorted ore may be placed at about $50 per ton.

These ores are found over a considerable part of the district, and notably on the "Jewel" and "Dinero Grande" claims in Long Lake Camp; "G. A. R." and "D. A." in Providence Camp; "Skylark," "Crescent" and "Last Chance" in Skylark Camp; "Nonesuch," "Boundary Falls" and "Ruby" in Smith's Camp, and the "No. Seven" and "Lincoln" in Attwood's and White's Camps, respectively, the latter affording grey copper as the principal source of value.

The milling ore mentioned above occurs on the "O.B." and "Big Ledge" claims, south of the "D.A." It affords values from $15 to $40 per ton.

The Devonian limestone, which extends north and south from the head of Copper Creek, is cut through by several dykes of porphyry and felsite, and along the contacts of these with the limestone are bodies of copper ores. In the southern part of this belt the mineral is copper glance and copper pyrites, the latter of which in places seems to be a constituent of the felsite. In the Copper Camp the ore is entirely in the contacts, has a quartz gangue, and is almost entirely copper glance, oxidized at surface and partly again reduced to metallic copper. These ores, while they carry only a small amount of the precious metals, sometimes give assays of over thirty ounces in silver. The copper tenure is about seven or eight per cent. only, but this grade could probably be improved by wet concentration of the sulphide.

This class of ore is found on the "Copper Mine," "King Solomon," "Copper Queen," &c., in Copper Camp, and the copper pyrites and some copper glance are found on the "Bruce," "Texas" and other claims in Graham's Camp, four miles west of Midway.

COAL MEASURES.

The Cretaceous rocks carry no metallic minerals as far as I know, but for some distance along Kettle River, from four miles west of Midway, they show occasional croppings of coal. Up to the present time the best of these is near the mouth of Rock Creek, where the seam is about four feet thick. Although prospected to a very limited extent this coal appears to be quite up to the average Cretaceous coal in quality, and it has undoubtedly been brought to its present stage as a coal by the heating and distilling influence of the abundant trachyte (?) flow of this vicinity.

The analyses of this coal, which have been made up to the present time, have been of samples from the immediate surface, which is much broken and has absorbed impurities from the overflow of Rock Creek. I give two of these analyses by the Messrs. Guess Bros., of Midway, as follows:—

	No. 1.	No. 2.
Fixed carbon	65.5	68.85
Volatile matter	28.3	15.7
Ash	6.2	15.44

Omitting from consideration the locations of 1895 and 1896 as of two recent date to have produced definite results, the present state of development of the older mineral claims in the Kettle River country is not such as their resources should have made it; although of the one hundred and twenty-seven valid claims shown of record at the end of 1895, but located prior to that year, probably over fifty can show an expenditure of five hundred dollars each. And yet the required assessment work on these one hundred and twenty-seven claims shown by records to have been done is over $40,000, which means that those claims which have received less than $500 worth of work have, on the average, done twice as much as the law requires. Nevertheless, without an attempt at accuracy, I think I am safe in saying that there are not more than three shafts over one hundred feet in depth, and not over thirty shafts between fifty and one hundred feet deep. This is simply another way of saying that outside capital has cast no more than a passing glance at the district. Another reason for the lack of further development is that many of the deposits are so large that they are really discouraging to the owners, most of whom, as usual, are men of limited means, not to say actually poor. For the same reason, when the owner has performed what the law requires for his maintenance of title, he has really accomplished little, and as likely as not failed to work his ground at a point which might have shown better results.

In other words, these very large surface showings require a proportionally large expenditure for the proof of their worth.

Of course the chief want of Boundary is cheap transportation. Even the high grade dry ores of the district can do little more than bear the burden of sixty or seventy miles of waggon haulage when added to the other necessary expenses. So much the less then can the low grade sulphide ores be profitably exported.

With a railway system in operation it is doubtful if a well equipped smelting plant adapted to the treatment of these ores could not be profitably operated in the district; for with the certainty of abundant ores of varied character, as pure limestone as can be desired, and an apparently excellent metallurgical coal at hand, no other material is needed. But the railway under ordinary circumstances will wait until the production of tonnage, either directly or indirectly dependent upon the mineral resources.

To those who are already interested in the Boundary District the necessary tonnage seems to be in sight, but whether this has been proven to the satisfaction of those upon whom the railway builder is dependent remains an open question. Thus again we are brought face to face with the immediate necessity of an ample and well directed mining capital, which is certain to meet with its just reward.

NOTES ON CAMP McKINNEY, B.C.

The camp is situated about 56 miles from Penticton, at the south end of Okanagan Lake. It is eight miles north of the International Boundary Line, and 32 miles west of Midway, at mouth of Boundary Creek on Kettle River. Altitude, 4,600 feet. The camp lies on a rolling plateau spur of a rounded mountain mass, of which Bald Mountain is the centre. This peak, 4 or 5 miles north-west of the camp, is a dome of granite (so I am told), which has been pushed up under the gneisses which lie west of it nearly to the Okanagan and the Cambrian (?) schists and quartzites, which extend east of it for a long distance. Bald Mountain is about 7,000 feet alt. These quartzites, etc., are highly tilted, and at Camp McKinney strike about north and south. Cutting these at right angles is a fissure vein (strike east and west, dip vertical) of quartz, on which are located the "Okanagan," "Amelia," "Cariboo," "Alice," "Emma," "Maple Leaf" and "Eureka" claims. Through all of them the vein is traced, and more or less proved.

Most of the work, and in fact the only work which amounts to much, is on the "Cariboo" and "Amelia," the property of the Cariboo M. M. & S. Co., of Spokane. This company erected a ten (850 lb.) stamp mill in the spring of 1894, which has been in operation with success ever since. The ore carries about 3% of concentrates, that are shipped to the coast smelters, *via* Penticton and C. P. R.

The mine is worked now through a shaft 170 feet deep, from which drifts run east and west. Tne several shafts and winzes foot up about 250 feet, and total drifts and cross-cuts, etc., about 2,000 feet.

The published reports of the company show that about $250,000 in gold have been produced, out of which about $125,000 have been paid in dividends, and about 18,000 tons of ore have been milled.

The only other property which is being worked is the "Victoria" and "Old England" claims, about 3 miles east of Camp McKinney, but no details are available as to the work being carried on.

COAL MINES.

—o—

BY A. DICK, INSPECTOR OF MINES.

I have the honour, as Inspector of Mines, to respectfully present my report for the year ending 31st December, 1896, for your information, in accordance with the "Coal Mines Regulation Act" of British Columbia.

The collieries in operation during the past year of 1896 were:—

The Nanaimo Colliery, of the New Vancouver Coal Mining & Land Company, Limited.

The Wellington Colliery, owned by Messrs. R. Dunsmuir & Sons.

The Union Colliery, owned by the Union Colliery Company; and

The West Wellington Company, owned by the West Wellington Coal Company, Limited Liability.

The output of coal for 1896 amounted to 894,882$\frac{8}{20}$ tons, produced by the several collieries as follows:—

	Tons.
The Nanaimo Colliery	320,575$\frac{13}{20}$
The Wellington Colliery	339,896$\frac{15}{20}$
The Union Colliery	233,610
The West Wellington Colliery	800
Total output for the year 1896	894,882$\frac{8}{20}$
Add coal on hand 1st January, 1896	33,450$\frac{13}{20}$
Total coal for disposal, 1896	928,333$\frac{1}{20}$

The export of coal by the collieries for 1896 was 634,237$\frac{16}{20}$, as follows:—

EXPORT.

	Tons.
The Nanaimo Colliery	232,436$\frac{11}{20}$
Wellington "	235,916$\frac{5}{20}$
Union "	165,885
Total coal exported in 1896	634,237$\frac{16}{20}$
Add home consumption in 1896	261,983$\frac{12}{20}$
Coal on hand 1st January, 1897	32,111$\frac{13}{20}$
Total	928,333$\frac{1}{20}$

The returns for the year show a home consumption of coal amounting to 261,983$\frac{12}{20}$ tons, as against 188,394 tons last year (1895). It must, however, be noted that the coal used in the collieries is, in most instances, under this heading.

In addition to the above home consumption of coal for 1896, we imported into British Columbia 21,059 tons, and 670 lbs of coke. Of this there came direct, 9,822 tons from the United States to Nelson, and from all appearances we may expect to see this market for coke in British Columbia growing both in the Kootenay and in the Coast districts. We will also expect to see this market supplied with coke from the mines of the Province. At present the Union Colliery at Comox can supply all the coke that is required in British Columbia, and with a first-class article equal to any that can or may be imported. The fixed ash in this Union coke is 8.5 per cent., so that a trial of it will speak for itself, of which 1,240$\frac{12}{20}$ tons was manufactured during the past year, giving great satisfaction.

The coal exported was shipped at the Port of Nanaimo, Departure Bay and Union (near Comox) on Vancouver Island, in British Columbia. The exports were principally made to San Francisco, San Pedro and San Diego, in California, U.S.A Shipments were also made to the

States of Oregon and Washington, and to Alaska and Petropavloski, and the Hawaiian Islands. In order to show the standing of the British Columbia coal in the Californian market, I append the following returns for the year ending 31st December, 1896:—

CALIFORNIAN MARKET.

Where From.	Tons.
British Columbia	551,852
Australia	273,851
English and Welsh	156,368
Scotch	8,356
Eastern (Cumberland and Anthracite)	17,907
Seattle, Franklin and Green River	128,917
Carbon Hill and South Prairie	255,293
Mount Diablo and Coos Bay	110,237
Japan	2,247
Total	1,505,660

Included in the above statement of annual supplies are the quantities received at Port Angeles and San Pedro, aggregating 154,875 tons for the two places, so that the quantity of coal taken into the Californian market during the past year was over 10% less than in 1895.

The total arrivals of coke into California for the year have been 36,132 tons. This is 50% more than in 1895. Fully 75% of this coke was imported from England and Belgium. Now that the owners of the Union Colliery at Comox, B.C., have begun the manufacture of coke on a large scale, having now 100 ovens from which they are turning out a first-class article, they have begun to make regular shipments to California, where it finds a ready sale. These shipments of coke, it is expected, will lead to a decrease in the importations to California from the countries already referred to. These ovens will also supply the Kootenay District, where there is a good demand for coke of such high quality for the smelters. A market for a limited quantity will also be found in Vancouver and Victoria.

NANAIMO COLLIERY.

I have, already, in a previous report, made mention of this colliery, which is owned by the New Vancouver Coal Mining and Land Company, Limited, with head offices in London, England.

No. 1 SHAFT.

No. 1 shaft is situated within the limits of the City of Nanaimo. It has proved valuable property, and has been the principal producing mine of the Nanaimo Colliery. Taking appearances as an indication, I may say that it contains a sufficiency of coal to give employment to a large number of men for many years to come.

With the exception of the shaft and a small area around the shaft bottom, the workings of this extensive mine are under the waters of Nanaimo Harbour, and beneath the surface of Protection (or Douglas) Island and Newcastle Island, both in the Gulf of Georgia, most of the working faces being at present under the last named island. The workings of this mine are for the most part dry, but not dusty, and are quite safe from any influx of water, there being a thickness of rock and earth varying from 450 to 1,300 feet between the bed of the harbour and the workings of the mine. These workings are carried on on the pillar and stall as well as on the panel system. The pillars (coal) are large, and contain fully two-thirds of all the coal that was originally in the mine, and are purposely left of large dimensions to protect the mine from the pressure of the large superincumbent and weighty body of water above it. These pillars, after they have served their purpose, will be gotten out at some future day. At present they are a paramount necessity to the safety of the mine.

With the exception of the slope, the only workings from this No. 1 shaft is what is known as the No. 1 north level. The level itself, has not been extended during the past year, but workings from it (the level) have been extended in 1,100. The coal found under the north side of Newcastle Island is generally hard, and of the usual good quality, and is from three to twelve feet thick. It is overlaid by a strong rock roof, but in some places this roof is much cut up with "slips," which make it very dangerous.

No. 3 Level.

There has not been much mining done here during the past year, but in this level, as in No. 1, there is a great field of coal in the pillars, which have not as yet been taken out. As all these (pillars) contain good coal, their removal will prove very remunerative to the Company, the "dead" work being all finished.

The Slope.

The slope has been mentioned in a previous report as being down 1,500 feet, in a northerly direction. During the past year it has been continued, without any intermission, until it is now down 1,900 yards, and is 1,300 feet under "tidal" water. I am sorry to say there is as yet but very little coal. In pushing the work, indications of soon having the coal appear, but these indications again change for the worse, and so on. The place where the coal ought to be is always there, but it is generally filled with rock or soft coal, or both combined. This slope and No. 1 level are the principal exploring places in the mine, and it will be a great relief to the management when they get good coal in both or either of those places, which I hope will soon happen.

The ventilation is good, the supplying motor power being a large "Guibal" fan 36 feet in diameter, and twelve feet wide. When I was down in December there were 44,100 cubic feet of air passing per minute for 120 men and 18 mules. This mine is ventilated on the separate split system, with Protection shaft as the "intake." To the level and inside incline (or panel) there were 12,600 cubic feet of air passing per minute, for 56 men and 6 mules, and to the outside panel or (long incline), 14,500 cubic feet, for the use of 64 men and 12 mules. In addition to the above there were 17,000 feet going, to keep the old works clear from gas, both in No. 1 and No. 3 level old works. The total amount for slope and shaft is 23,000 feet. In the No. 1 level, great care is taken to prevent the accumulation of coal dust, which, as you are doubtless aware, has, by modern experience, been proven to be a dangerons explosive. This dust is carefully swept from the sides and roof and other places of lodgement in the level and carefully disposed of. It is in this No. 1 level that the coal is being hauled out by electricity. It is no uncommon thing to see 90 cars in one train being rapidly moved by this new motive power. Those who may be desirous of obtaining a description of the system in vogue here, can do so by reading my report of 1894. The system has proved quite a success. It is now working for a distance of 5,600 yards from the bottom of the shaft.

Protection Island Shaft.

This is also the property of the New Vancouver Coal Co., and is situated on the south point of Protection Island.

This mine opens out from the north and south sides of the shaft, with slope going to the east. These are situated 1,720 feet below the surface, under the entrance to Nanaimo harbour, and are down 1,690 yards. When I say below the surface, I mean to say the surface of "tidal" water. These slopes have been much troubled with faults and with coal of a soft nature. In the upper levels, to the north and south sides of these slopes, the coal has been good and productive, being worked on the pillar and stall system.

On the north side of the shaft is what is known as the "diagonal" slope. This is being driven in a north-easterly direction, being now 1,490 yards long, and 1,200 feet below "tidal" water of the Northumberland Channel. This slope has passed through some very fine coal, but now for quite a distance the management have been troubled with faults and soft coal. The slope is now the only place being worked down here. About 500 yards down this slope there is another branch slope to the eastward. This is now down 750 yards in good coal all the way, but here the large "down-throw" is encountered that has already been crossed in the slope, so that they are now working the coal from both sides on the pillar and stall system.

The ventilation is good, the "intake" being Protection shaft, with No. 2, or fan shaft, in the City of Nanaimo, as the "upcast." This mine is ventilated on the separate split system. When I last examined this mine there were 25,200 cubic feet of air passing per minute to the diagonal and side slopes. This quantity was for 37 men and 4 mules. Down the slope on the southern side there were 18,720 cubic feet of air passing per minute for the use of 42 men and 2 mules. After the air has passed along, it is carried away on the return to the fan-shaft.

No. 5, SOUTHFIELD.

This mine, as mentioned in my last report, is the property of the New Vancouver Coal Co., and is the southern part of their large estate. The workings of this shaft are all to the eastward. The management have been much troubled here with faults, and have not as yet got clear of them. The coal now mined here is very good and hard, and of good quality. In some places it is 12 feet thick. It is worked on the pillar and stall system, leaving as much of the faulty ground as possible in the pillar.

Ventilation is very good. When I was down in December, there were 36,880 cubic feet of air passing per minute. This was for 56 men and 11 mules. It was divided as follows:—18,000 feet of air per minute, for 30 men and 2 mules, to the east incline; 18,880 feet of air per minute to the east level, for 26 men and 9 mules. This mine is free from dust, and otherwise in good order. In addition to the air current above mentioned, a large quantity goes out by the No. 4 slope, with which this mine is connected.

PROSPECTING.

Quite a large amount of prospecting has been done by this company, both by "pick and shovel" and by the "bore." At the present time of writing one "bore hole" is down fully a thousand feet, and still have not reached the required depth. On their property close to the "Extension" mine (owned by the E. & N. R. R. Co.), a considerable amount of prospecting has been done by pick and shovel, with the result of opening up a good seam of coal, into which they have driven a slope to a distance of 75 yards. This "find" has the appearance of being what is known commercially as Wellington coal. It is hard and of good quality, and it is hoped that it will lead to the finding of quite an extensive field.

WELLINGTON COLLIERIES.

These collieries belong to Messrs. R. Dunsmuir & Sons, and are situated in North Nanaimo, six miles from the City of Nanaimo. Departure Bay is the shipping point of these collieries, where the Company have erected extensive wharves for the accommodation of the shipping, and which are furnished with every modern facility for the loading of coal.

No. 1 PIT, WELLINGTON.

This pit is near the eastern boundary of the Wellington Estate. It is connected, underground with No. 5 pit. In a previous report I mentioned that the mining in this pit consisted of a good deal of rock work, but during the past year, I am pleased to state, a change has taken place, and the pit is now one of the producers of the Wellington coal. As all the coal to the rise of the shaft had been worked out on the long wall system, a slope was put down to near their southern boundary, and in that direction they have found a large extent of coal before them, which is hard and of the usual good quality. It is here they are now working.

Ventilation is good. When I was down in December, there were 16,000 cubic feet of air passing per minute, to supply 35 men. Of the foregoing current of air, 10,000 feet went to No. 5 fan-shaft and 6,000 feet to the return at No. 1 pit. The air goes down the slope and into the level, and returns along the coal face, which is worked on the long wall system. It is also in this pit that a stratum of "fire clay" may be found 30 feet in thickness.

No. 3 PIT, WELLINGTON.

At the time of my last report, the management were having the water pumped out and the pit otherwise cleaned up. Everything went well until the month of October, when a fire broke out in the lower working of No. 4 pit, which necessitated for the third time the introduction of water from the Millstone River to extinguish the fire in No. 4. At the present time this water is being removed by pumps, consequently no mining is going on here.

No. 4 PIT, WELLINGTON.

This is also the property of Messrs. Dunsmuir. This mine has, on two different occasions, been filled with water on account of fires. During the past year it had once again, and for the third time to be flooded to subdue a fire, which had broken out in the lowest part of the

mine, and to which I referred in my remarks on No. 3 pit. The water introduced, filled the lowest parts of this and No. 3 pit. The quantity introduced was only sufficient to submerge those places which were on fire, and as they happened to be in the lowest part of the mine, the water did not interfere with the working of the remainder of the pit, as it did not encroach upon the roads or airways. The only delay caused was a month, which was taken up in the introduction of water. The coal mining in this pit is confined to the extraction of the pillars (coal), and as the management know exactly what amount they possess in this form, I am in a position to state that mining will be carried on here for several years to come.

Ventilation is good. From tests taken by me in December, I ascertained that at that time there were 63,840 cubic feet of air passing per minute on the return airway, for 150 men and 35 mules, and supplied in the following manner, viz.: split to the east side, 24,688 feet of air for 60 men; to the slope, 20,540 cubic feet of air per minute for 50 men; to the south side, 15,420 cubic feet of air for 40 men, leaving 3,192 feet of air to be accounted for, and which passed along and into the old workings. In addition to supplying the men already enumerated, this current or supply of air furnished breathing material for 35 mules scattered throughout the mine. Notwithstanding that very little gas is found in this mine, still the greatest care is taken as to the ventilation, so as to obviate all chances of accidents. After the pillars have been taken out, it will not be possible to enter the old workings, but at the present time, the firemen and shot-lighters give these old workings a careful and continuous examination, as to the existence or collection of gas.

No. 5 Pit, Wellington.

This pit still upholds its record as the greatest coal producing mine of the whole colliery. Much of the coal mining carried on here has been on the "long wall" system; but at present it is from the pillars and stalls that the greatest amount of the coal is obtained. The taking out of pillars (coal) also furnishes a certain amount. The area of coal in sight in this mine justifies me in stating that this mine will work for many years to come. This pit is connected with Nos. 1 and 6 pits by good travelling roads.

Ventilation is good, though at times there is considerable powder smoke after blasting, but this smoke is soon carried away by the excellent ventilation. Observations taken by me in December, showed that there were 90,500 cubic feet of air passing per minute at the foot of the upcast shaft for 185 men. Carried on the separate split system, this air was disposed of as follows; to the east side, 26,300 cubic feet per minute for 62 men and boys; to the side slope, 8,400 feet for 25 men; to the north-west level, 35,400 feet for 65 men; to Nos. 2 and 3 levels, 11,200 feet for 33 men at work there. The balance of air unaccounted for escapes to the fan-shaft, and through the old workings. There is little gas seen in this mine, yet as a precautionary measure in that part of the mine where they are taking out pillars, and where it is impossible to get into the back to examine it, the men work with locked safety-lamps. This pit is free from dust. In addition to the manager, this mine or pit has a staff of assistants, who give a very careful examination to the pit in every detail, and any serious change in the ventilation would be detected at once.

No. 6 Pit, Wellington.

This is another extensive mine of the Wellington collieries. Coal was first mined here on the pillar and stall system, then with a division on the long wall system, but at present time mining is confined to taking out the pillars, which are all of coal. These are found on the north, east and west sides. The rest of the pit was worked on the long wall system, which leaves nothing to be taken out. There is quite a large area of coal embraced in these pillars. In addition to these pillars, there is still a large strip of coal on the southern side, between this pit and what is known as the East Wellington pit. The coal is here known to be good on both sides.

Ventilation is good. The motive supplying power is a fan worked by steam. My December observations indicated 37,900 cubic feet of air passing per minute, on the separate split system, and was disposed of as follows: to the east level, 20,400 feet per minute for 24 men and 5 mules; to the east incline, 7,000 feet for 14 men and 2 mules; and to the west side, 10,500 feet for 18 men and 4 mules. Each of these divisions has a separate return airway, until they arrive close to the upcast shaft.

EAST WELLINGTON.

No. 1 SHAFT.

In my last report, I stated that this mine was now the property of Messrs. R. Dunsmuir & Sons. During the time which elapsed between the period of the shutting down of this mine under the former ownership, and the taking of it over by its present proprietors, the pit filled with water, and at the time of my last report, I stated that the water had been pumped out, and that a few men were at work in the mine. Work was carried on for a few months getting out coal, but work was stopped and matters came again to a standstill. The only work done here at present is pumping the water out, and keeping the pit dry. What the cause of the stoppage is, I cannot tell.

All the upper works and pit-head gear of No. 2 shaft, were destroyed by fire during the dry weather, which prevailed at the latter end of last summer.

ALEXANDRIA MINE.

This property also belongs to Messrs. R. Dunsmuir & Sons, and lies to the south side of the New Vancouver Coal Co.'s Southfield. There have been some extensive improvements made here during the past year, amongst which is the addition of a large hoisting engine with powerful boiler, capable of taking out of the mine a large amount of coal per day. For the first ten months of the year, they pushed the levels with much energy. They have got what is known as the north level, in about 800 yards from the slope. The greater part of this distance is in good coal. At the present time, no work is going on in the mine itself, but great improvements are being made outside. During the summer a switch was run in from the E. & N. R. R., so that when everything is ready to resume the taking out of coal, it can be shipped immediately to Victoria for sale, or elsewhere for exportation. Large bunkers and other facilities for handling coal are now being built. The coal found in this mine is of very good quality.

Ventilation is good. When I last took observations, there were 9,000 feet of air passing down the slope per minute for only 7 men employed. This mine will certainly give a good account of itself before another year is out.

E. & N. EXTENSION, (WELLINGTON).

This mine is mentioned in a previous report as being situated on the south slope of Mt. Benson, and is the property of the E. & N. R. R. Co., being included in the railway grant. The Company have been prospecting this property very extensively during the past year. The No. 1 slope is now down 700 yards, in a southerly direction; the coal being good all the way, and varying in thickness from 6 to 11 feet, and having a return airway to the same. About two miles in a south-easterly direction from No. 1 slope, they have the coal again. Here it is known as the No. 2 slope. At the outcrop, the coal was 15 feet thick. The last time I was there they were working 8 feet of the coal, and they did not know much was over them, as they had not seen the roof since they started. They were then down 80 yards, the coal being hard and of good quality. From all indications, and from what is now known of this field, Douglas District is going to be the great coal producing centre for the next generation.

WEST WELLINGTON COLLIERY.

The mine is west of and adjoining the Wellington colliery, owned by Messrs. Dunsmuir & Sons, and is owned by the West Wellington Coal Co., (Ltd. Ly.) There has been considerable work done here since the above Company purchased this property.

This mine is entered by a slope going in a southerly direction, and heading to under the Millstone River. The coal is found not far below the surface, and is from 4 to 6 feet thick, and is of the usual good quality for which the Wellington coal is celebrated. This slope is not far down, as this Company has only recently commenced operations; but they have already two levels whence they are taking the coal. From the mine they have a second outlet, which serves as a return airway in their ventilating system. The Company has been shipping coal to Victoria *via* E. & N. R. R., where they find a ready sale for all they can ship. Their

wharf is situated in Nanoose Bay, distant about six miles, and connected with the mine by means of a wooden tramway. This mine has only recently become the property of this Company, and they are getting the works into good working order, so that we may expect to see this a producing mine, and also stirring times before the year is out.

UNION COLLIERY.

No. 2 Slope.

This colliery is the property of the Union Colliery Co., and is situated near the farming district of Comox. I mentioned in my previous report that this slope was down 700 yards. It has, however, been idle for the past six months. This stoppage has not been due to the want of coal in the working, but on account of the dullness of trade The management has, however, kept the water pumped out regularly, so that when trade revives they will be in a position to resume operations at two days' notice. This improvement in the market I hope to see soon.

No. 4 Slope, Union Colliery.

This slope is the most extensive mine in the Union Colliery, and is now down 2,400 yards, with an easy grade all the way. From this slope, at about 100 yards from the entrance, there branches off to the east, and at an angle of 45 degrees, a slope known as the No. 2 slope, which runs almost on the true dip of the coal. Although not so long, but having a greater dip than No. 1, it is now almost down to the level of the main slope. From this last named slope there branch of on each side, and to the east and west, three levels. These are called 11, 12, and 13 levels. The character of the coal in each of these three levels to the east and west of this slope is the same. It is good and hard, and from 5 to 7 feet thick. In the diagonal slope the coal is about the same in quantity and quality as in the main slope. This diagonal has also three levels on each side of the slope, running to the east and west. The two slopes (main and diagonal) are connected through the No. 11 level.

Ventilation is good. In December there were 55,589 cubic feet of air passing per minute on the intakes for 183 men and 12 mules. From the intake the air was split in the following divisions inside of all the doors :—The first division is where the No. 2 branches off the No. 2 slope at the junction of the diagonal slope, part of the air going down the diagonal and part down the main slope. At this split, by test, I found that there were 24,574 cubic feet of air passing per minute down the main slope. The air is carried down this main slope to the bottom, where it is again split into two separate currents, the one going to No. 13, the lowermost of the levels on the east side. The remaining levels on the west and east sides obtain their air from the No. 13 level on each side. I found at the foot of the main slope, where the split was, that 15,387 cubic feet of air passed per minute into No. 13 level on the west side, to supply 64 men and 4 mules, and 9,187 cubic feet of air to the east side, to supply 28 men and 2 mules. To return to the point where the split existed at the junction of the main and diagonal slopes, I found that 22,168 cubic feet of air passed into the diagonal, and thence into the lowermost level, where it was again split to supply the levels on the west and east sides of the slope. To the west there went 7,075 cubic feet of air, for 31 men and 2 mules, and to the east there went 15,093 cubic feet of air per minute, for 60 men and 4 mules. There are therefore 8,847 feet to be accounted for. This quantity escapes at the doors of the different levels of the slopes ; but it is not lost, as it is caught there and taken into the levels. This mine is free from dust.

All the appliances and arrangements about this mine are of and on the most improved system for the saving of labour and the handling of coal.

I may mention before completing my remarks upon this mine that when I was down in the course of duty in December last there were no men at work at that time.

No. 5 Shaft, Union Colliery.

This shaft and the machinery are fully described in my report of this mine in 1896. I further stated that the work was at that time at the bottom of the shaft and in good coal. Since that report was written, work has been carried more away from the shaft, and in the course of so doing many troubles and faults were met with. These faults sometimes raised the

coal and sometimes lowered it. To make my meaning more plain to those unacquainted with coal mining, I might explain that by raising the coal I mean that the working face would meet with rock, when the coal would be either up or down. If "up," I use the expression "raising" the coal; if down, I use the expression "lowering" the coal. To resume: besides the faults met with, the work would sometimes meet with a "want," by which I mean that the coal would sometimes give out and run into dirt. They have had very good coal to the south, which is worked on the "long wall" principle, and works well, when clear of faults; but in the levels they met with one fault after another, but they expect to get clear of these soon.

Ventilation is good; motive furnishing power being a large Guibal fan worked by a steam engine. In December, when I was there, I found by examination that there were 34,570 cubic feet of air passing down the shaft, where were 46 men and 1 mule. This mine is ventilated on the separate split system, the divisions being, at the bottom of the shaft, as follows:—To the east side, 18,110 cubic feet of air per minute for 30 men; to the west level 16,460 cubic feet of air per minute for 16 men and 1 mule.

In addition to the extensive prospecting done in this colliery, this company has erected near the shipping wharf a "Luhrig" coal washer. This is used for washing the screenings from the lump coal, and gives as a result five different sizes, from "nut" to fine coal dust.

I mentioned in my last report that at that time a contract existed for the erection of 100 ovens for the manufacture of coke, for which the coal from the Union Colliery is well adapted. The foundations (stone) of the buildings were laid in the fall of 1895, and in the spring the company imported a large shipload of fire-bricks and other blocks of the same material, as well as milled clay to complete the buildings. A large number of men were at once put to work, and in the course of time a block containing 100 ovens, having a double front, with 50 ovens on each side, was erected. Between the two sets of ovens is a flue to conduct the gas away which comes from the coal while in the course of being transformed into coke. This gas is utilized by being burned as fuel to generate steam to work the engine. To reiterate this, coke is made from the screenings obtained from the "Luhrig" washer, which would not have been saleable if it had not been for this great and enterprising outlay of money. The coke manufactured at these ovens is a very fine article, and the company is now finding a ready market for its sale in California. Special rates have, I understand, been obtained from the Canadian Pacific Railway Co. for the carriage of coke from these ovens into the Kootenay country, by which the Union Colliery Co. will be able to compete successfully in price with coke imported from the U. S. and elsewhere. There can be little doubt that, as our rich mineral claims become developed, many more smelters will be erected in British Columbia, which will consume more of this superior coke.

ACCIDENTS

IN AND ABOUT THE COAL MINES OF BRITISH COLUMBIA FOR THE YEAR 1896.

January 8—Thomas Gemmall, fireman, and Ah Wing, bratticeman, were very slightly burned about the face and hands by an explosion of gas while at work repairing brattice in the No. 2 slope, Union Colliery.

" 8—Evan Morgan, miner, working in No. 1 pit, Wellington Colliery, was seriously injured by being jammed by a car in the mine.

" 10—Albert Parrott, miner, working in No. 1 shaft, Nanaimo Colliery, got his leg broken by a fall of rock while at work.

" 23—Alexander Rowan, mule driver, was injured about the leg by being jammed between two mine cars while at his work in No. 4 slope, Union Colliery.

" 24—Joseph Wilson, miner, was slightly injured by a fall of coal while at his work in No. 4 slope, Union Colliery.

" 24—Thomas Jenkins, miner, working in No. 4 slope, Union Colliery, was burnt about the face and hands by an explosion of gas.

February 4—William Bray, miner, was killed by a fall of coal while at work in Protection Island shaft, Nanaimo Colliery.

" 8—Joseph Potter, miner, working in No. 4 slope, Union Colliery, was slightly burned. There was a cave on his road, a short distance from the face. This broke down the brattice, and as Potter was taking away the rock he required some tools, and went into the face to get them; hence the result.

February 17—John Nord, miner, working in the No. 1 mine, or shaft, Nanaimo, had a leg broken by a fall of rock while at work in his stall.

" 19—James Harley, miner, while at work in his stall in No. 1 shaft, Nanaimo Colliery, had his collar bone broken by a fall of coal.

" 20—Z. Donatto, miner, in No. 1 shaft, Nanaimo Colliery, was slightly burned about the face and hands, by igniting a quantity of loose powder in the mine.

" 21—John Gray, miner, working in No. 5 shaft, Union Colliery, was slightly burned by a small quantity of gas, which he kindled while at work.

" 21—George McLean, miner, working in No. 4 slope, Union Colliery, had his jaw broken by being struck with a stringer while in the act of putting it into its place to support the roof.

" 21—A. Lelland was killed by being crushed between the weigh-house and the workman's car, while attempting to get on the car while in motion, near the No. 4 slope, Union Colliery.

" 27—Owen Bradshaw, miner, while at work in Protection shaft, Nanaimo Colliery, was slightly burned about the face and one arm, by the ignition of a small quantity of gas.

March 5—George Smith, labourer, working in No. 4 slope, Union Colliery, was hurt about the head and shoulders by a fall of rock while at work.

" 26—Ah Hee, Chinese runner in No. 4 slope, Union Colliery, had his leg broken by a mine car while at work.

April 10—William Moore, miner, was severely injured by a fall of coal while at work in No. 5 shaft, Union Colliery, and died the following morning.

" 13—George Hards, boy, running in Protection shaft, Nanaimo Colliery, had his thigh bone broken, by being jammed between a mine car and a prop.

" 13—Thomas Walker, miner, working in No. 4 slope, Union Colliery, was slightly hurt about the back by a piece of rock while at work in his stall.

" 22—Caleb Evans, miner, and Ah Creep, labourer, were slightly burned by a blown-out shot in the No. 5 shaft, Union Colliery.

" 29—William Jackson, miner, had his leg broken by a fall of rock while at work in his stall, in No. 6 pit, Wellington Colliery.

May 6—Ah Yum, labourer, at Union Colliery, while going to his work in the workman's car, and sitting at the window during the time the car was in motion, was struck by a timber of the trestle, from the effects of which he died to-day. The accident happened on the 5th (the day before).

June 2—John Alexander, miner, was killed by a fall of rock while at his work in the No. 5 pit, Wellington Colliery. He was blasting down rock, and went below a piece that had been loosened by a shot, when it came down on him.

" 10—Charles Gorion, miner, working in No. 4 pit, Wellington, was killed by the giving away of a stringer while at work in his stall.

" 12—Frank Prime, miner, working in No. 1 shaft, Nanaimo Colliery, had his arm broken by a small piece of rock falling on him while at work in his stall.

" 25—Fred Turner, brakeman on electro-locomotive, had one arm broken by a piece of rock falling on him; car going off the rails.

" 25—James Glen, miner, had one of his legs broken by a fall of rock, while at work in his stall in No. 5 pit, Wellington.

July 4—Angus McLellan, miner, got one rib broken by a fall of coal while at work in his stall in No. 5 pit, Wellington.

" 9—John O'Connell, pusher, in No. 5 pit, Wellington, got his collar bone broken by being jammed between two empty cars.

" 29—William Thomas, miner, had several of his ribs broken by being jammed by a loaded car against the coal face while at work. He was starting a level off the slant from the diagonal slope Protection Shaft, Nanaimo Colliery.

" 29—John Naomi, runner, in No. 5 pit, Nanaimo Colliery, had his thigh dislocated and foot severely cut by getting entangled in a rope that he was using for lowering cars down an incline.

August 4—Peter Masuggo and Dominic Valezano, miners, got burnt on the head, face, and hands by an explosion of gas at a cave they were clearing in the No. 5 pit, Wellington.

" 7—The first-named, Peter Masuggo, died in the Nanaimo hospital to-day.

September 10—R. Hamilton, miner, working in the No. 5 shaft, Union Colliery, was slightly burned on the neck by the ignition of a small quantity of gas.

October 2—Tai Suen, miner, working in the No. 5 shaft, Union Colliery, was seriously injured by coal falling on him while at work in his stall.

" 3—The above Tai Suen died to-day from the injuries received.

" 6—Joseph Nanaivell, miner, was injured about the back by a fall of rock, while at work in his stall, in Protection Island shaft, Nanaimo Colliery.

November 12—Richard Spear, shot-lighter, Protection Island Shaft, Nanaimo Colliery, was severely injured about the body by being thrown from and jammed by a run of loaded cars.

" 16—James Dickie, timberman, in the No. 6 pit, Wellington Colliery, was slightly burned about the face and hands, by gas when going over a cave of rock.

" 16—Thomas Wilkinson, miner, was injured about the head, by a fall of rock, while at work in his stall in the No. 6 pit, Wellington Colliery.

December 2—William Lockhart, miner, working in No. 5 pit, Union Colliery, was slightly burned about the face and hands by an explosion of gas.

" 12—Chee-He-Chung, switchman, in No. 4 slope, Union Colliery, was killed by falling between the mine cars while at work.

" 23—W. J. Pollard, miner, working in No. 1 pit, Nanaimo Colliery, had his leg broken by a run of loaded cars.

" 29—Robert McGargle, miner, working in No. 4 slope, Union Colliery, was burnt on the face and hands, by firing a little gas in a hole in the roof.

" 31—John Bowen, miner, working in No. 4 pit, Wellington, got his arm broken and crushed about the body by a fall of coal while at work in his stall.

It is with sincere regret that I have again at this time, the close of another year, to make out the above long list of accidents, although there is a decrease in their number below that of last year.

Some of the accidents enumerated were quite slight, but on the other hand, some of them very serious. In some of the cases, months elapsed before the man injured could return to his work. In the above list, you will observe that there is a total of 47 accidents, 38 of these being reported as slight, or serious, and 9 fatal. Of the 38 casualties, 5 were from the falling of or injuries from coal, 8 from rock, and 11 from explosions of gas, 2 from shots, 8 from accidents in connection with the cars in the mine, 1 from powder, 1 from a rope and 2 from injuries from stringers. Of the 9 fatal accidents, 3 were caused by falls of coal, 2 by rock, 1 by explosion of gas, 1 with cars in the mine and 2 on the railway, not below but on the surface, so that the number of fatal accidents in the mine is reduced to 7. I have made enquiries into the circumstances and causes incidental to all of these accidents, as soon as possible, after receiving word of their having happened, and on many occasions I have been at the spot before the notice from the manager had reached me. In looking over the list you will observe that nearly all of the accidents mentioned, happenéd while the men were at work in their places. With respect to the fatal accidents, an inquest was held in nearly every case, so that if the minute incidents in connection with the fatalities are required, these can be obtained from the evidence filed with the inquisition, in the office of the Honourable the Attorney-General.

In addition to the workmen who is supposed to use ordinary precautions for his own safety, there is a large staff of men employed to look after and care for the safety of those at work. For instance, there are the manager, overman, fire-man, shot-examiners and many other persons having authority, all of whom are constantly on the move throughout the mine, not being long in one place unless their presence may be required. Fire-men and shot-examiners always have safety lamps with them, so that they may be always on hand and prepared to examine all places where gas might suddenly appear, or where there is any likelihood of this, the most dreaded of all dangers in connection with coal mining existence. All of the old workings that can be got at are frequently examined, the more especially when the men are engaged in taking out pillars (coal). In these cases, examination of the back part is impossible, as everything in the rear has mostly fallen in, and the examination is therefore confined perforce to what is termed as the "gob" or the place in which the refuse is thrown.

I have once more to record that the miners of the Nanaimo Colliery, are as yet, the only workmen that have availed themselves of the privilege allowed them under General Rule 31, "Coal Mine Regulation Act." This privilege is the examination, by a committee of them-

selves, of the mine and its condition as to safety. The results of these examinations are posted up in a conspicuous place for the information of the men, and also entered in a book kept for the purpose. The workmen have, therefore, the benefit of the results of their own as well as the examination made by the management.

This system is not followed in either the Wellington or Union Collieries by the employees, and I think that it is a great oversight on their part. I have reason to believe that the managers of both of the collieries just named would be pleased if their workmen would take advantage of the privilege referred to, and examine into the condition of the mine at least once a month. It would give the workmen a better idea of the condition of their working places by personal observation, and thereby do away with much friction which should not exist. The manager and the men would better understand each other, and I am also convinced that the manager would give them every assistance in making these monthly examinations.

Although there has been quite a decrease of casualties and fatal accidents in the mines during the past year, there is yet room for improvement that way, as many of the accidents recorded could have been prevented had greater precautions been used; but we will yet hope that our mines may yet be worked so that casualties will be a thing of the past, as they should be if all the means at our disposal were properly used; indeed, if they were now, good results would be sure to follow.

I append hereto the Annual Colliery Returns for 1896.

I have the honour to be,
Sir,
Your obedient servant,
ARCHIBALD DICK,
Government Inspector of Mines.

COLLIERY RETURNS.

WEST WELLINGTON COLLIERY RETURNS FOR 1896.

Output of coal from September to December, 1896.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1896.		No. of tons unsold, including coal in stock, Jan. 1st, 1896.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
800	—	About 800	—	—	—	—	—	—	—

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
12	.....	.....	1	$2.50	.....	.....	$1.25

Total hands employed, about 15

Miners' earnings, per day $2.50

Name of Seams or Pits—West Wellington.
Value of Plant—About $2,000.
Description of seams, tunnels, levels, shafts, etc., and number of same—One slope; seam, 5 to 6 feet thick; 2 levels; no shaft.
Description and length of tramway, plant, etc.—Wooden tramway, about 6½ miles, to Nanoose Bay; 1 steam pump and hoist,

WEST WELLINGTON COAL CO., LTD. LY.,
E. H. HEAPS,
Managing Director.

NANAIMO COLLIERY RETURNS FOR 1896.

Output of coal for 12 months ending December 31st, 1896.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1896.		No. of tons unsold, including coal in stock, Jan. 1st, 1897.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
320,575	13	91,406	8	232,436	11	6,334	10	3,067	4

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
803	53	.....	125	$2.37 to $3.50	$1 to $2	.....	$1 to $1.25
Total hands employed 981				Miners' earnings, per day ..... $3 to $5.			

Name of Seams or Pits—Southfield No. 2, Southfield No. 5, No. 1 Esplanade Shaft, No. 1 Northfield Shaft, Protection Island Shaft.

Value of Plant—$350,000.

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; 8 hauling and pumping engines, 15 steam pumps, 5 locomotives, 238 coal cars (6 tons), besides lumber and ballast cars; bunkers with a capacity of 3,700 tons; fitting shops for machinery repairs, with turning lathes, boring, drilling, planing, 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, dynamo; 4 30 horse-power 8-ton locomotives, and 1 15 horse-power locomotive; hauling and lighting equipment; wharves, 2,000 feet frontage, at which ships of the largest tonnage can load at all stages of the tide.

SAMUEL M. ROBINS,
Superintendent.

WELLINGTON COLLIERY RETURNS FOR 1896.

Output of coal for 12 months ending December 31st, 1896.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1896.		No. of tons unsold, including coal in stock, Jan. 1st, 1897.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
339,896	15	103,129	4	235,916	5	13,783	3	14,634	9

Number of hands employed.				Wages per day.			
Whites.	Boys.	Indians.	Chinese.	Whites.	Boys.	Indians.	Chinese.
796	72	.....	91	$2.25 to $3.50	$1 to $2	.....	$1 to $1.50
Total hands employed 959				Miners' earnings, per day ..... $2.50 to $3.50.			

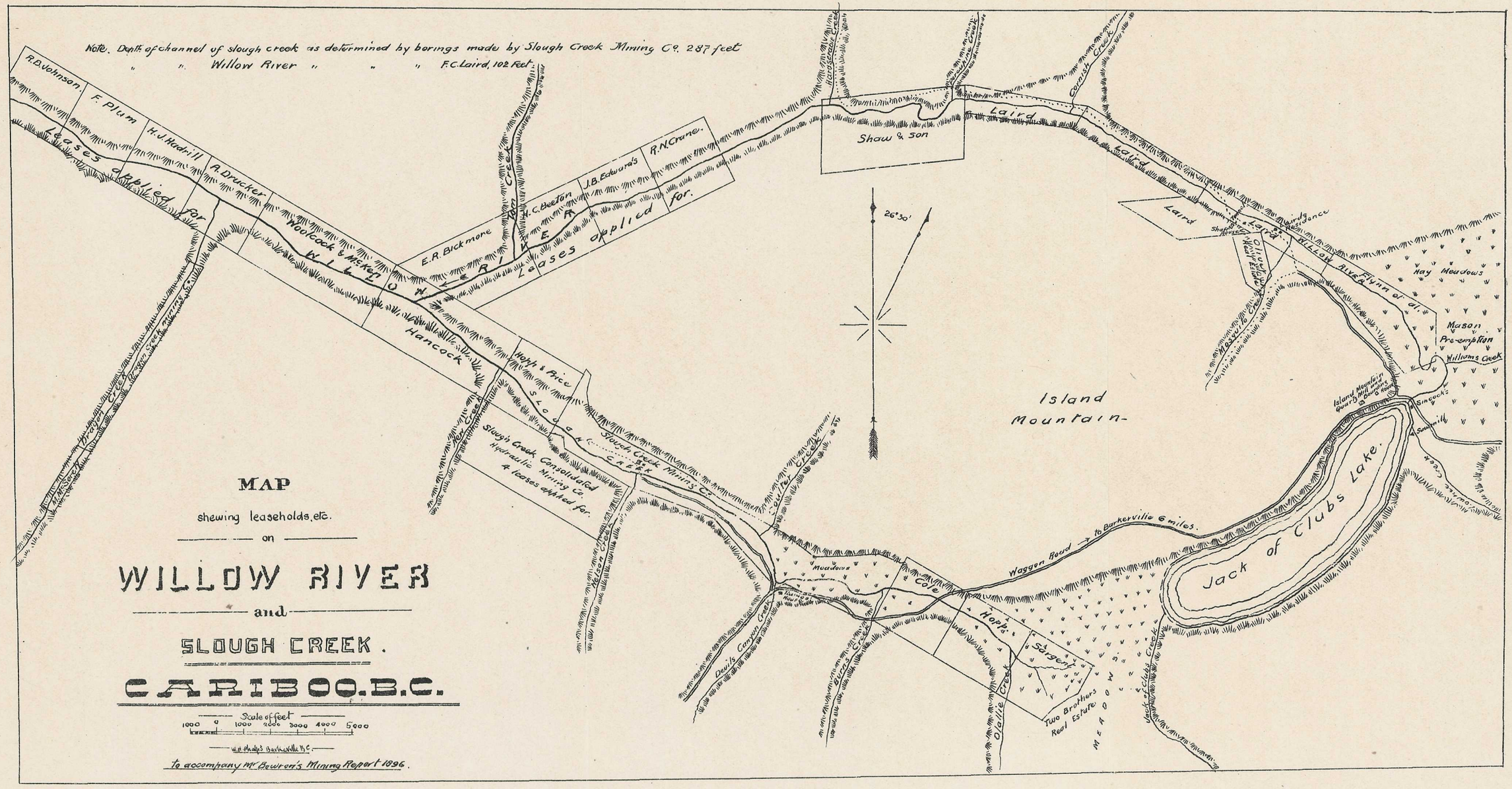
Name of Seams or Pits—1, 3, 4, 5, and 6 Wellington, and 1 and 2 East Wellington.
Value of Plant—$150,000.
Description of seams, tunnels, levels, shafts, &c., and number of same—7 shafts, with slopes, airways, and levels; 3 air shafts.
Description and length of tramway, plant, &c—5 miles of railway, with sidings and branches; 6 locomotives; 250 coal cars; 13 stationary engines; 9 steam pumps; 4 wharves for loading vessels, and bunkers.
Output of fire-clay—286 tons; sold, 286 tons. R. DUNSMUIR & SONS.

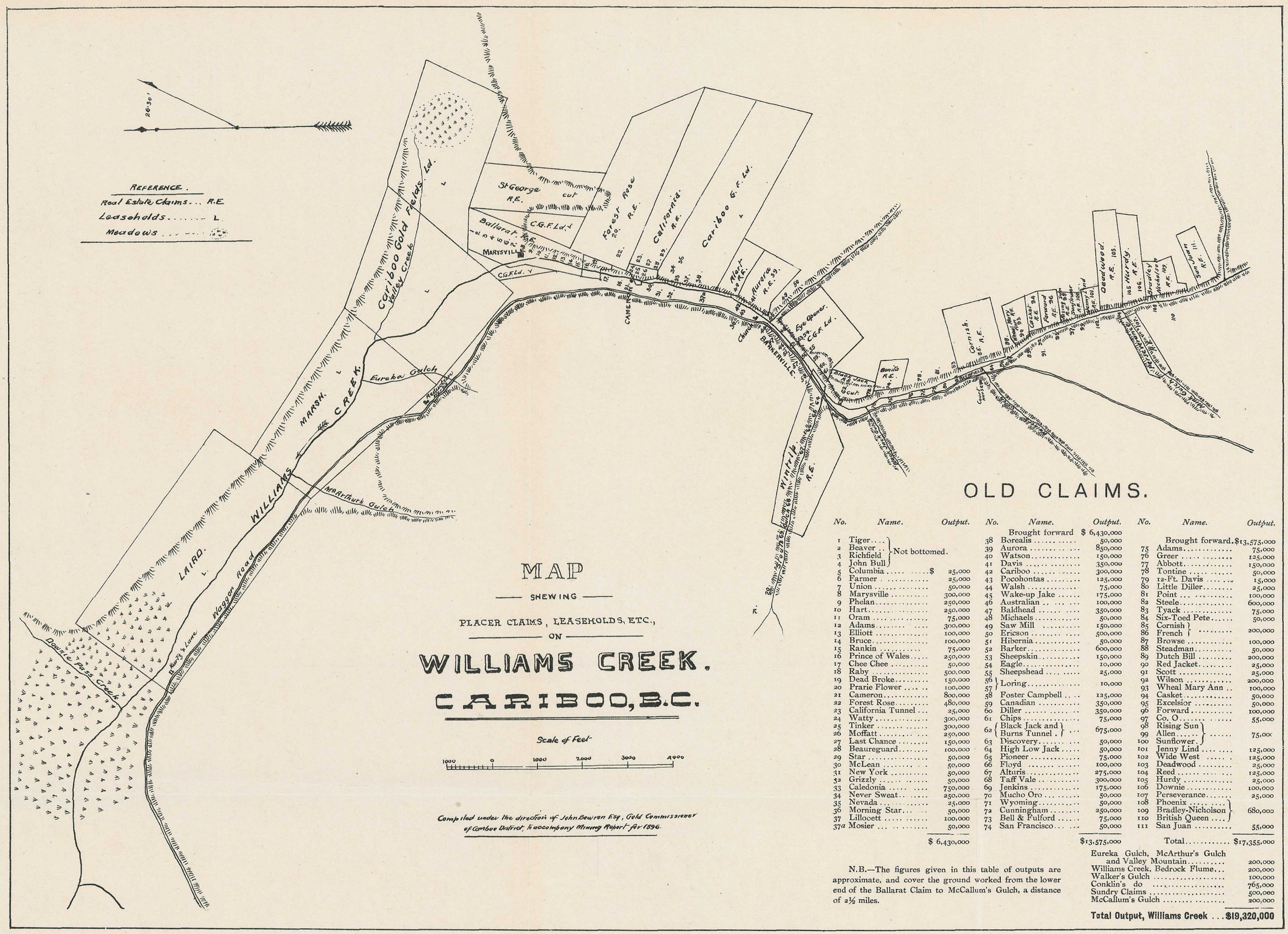
UNION COLLIERY RETURNS FOR 1896.

Output of coal for 12 months ending December 31st, 1896.		No. of tons sold for home consumption.		No. of tons sold for exportation.		No. of tons on hand 1st January, 1896.		No. of tons unsold, including coal in stock, Jan. 1st, 1897.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
233,610	—	66,648	—	165,885	—	13,333	—	14,410	—

Number of hands employed.				Wages per day.			
Whites.	Boys.	Japanese.	Chinese.	Whites.	Boys.	Japanese.	Chinese.
365	18	132	283	$2.25 to $3.50	$1 to $2	$1 to $1.25	$1 to $1.35
Total hands employed 798				Miners' earnings, per day.....$2.50 to $4.50.			

Name of Seam or Pits—Comox. Value of Plant—$125,000.
Description of seams, tunnels, levels, shafts, &c., and number of same—No. 2 Slope; No. 4 Slope, with airway and levels; No. 5 Shaft, with airway and levels.
Description and length of tramway, plant, &c.—12 miles railway, 4 feet $8\frac{1}{2}$ inches gauge; 4 locomotives; 150 coal cars (25 tons each); 1 second-class passenger car; 1 combination passenger car; 1 diamond drill; 4 stationary engines; 5 steam pumps; 5 electric pumps; 1 dynamo; 1 steam saw-mill; 1 Luhrig coal washer; 100 coke ovens (Beehive pattern); 2 wharves; 1 pile-driver.
No. of tons of coke sold—$416\frac{12}{20}$ tons. Coke on hand—642 tons.
" " fire-clay sold—126. JAMES DUNSMUIR, *President.*


Note. Depth of channel of slough creek as determined by borings made by Slough Creek Mining Co. 287 feet
" " Willow River " " " F.C. Laird, 102 feet.
MAP
shewing leaseholds, etc.
on
WILLOW RIVER
and
SLOUGH CREEK.
CARIBOO.B.C.
Scale of feet
1000 0 1000 2000 3000 4000 5000
Wm. Phillips Barkerville B.C.
to accompany Mr. Bewick's Mining Report 1896.
R.D. Johnson
F. Plum
H.J. Hadrill
A. Drucker
Leases applied for
Hoolcock & McKay
Willow River
Hancock
E.R. Blickmore
H.C. Beeton
J.B. Edward's
R.N. Crane
Leases applied for.
Horsefoot Creek
Hopp & Price
Slough Creek Mining Co.
Slough Creek Hydraulic Mining Co.
4 leases applied for.
Slough Creek
Cutler Creek
Shaw & Son
Laird
Cornish Creek
Laird
Laird
Laird
Willow River
Flynn et al.
Hay Meadows
Mason Pre-emption
Williams Creek
Island Mountain
Jack of Clubs Lake
Waggon Road → to Barkerville 6 miles.
Meadows
Cole
Hopp
Sargent
Olivie Creek
Devil's Canyon Creek
Two Brothers Real Estate
MEADOWS
Jack of Clubs Creek
26°30'



MAP

SHEWING

PLACER CLAIMS, LEASEHOLDS, ETC.,

ON

WILLIAMS CREEK.

CARIBOO, B.C.

Scale of Feet

1000 0 1000 2000 3000 4000

Compiled under the direction of John Bowron Esq., Gold Commissioner of Cariboo District, to accompany Mining Report for 1896.

OLD CLAIMS.

No.	Name.	Output.
1	Tiger....	Not bottomed.
2	Beaver..	
3	Richfield	
4	John Bull	
5	Columbia.....	$ 25,000
6	Farmer.....	25,000
7	Union.....	50,000
8	Marysville.....	300,000
9	Phelan.....	250,000
10	Hart.....	250,000
11	Oram.....	75,000
12	Adams.....	300,000
13	Elliott.....	100,000
14	Bruce.....	100,000
15	Rankin.....	75,000
16	Prince of Wales.....	250,000
17	Chee Chee.....	50,000
18	Raby.....	500,000
19	Dead Broke.....	150,000
20	Prarie Flower.....	100,000
21	Cameron.....	800,000
22	Forest Rose.....	480,000
23	California Tunnel...	25,000
24	Watty.....	300,000
25	Tinker.....	300,000
26	Moffatt.....	250,000
27	Last Chance.....	150,000
28	Beaureguard.....	100,000
29	Star.....	50,000
30	McLean.....	50,000
31	New York.....	50,000
32	Grizzly.....	50,000
33	Caledonia.....	750,000
34	Never Sweat.....	250,000
35	Nevada.....	25,000
36	Morning Star.....	50,000
37	Lillooett.....	100,000
37a	Mosier.....	50,000
		$ 6,430,000

No.	Name.	Output.
	Brought forward	$ 6,430,000
38	Borealis.....	50,000
39	Aurora.....	850,000
40	Watson.....	150,000
41	Davis.....	350,000
42	Cariboo.....	300,000
43	Pocohontas.....	125,000
44	Walsh.....	75,000
45	Wake-up Jake.....	175,000
46	Australian.....	100,000
47	Baldhead.....	350,000
48	Michaels.....	50,000
49	Saw Mill.....	150,000
50	Ericson.....	500,000
51	Hibernia.....	50,000
52	Barker.....	600,000
53	Sheepskin.....	150,000
54	Eagle.....	10,000
55	Sheepshead.....	25,000
56	Loring.....	10,000
57		
58	Foster Campbell...	125,000
59	Canadian.....	350,000
60	Diller.....	350,000
61	Chips.....	75,000
62	Black Jack and Burns Tunnel.	675,000
63	Discovery.....	50,000
64	High Low Jack.....	50,000
65	Pioneer.....	75,000
66	Floyd.....	100,000
67	Alturis.....	275,000
68	Taff Vale.....	300,000
69	Jenkins.....	175,000
70	Mucho Oro.....	50,000
71	Wyoming.....	50,000
72	Cunningham.....	250,000
73	Bell & Fulford.....	75,000
74	San Francisco.....	50,000
		$13,575,000

No.	Name.	Output.
	Brought forward.	$13,575,000
75	Adams.....	75,000
76	Greer.....	125,000
77	Abbott.....	150,000
78	Tontine.....	50,000
79	12-Ft. Davis.....	15,000
80	Little Diller.....	25,000
81	Point.....	100,000
82	Steele.....	600,000
83	Tyack.....	75,000
84	Six-Toed Pete.....	50,000
85	Cornish	200,000
86	French	
87	Browse.....	100,000
88	Steadman.....	50,000
89	Dutch Bill.....	200,000
90	Red Jacket.....	25,000
91	Scott.....	25,000
92	Wilson.....	200,000
93	Wheal Mary Ann..	100,000
94	Casket.....	50,000
95	Excelsior.....	50,000
96	Forward.....	100,000
97	Co. O.....	55,000
98	Rising Sun	75,000
99	Allen.....	
100	Sunflower.	
101	Jenny Lind.....	125,000
102	Wide West.....	125,000
103	Deadwood.....	25,000
104	Reed.....	125,000
105	Hurdy.....	25,000
106	Downie.....	100,000
107	Perseverance.....	25,000
108	Phoenix.....	680,000
109	Bradley-Nicholson	
110	British Queen....	
111	San Juan.....	55,000
	Total.....	$17,355,000

Eureka Gulch, McArthur's Gulch and Valley Mountain.....	200,000
Williams Creek, Bedrock Flume...	200,000
Walker's Gulch.....	100,000
Conklin's do	765,000
Sundry Claims.....	500,000
McCallum's Gulch.....	200,000
Total Output, Williams Creek ...	**$19,320,000**

N.B.—The figures given in this table of outputs are approximate, and cover the ground worked from the lower end of the Ballarat Claim to McCallum's Gulch, a distance of 2½ miles.