

ANNUAL REPORT
OF THE
MINISTER OF MINES

FOR THE
YEAR ENDING 31st DECEMBER,
1911,

BEING AN ACCOUNT OF
MINING OPERATIONS FOR GOLD, COAL, ETC.,
IN THE
PROVINCE OF BRITISH COLUMBIA.



PRINTED BY AUTHORITY OF
THE LEGISLATIVE ASSEMBLY OF BRITISH COLUMBIA. .

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1912.

ANNUAL REPORT

OF THE

MINISTER OF MINES,

1911.

To His Honour THOMAS W. PATERSON,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Provincial Mineralogist upon the Mining Industry of the Province for the year 1911 is herewith respectfully submitted.

RICHARD McBRIDE,

Minister of Mines.

Minister of Mines' Office,

March, 1912.



New Denver, Slocan Lake, B.C.

REPORT OF THE BUREAU OF MINES

—BY—

WILLIAM FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

—:O:—

*To the Honourable Richard McBride,
Minister of Mines.*

SIR,—I have the honour to submit herewith my Annual Report on the Mining Industry of the Province for the year ending December 31st, 1911.

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

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

I have the honour to be,

Sir,

Your obedient servant,

WILLIAM FLEET ROBERTSON,
Provincial Mineralogist.

*Bureau of Mines, Victoria, B.C.,
March, 1912.*

MINERAL PRODUCTION OF BRITISH COLUMBIA.

METHOD OF COMPUTING PRODUCTION.

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

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

In the lode mines tables, the amount of the shipments has been obtained from certified returns received from the various mines, as provided for in the "Inspection of Metalliferous Mines Act, 1897." In calculating the value of the products, the average prices for the year in the New York Metal Market have been used as a basis. For silver 95 per cent., for lead 90 per cent., and for zinc 85 per cent. of such market prices have been taken. Treatment and other charges have not been deducted, except an allowance of 5 lb. of copper to the ton of ore for loss in slags.

TABLE I.—TOTAL PRODUCTION FOR ALL YEARS UP TO AND INCLUDING 1911.

| | |
|-----------------------------------|---------------|
| Gold, placer | \$ 71,639,103 |
| Gold, lode | 65,536,580 |
| Silver | 32,063,895 |
| Lead | 25,715,126 |
| Copper | 65,315,049 |
| Coal and coke | 122,084,343 |
| Building-stone, bricks, etc. | 14,140,362 |
| Other metals, zinc, etc. | 1,212,264 |
| Total | \$397,696,722 |

TABLE II.—PRODUCTION FOR EACH YEAR FROM 1890 TO 1911 (INCLUSIVE).

| | |
|--------------------------------|---------------|
| 1852 to 1891 (inclusive) | \$ 78,111,539 |
| 1892 | 2,978,530 |
| 1893 | 3,588,413 |
| 1894 | 4,225,717 |
| 1895 | 5,643,042 |
| 1896 | 7,507,956 |
| 1897 | 10,455,268 |
| 1898 | 10,906,861 |
| 1899 | 12,393,131 |
| 1900 | 16,344,751 |
| 1901 | 20,086,780 |
| 1902 | 17,486,550 |
| 1903 | 17,495,954 |
| 1904 | 18,977,359 |
| 1905 | 22,461,325 |
| 1906 | 24,980,546 |
| 1907 | 25,882,560 |
| 1908 | 23,851,277 |
| 1909 | 24,443,025 |
| 1910 | 26,377,066 |
| 1911 | 23,499,072 |
| Total | \$397,696,722 |

Table III. gives a statement in detail of the quantities and value of the different mineral products for the years 1909, 1910, and 1911. It has been impossible as yet to collect complete statistics regarding building-stone, lime, bricks, tiles, and other miscellaneous products, but such figures as it has been possible to secure are given in some detail in Table V.

TABLE III.

QUANTITIES AND VALUE OF MINERAL PRODUCTS FOR 1909, 1910, AND 1911.

| | Customary Measure. | 1909. | | 1910. | | 1911. | |
|-----------------------------|--------------------|------------|--------------|------------|--------------|------------|--------------|
| | | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. |
| Gold, placer..... | Ounces..... | | \$ 477,000 | | \$ 540,000 | | \$ 426,000 |
| " lode..... | " | 238,224 | 4,924,090 | 267,701 | 5,533,380 | 228,617 | 4,725,513 |
| Silver..... | " | 2,532,742 | 1,239,270 | 2,450,241 | 1,245,016 | 1,892,364 | 958,293 |
| Lead..... | Pounds..... | 44,396,346 | 1,709,259 | 34,658,746 | 1,386,350 | 26,872,397 | 1,069,521 |
| Copper..... | " | 45,597,245 | 5,918,522 | 38,243,934 | 4,871,512 | 36,927,656 | 4,571,644 |
| Zinc..... | " | | 400,000 | 4,184,192 | 192,473 | 2,634,544 | 129,092 |
| Coal..... | Tons, 2,240 lb. | 2,006,476 | 7,022,666 | 2,800,046 | 9,800,161 | 2,193,062 | 7,675,717 |
| Coke..... | " | 258,703 | 1,552,218 | 218,029 | 1,308,174 | 66,005 | 396,030 |
| Miscellaneous products..... | | | 1,200,000 | | 1,500,000 | | 3,547,262 |
| | | | \$24,443,025 | | \$26,377,066 | | \$23,499,072 |

TABLE IV.

OUTPUT OF MINERAL PRODUCTS BY DISTRICTS AND DIVISIONS.

| . NAMES. | DIVISIONS. | | | DISTRICTS. | | |
|---|------------|------------|------------|--------------|--------------|--------------|
| | 1909. | 1910. | 1911. | 1909. | 1910. | 1911. |
| CARIBOO DISTRICT..... | | | | \$ 247,000 | \$ 239,000 | \$ 180,000 |
| Cariboo Mining Division..... | \$ 220,000 | \$ 218,000 | \$ 136,000 | | | |
| Quesnel " | 12,000 | 6,000 | 34,000 | | | |
| Omineca " | 15,000 | 15,000 | 10,000 | | | |
| CASSIAR DISTRICT..... | | | | 234,498 | 283,807 | 293,442 |
| EAST KOOTENAY DISTRICT..... | | | | 4,766,215 | 6,121,832 | 2,475,056 |
| WEST KOOTENAY DISTRICT..... | | | | 5,169,749 | 5,088,186 | 4,343,912 |
| Ainsworth Division..... | 867,340 | 318,058 | 75,768 | | | |
| Slocan and Slocan City " | 704,737 | 845,106 | 798,989 | | | |
| Nelson " | 584,955 | 876,002 | 509,265 | | | |
| Trail Creek " | 2,875,084 | 2,966,096 | 2,891,866 | | | |
| Other parts..... | 137,633 | 82,924 | 68,024 | | | |
| BOUNDARY DISTRICT..... | | | | 7,728,256 | 6,998,519 | 5,621,109 |
| Osoyoos, Grand Forks & Greenwood Divisions..... | 7,501,046 | 6,442,063 | 4,763,817 | | | |
| Similkameen, Nicola, Vernon.. | 225,210 | 556,456 | 814,386 | | | |
| Yale, Ashcroft, Kamloops..... | 2,000 | | 42,906 | | | |
| LILLOOET DISTRICT..... | | | | 16,676 | 9,832 | 6,467 |
| COAST DISTRICTS (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria) | | | | 6,280,631 | 7,635,890 | 10,579,086 |
| | | | | \$24,443,025 | \$26,377,066 | \$23,499,072 |

TABLE V.
MISCELLANEOUS PRODUCTS AND TOTALS OF PRODUCTION, 1911.

| DISTRICT AND DIVISION. | DETAILS OF MISCELLANEOUS PRODUCTS. | | | | | | | | | | SUMMARY OF TOTALS OF PRODUCTION. | | | | |
|------------------------------|------------------------------------|---------|-----------------|----------|---------------|------------------|-------------------|------------|---------------------------|--------------------|----------------------------------|-----------------------------|-------------------------------|-----------------------|-----------------------|
| | Cement. | Lime. | Building-stone. | Rip-rap. | Crushed Rock. | Sand and Gravel. | Pottery and Tile. | Red Brick. | Fire, Face, Silica Brick. | Clay, Gypsum, etc. | Total Miscellaneous Products. | Total Output of Collieries. | Total of Metalliferous Mines. | Totals for Divisions. | Totals for Districts. |
| CARIBOO | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Cariboo | | | | | | | | | | | | | 136,000 | 136,000 | 180,000 |
| Quesnel | | | | | | | | | | | | | 34,000 | 34,000 | |
| Omineca | | | | | | | | | | | | | 10,000 | 10,000 | |
| CASSIAR | | | | | | | | | | | | | | | 293,442 |
| Atlin | | | | | | | | | | | | | 228,776 | 228,776 | |
| Liard-Stikine | | | | | | | | | | | | | | | |
| Skeena, Portland Canal | | | 25,000 | | | | | | | | 25,000 | | 39,666 | 64,666 | |
| Queen Charlotte | | | | | | | | | | | | | | | |
| EAST KOOTENAY | | | | | | | | | | | | | | | 2,475,056 |
| Fort Steele | | | 40,000 | | | | | 5,000 | | | 45,000 | 1,576,934 | 853,122 | 2,475,056 | |
| Windermere-Golden | | | | | | | | | | | | | | | |
| WEST KOOTENAY | | | | | | | | | | | | | | | 4,343,912 |
| Ainsworth | | | 25,000 | | | | | | | | 25,000 | | 50,768 | 75,768 | |
| Slocan and Slocan City | | | | | | | | | | | | | 798,989 | 798,989 | |
| Nelson | | 5,000 | 14,000 | 1,200 | | | | 6,300 | 1,500 | | 28,000 | | 481,265 | 509,265 | |
| Trail Creek | | | | | | | | 10,000 | | | 10,500 | | 2,881,366 | 2,891,866 | |
| Other Divisions | | | 10,000 | | | | | | | | 10,000 | | 58,024 | 68,024 | |
| YALE | | | | | | | | | | | | | | | 5,621,109 |
| Grand Forks | | | | | | | | | | | | | | | |
| Greenwood | | 5,000 | 2,000 | | | | | 10,000 | | 1,300 | 18,300 | | 4,745,517 | 4,763,817 | |
| Osoyoos | | | | | | | | | | | | | | | |
| Similkameen | | | | | | | | | | | | | | | |
| Nicola | | | | | | | | 6,500 | | | 6,500 | 806,886 | 1,000 | 814,386 | |
| Vernon | | | | | | | | | | | | | | | |
| Yale | | | | | | | | | | | | | | | |
| Ashcroft | | | 3,000 | | | | | 18,750 | | | 21,750 | | 21,156 | 42,906 | |
| Kamloops | | | | | | | | | | | | | | | |
| LILLOOET | | | | | | | | | | | | | 6,467 | | 6,467 |
| COAST DISTRICT | 650,000 | 118,556 | 1,300,000 | 17,800 | 235,214 | 359,156 | 162,256 | 348,550 | 146,480 | 19,200 | 3,357,212 | 5,687,927 | 1,533,947 | | 10,579,086 |
| | 650,000 | 128,556 | 1,419,000 | 19,000 | 235,214 | 359,156 | 162,256 | 405,100 | 147,980 | 21,000 | 3,547,262 | 8,071,747 | 11,880,063 | | 23,499,072 |

TABLE VI.—PLACER GOLD.

Table VI. contains the yearly production of placer gold to date, as determined by the returns, sent in by the banks and express companies, of gold transmitted by them to the mints, and from returns sent in by the Gold Commissioners and Mining Recorders. To these yearly amounts one-third was added up to the year 1878; from then to 1895 and from 1898 to 1909, one-fifth; and since then one-tenth, which proportions are considered to represent, approximately, the amount of gold sold of which there is no record. This placer gold contains from 10 to 25 per cent. silver, but the silver value has not been separated from the totals, as it would be insignificant.

YIELD OF PLACER GOLD PER YEAR TO DATE.

| | | | | | |
|-----------|------------|-----------|-------------|-----------|------------|
| 1858..... | \$ 705,000 | 1876..... | \$1,786,648 | 1894..... | \$ 405,516 |
| 1859..... | 1,615,070 | 1877..... | 1,608,182 | 1895..... | 481,683 |
| 1860..... | 2,228,543 | 1878..... | 1,275,204 | 1896..... | 544,026 |
| 1861..... | 2,666,118 | 1879..... | 1,290,058 | 1897..... | 513,520 |
| 1862..... | 2,656,903 | 1880..... | 1,013,827 | 1898..... | 643,346 |
| 1863..... | 3,913,563 | 1881..... | 1,046,737 | 1899..... | 1,344,900 |
| 1864..... | 3,735,850 | 1882..... | 954,085 | 1900..... | 1,278,724 |
| 1865..... | 3,491,205 | 1883..... | 794,252 | 1901..... | 970,100 |
| 1866..... | 2,662,106 | 1884..... | 736,165 | 1902..... | 1,073,140 |
| 1867..... | 2,480,868 | 1885..... | 713,738 | 1903..... | 1,060,420 |
| 1868..... | 3,372,972 | 1886..... | 903,651 | 1904..... | 1,115,300 |
| 1869..... | 1,774,978 | 1887..... | 693,709 | 1905..... | 969,300 |
| 1870..... | 1,336,956 | 1888..... | 616,731 | 1906..... | 948,400 |
| 1871..... | 1,799,440 | 1889..... | 588,923 | 1907..... | 828,000 |
| 1872..... | 1,610,972 | 1890..... | 490,435 | 1908..... | 647,000 |
| 1873..... | 1,305,749 | 1891..... | 429,811 | 1909..... | 477,000 |
| 1874..... | 1,844,618 | 1892..... | 399,526 | 1910..... | 540,000 |
| 1875..... | 2,474,004 | 1893..... | 356,131 | 1911..... | 426,000 |

Total.....\$71,639,103

TABLE VII.—PRODUCTION OF LODE MINES.*

| YEAR. | GOLD. | | SILVER. | | LEAD. | | COPPER. | | TOTAL VALUE |
|-----------|-----------|------------|------------|------------|-------------|------------|-------------|------------|-------------|
| | Oz. | Value. | Oz. | Value. | Pounds. | Value. | Pounds. | Value. | |
| 1887..... | | | 17,690 | \$ 17,331 | 204,800 | \$ 9,216 | | | \$ 26,547 |
| 1888..... | | | 79,780 | 75,000 | 674,500 | 29,813 | | | 104,813 |
| 1889..... | | | 53,192 | 47,873 | 165,100 | 6,498 | | | 54,371 |
| 1890..... | | | 70,427 | 73,948 | Nil. | Nil. | | | 73,948 |
| 1891..... | | | 4,500 | 4,000 | Nil. | Nil. | | | 4,000 |
| 1892..... | | | 77,160 | 66,935 | 808,420 | 33,064 | | | 99,999 |
| 1893..... | 1,170 | \$ 23,404 | 227,000 | 195,000 | 2,135,023 | 78,996 | | | 297,400 |
| 1894..... | 6,252 | 125,014 | 746,379 | 470,219 | 5,662,523 | 169,875 | 324,680 | \$ 16,234 | 781,342 |
| 1895..... | 39,264 | 785,271 | 1,496,522 | 977,229 | 16,475,464 | 532,255 | 952,840 | 47,642 | 2,342,397 |
| 1896..... | 62,259 | 1,244,180 | 3,135,343 | 2,100,689 | 24,199,977 | 721,384 | 3,818,556 | 190,926 | 4,257,179 |
| 1897..... | 106,141 | 2,122,820 | 5,472,971 | 3,272,836 | 38,841,135 | 1,390,517 | 5,325,180 | 266,258 | 7,052,431 |
| 1898..... | 110,061 | 2,201,217 | 4,292,401 | 2,375,841 | 31,693,559 | 1,077,581 | 7,271,678 | 874,781 | 6,529,420 |
| 1899..... | 138,315 | 2,857,573 | 2,939,413 | 1,663,708 | 21,862,436 | 878,870 | 7,722,591 | 1,351,453 | 6,751,604 |
| 1900..... | 167,153 | 3,453,381 | 3,958,175 | 2,309,200 | 63,358,621 | 2,691,887 | 9,997,080 | 1,615,289 | 10,069,757 |
| 1901..... | 210,384 | 4,348,603 | 5,151,333 | 2,884,745 | 51,582,906 | 2,002,733 | 27,603,746 | 4,446,963 | 13,683,044 |
| 1902..... | 236,491 | 4,888,269 | 3,917,917 | 1,941,328 | 22,536,381 | 824,832 | 29,636,057 | 3,446,673 | 11,101,102 |
| 1903..... | 232,831 | 4,812,616 | 2,996,204 | 1,521,472 | 18,089,283 | 689,744 | 34,359,921 | 4,547,535 | 11,571,367 |
| 1904..... | 222,042 | 4,589,608 | 3,222,481 | 1,719,516 | 36,646,244 | 1,421,874 | 35,710,128 | 4,578,037 | 12,309,035 |
| 1905..... | 238,660 | 4,933,102 | 3,439,417 | 1,971,818 | 56,580,703 | 2,399,022 | 37,692,251 | 5,876,222 | 15,180,164 |
| 1906..... | 224,027 | 4,630,839 | 2,990,262 | 1,897,320 | 52,408,217 | 2,667,578 | 42,990,488 | 8,288,565 | 17,484,102 |
| 1907..... | 196,179 | 4,055,020 | 2,745,448 | 1,703,825 | 47,738,703 | 2,291,458 | 40,832,720 | 8,166,544 | 16,216,847 |
| 1908..... | 255,582 | 5,282,880 | 2,631,389 | 1,321,483 | 43,195,733 | 1,632,799 | 47,274,614 | 6,240,249 | 14,477,411 |
| 1909..... | 238,224 | 4,924,090 | 2,532,742 | 1,239,270 | 44,396,346 | 1,709,259 | 45,597,245 | 5,918,522 | 13,791,141 |
| 1910..... | 267,701 | 5,533,380 | 2,450,241 | 1,245,016 | 34,658,746 | 1,386,350 | 38,243,934 | 4,871,512 | 13,036,258 |
| 1911..... | 228,617 | 4,725,513 | 1,892,364 | 958,293 | 26,872,397 | 1,069,521 | 36,927,656 | 4,571,644 | 11,324,971 |
| Total | 3,181,353 | 65,536,580 | 56,540,751 | 32,053,895 | 640,787,217 | 25,715,126 | 452,281,365 | 65,315,049 | 188,620,650 |

* In addition to the above, there was mined in 1910 zinc-ore containing some 4,184,192 lb. of zinc, valued at \$192,473—which makes the total production of lode mines for 1910 \$13,228,731. In 1911 there was mined zinc-ore containing 2,634,544 lb. of zinc, valued at \$129,092—making the total production of lode mines for 1911 \$11,464,063, and the total to date \$188,942,215.

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

| YEAR. | COAL. | |
|---------------|-------------------|--------------|
| | TONS (2,240 lb.). | VALUE. |
| 1836-75 | 672,564 | \$ 2,399,216 |
| 1876 | 139,192 | 417,576 |
| 1877 | 154,052 | 462,156 |
| 1878 | 170,846 | 512,538 |
| 1879 | 241,301 | 723,903 |
| 1880 | 267,595 | 802,785 |
| 1881 | 228,357 | 685,071 |
| 1882 | 282,139 | 846,417 |
| 1883 | 213,299 | 639,897 |
| 1884 | 394,070 | 1,182,210 |
| 1885 | 265,596 | 796,788 |
| 1886 | 326,636 | 979,908 |
| 1887 | 413,360 | 1,240,080 |
| 1888 | 489,301 | 1,467,903 |
| 1889 | 579,830 | 1,739,490 |
| 1890 | 678,140 | 2,034,420 |
| 1891 | 1,029,097 | 3,087,291 |
| 1892 | 826,335 | 2,479,005 |
| 1893 | 978,294 | 2,934,882 |
| 1894 | 1,012,953 | 3,038,859 |
| 1895 | 939,654 | 2,818,962 |
| 1896 | 896,222 | 2,688,666 |
| 1897 | 882,854 | 2,648,562 |
| 1898 | 1,135,865 | 3,407,595 |
| 1899 | 1,306,324 | 3,918,972 |
| 1900 | 1,439,595 | 4,318,785 |
| 1901 | 1,460,331 | 4,380,993 |
| 1902 | 1,397,394 | 4,192,182 |
| 1903 | 1,168,194 | 3,504,582 |
| 1904 | 1,253,628 | 3,760,884 |
| 1905 | 1,384,312 | 4,152,936 |
| 1906 | 1,517,303 | 4,551,909 |
| 1907 | 1,800,067 | 6,300,235 |
| 1908 | 1,677,849 | 5,872,472 |
| 1909 | 2,006,476 | 7,022,666 |
| 1910 | 2,800,046 | 9,800,161 |
| 1911 | 2,193,062 | 7,675,717 |

Total 34,622,133 tons. \$109,486,674

| COKE. | | |
|------------------------|---------------|-----------|
| 1895-97 | 19,396 | \$ 96,980 |
| 1898 (estimated) | 35,000 | 175,000 |
| 1899 | 34,251 | 171,255 |
| 1900 | 85,149 | 425,745 |
| 1901 | 127,081 | 635,405 |
| 1902 | 128,015 | 640,075 |
| 1903 | 165,543 | 827,715 |
| 1904 | 238,428 | 1,192,140 |
| 1905 | 271,785 | 1,358,925 |
| 1906 | 199,227 | 996,135 |
| 1907 | 222,913 | 1,337,478 |
| 1908 | 247,399 | 1,484,394 |
| 1909 | 258,703 | 1,552,218 |
| 1910 | 218,029 | 1,308,174 |
| 1911 | 66,005 | 396,030 |

Total 2,316,914 tons. \$12,597,669

TABLE IX.—PRODUCTION IN DETAIL OF THE

| DISTRICT. | YEAR | TONS. | GOLD—PLACER. | | GOLD—LODE. | | SILVER. | |
|--|------|-----------|--------------|---------|------------|-----------|-----------|-----------|
| | | | Ounces | Value. | Ounces | Value. | Ounces | Value. |
| | | | | \$ | | \$ | | \$ |
| Cariboo | 1908 | | 17,750 | 355,000 | | | | |
| Cariboo Division | 1909 | | 11,000 | 220,000 | | | | |
| | 1910 | | 10,900 | 218,000 | | | | |
| | 1911 | | 6,800 | 136,000 | | | | |
| Queensland " | 1908 | | 1,500 | 30,000 | | | | |
| | 1909 | | 600 | 12,000 | | | | |
| | 1910 | | 300 | 6,000 | | | | |
| | 1911 | | 1,700 | 34,000 | | | | |
| Omineca " | 1908 | | 1,000 | 20,000 | | | | |
| | 1909 | | 750 | 15,000 | | | | |
| | 1910 | | 750 | 15,000 | | | | |
| | 1911 | | 500 | 10,000 | | | | |
| Cassiar | 1908 | 2 | 10,150 | 203,000 | | | 90 | 45 |
| Atlin Division | 1909 | 9 | 10,000 | 200,000 | | | 353 | 178 |
| | 1910 | | 13,750 | 275,000 | | | | |
| | 1911 | 38 | 11,250 | 225,000 | 3 | 62 | 2,653 | 1,343 |
| Liard, Stikine, Skeena, Queen Charlotte, Portland Canal Divisions. | 1908 | 6,928 | 450 | 9,000 | 683 | 14,324 | 14,079 | 7,070 |
| | 1909 | 4,260 | 450 | 9,000 | 261 | 5,395 | 4,216 | 2,063 |
| | 1910 | 4 | 400 | 8,000 | | | 1,454 | 739 |
| | 1911 | 7,061 | 300 | 6,000 | 500 | 10,335 | 27,323 | 13,836 |
| East Kootenay | 1908 | 165,318 | 170 | 3,400 | | | 641,855 | 822,840 |
| Fort Steele Division..... | 1909 | 149,680 | 150 | 3,000 | | | 583,240 | 288,911 |
| | 1910 | 115,762 | 150 | 3,000 | | | 501,475 | 264,809 |
| | 1911 | 30,543 | 150 | 3,000 | | | 330,235 | 167,231 |
| Windermere-Golden | 1908 | 714 | 20 | 400 | | | 3,384 | 1,699 |
| | 1909 | 20 | | | | | 825 | 404 |
| | 1910 | 53 | | | | | 243 | 124 |
| | 1911 | | | | | | | |
| West Kootenay | 1908 | 38,282 | | | 162 | 3,349 | 314,142 | 157,762 |
| Ainsworth Division..... | 1909 | 97,698 | | | 162 | 3,349 | 352,555 | 172,505 |
| | 1910 | 21,850 | | | 71 | 1,468 | 233,010 | 118,397 |
| | 1911 | 671 | | | 4 | 83 | 77,376 | 38,163 |
| Slocan & Slocan City..... | 1908 | 23,309 | | | 96 | 1,954 | 848,595 | 426,164 |
| | 1909 | 28,306 | | | 95 | 1,964 | 738,175 | 361,189 |
| | 1910 | 44,466 | | | 101 | 2,088 | 964,834 | 490,150 |
| | 1911 | 45,466 | | | 47 | 971 | 783,326 | 402,044 |
| Nelson Division..... | 1908 | 24,854 | 50 | 1,000 | 17,376 | 359,167 | 25,067 | 12,589 |
| | 1909 | 36,514 | 50 | 1,000 | 21,909 | 452,859 | 75,908 | 37,142 |
| | 1910 | 36,203 | 100 | 2,000 | 36,834 | 761,359 | 45,787 | 23,265 |
| | 1911 | 39,756 | 50 | 1,000 | 17,640 | 364,619 | 76,774 | 38,878 |
| Trail Creek Division..... | 1908 | 302,419 | | | 142,314 | 2,941,630 | 129,558 | 65,064 |
| | 1909 | 237,656 | | | 116,153 | 2,380,213 | 80,026 | 39,157 |
| | 1910 | 253,471 | | | 119,277 | 2,465,455 | 87,833 | 44,630 |
| | 1911 | 254,062 | | | 116,683 | 2,411,637 | 88,076 | 44,602 |
| Revelstoke, Trout Lake and Lardeau..... | 1908 | 2,819 | 250 | 5,000 | 870 | 17,988 | 173,675 | 87,220 |
| | 1909 | 1,750 | 100 | 2,000 | 732 | 15,130 | 169,435 | 82,904 |
| | 1910 | 971 | 50 | 1,000 | 418 | 8,640 | 107,753 | 54,752 |
| | 1911 | 746 | 100 | 2,000 | 57 | 1,178 | 67,834 | 34,376 |
| Boundary | 1908 | 1,491,063 | 100 | 2,000 | 91,551 | 1,892,359 | 451,323 | 226,654 |
| (Grand Forks, Greenwood and Osoyoos Divisions.) | 1909 | 1,461,533 | 50 | 1,000 | 93,229 | 1,927,043 | 492,383 | 240,898 |
| | 1910 | 1,701,113 | 50 | 1,000 | 105,294 | 2,176,427 | 460,945 | 234,215 |
| | 1911 | 1,244,819 | 50 | 1,000 | 87,745 | 1,813,690 | 326,849 | 165,517 |
| Similkameen, Nicola, and Vernon Divisions... | 1908 | 57 | 50 | 1,000 | | | 23 | 12 |
| | 1909 | | 50 | 1,000 | | | | |
| | 1910 | | 50 | 1,000 | | | | |
| | 1911 | | 50 | 1,000 | | | | |
| Yale, Ashcroft and Kamloops Divisions..... | 1908 | | 150 | 3,000 | | | | |
| | 1909 | | 100 | 2,000 | | | | |
| | 1910 | 12 | 100 | 2,000 | | | 3 | 1 |
| | 1911 | 4,257 | 50 | 1,000 | 52 | 1,075 | 343 | 174 |
| Lillooet | 1908 | 15 | 660 | 13,200 | 28 | 579 | | |
| Lillooet and Clinton Divisions..... | 1909 | 436 | 500 | 10,000 | 323 | 6,676 | | |
| | 1910 | 443 | 350 | 7,000 | 137 | 2,832 | | |
| | 1911 | 84 | 250 | 5,000 | 71 | 1,467 | | |
| Coast | 1908 | 27,831 | 50 | 1,000 | 2,492 | 51,510 | 29,598 | 14,894 |
| (Nanaimo, Alberni, Clayoquot, Quat- sino, New Westminster and Victoria Divisions.) | 1909 | 39,557 | 50 | 1,000 | 6,380 | 131,461 | 88,678 | 18,924 |
| | 1910 | 42,080 | 50 | 1,000 | 5,569 | 115,111 | 47,104 | 23,934 |
| | 1911 | 143,252 | 50 | 1,000 | 5,815 | 120,196 | 100,926 | 51,109 |
| TOTALS | 1908 | 2,083,806 | 32,350 | 647,000 | 255,532 | 5,282,880 | 2,631,389 | 1,321,483 |
| | 1909 | 2,067,713 | 23,850 | 477,000 | 238,224 | 4,924,090 | 2,632,742 | 1,230,270 |
| | 1910 | 2,216,428 | 27,060 | 540,000 | 267,701 | 5,533,590 | 2,451,241 | 1,245,016 |
| | 1911 | 1,770,755 | 21,300 | 429,000 | 223,617 | 4,725,513 | 1,852,374 | 956,293 |

METALLIFEROUS MINES, ETC., FOR 1908, 1909, 1910, AND 1911.

| LEAD. | | COPPER. | | ZINC. | | TOTALS FOR DIVISIONS. | | | | TOTALS FOR DISTRICTS. |
|------------|-----------|------------|-----------|-----------|-----------|-----------------------|------------|------------|------------|-----------------------|
| Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | 1908. | 1909. | 1910. | 1911. | 1911. |
| | \$ | | \$ | | \$ | \$ | \$ | \$ | \$ | \$ |
| | | | | | | 365,000 | | | | 180,000 |
| | | | | | | | 220,000 | | | |
| | | | | | | | | 218,000 | | |
| | | | | | | 30,000 | | | 135,000 | |
| | | | | | | | 12,000 | | | |
| | | | | | | | | 6,000 | | |
| | | | | | | 20,000 | | | 34,000 | |
| | | | | | | | 15,000 | | | |
| | | | | | | | | 15,000 | 10,000 | |
| | | | | | | | | | | 268,442 |
| | | 1,014 | 184 | | | 203,179 | | | | |
| | | 4,291 | 557 | | | | 200,780 | | | |
| | | | | | | | | 275,000 | | |
| | | 19,151 | 2,371 | | | | | | 228,776 | |
| | | 439,859 | 64,661 | | | 96,055 | | | | |
| | | 133,360 | 17,310 | | | | 53,768 | | | |
| 1,695 | 68 | | | | | | | 8,807 | | |
| 233,578 | 9,495 | | | | | | | | 39,666 | |
| | | | | | | | | | | 853,122 |
| 80,204,788 | 1,141,741 | | | | | 1,547,481 | | | | |
| 27,004,528 | 1,039,674 | | | | | | 1,540,585 | | | |
| 23,874,562 | 954,983 | | | | | | | 1,217,792 | | |
| 17,158,069 | 682,881 | | | | | | | | 853,122 | |
| 358,270 | 13,543 | | | | | 15,642 | | | | |
| 18,724 | 721 | | | | | | 1,125 | | | |
| 66,010 | 2,640 | | | | | | | 2,764 | | |
| | | | | | | | | | | 4,270,412 |
| 4,790,216 | 181,070 | | | | 80,000 | 422,181 | | | | |
| 10,298,348 | 396,456 | | | | 250,000 | | 367,340 | | | |
| 2,558,358 | 102,334 | | | 2,083,896 | 95,859 | | | 318,058 | | |
| 239,009 | 11,502 | | | | | | | | 50,768 | |
| 6,572,288 | 248,432 | | | | 90,000 | 706,680 | | | | |
| 4,978,199 | 191,581 | | | | 150,000 | | 704,737 | | | |
| 6,408,358 | 256,254 | | | | 2,100,296 | 96,614 | | 845,106 | | |
| 6,705,571 | 266,882 | | | 2,634,544 | 129,092 | | | | 798,989 | |
| | | | | | | 412,936 | | | | |
| 545,424 | 18,067 | 53,243 | 7,028 | | | | 584,065 | | | |
| 1,097,069 | 42,237 | 189,572 | 24,217 | | | | | | | |
| 1,245,844 | 49,834 | 231,986 | 29,544 | | | | | 876,002 | | |
| 1,823,836 | 76,768 | | | | | | | | 481,265 | |
| 29,692 | 1,122 | 5,042,244 | 665,676 | | | 3,693,392 | | | | |
| 3,315 | 128 | 3,509,909 | 455,586 | | | | 2,875,084 | | | |
| 6,946 | 278 | 3,577,745 | 456,733 | | | | | 2,966,096 | | |
| 8,301 | 330 | 3,429,702 | 424,597 | | | | | | 2,861,366 | |
| 873,860 | 33,032 | | | | | 158,236 | | | | |
| 976,601 | 37,599 | | | | | | 197,638 | | | |
| 463,295 | 18,552 | | | | | | | 82,924 | | |
| 514,314 | 20,470 | | | | | | | | 56,024 | |
| | | | | | | | | | | 4,767,673 |
| 21,215 | 802 | 40,178,521 | 5,303,565 | | | 7,546,380 | | | | |
| 21,867 | 830 | 40,603,042 | 5,270,275 | | | | 7,501,046 | | | |
| 35,584 | 1,423 | 81,354,985 | 3,963,998 | | | | | 6,442,063 | | |
| 23,719 | 1,183 | 22,327,366 | 2,764,127 | | | | | | 4,745,517 | |
| | | 8,269 | 432 | | | 1,444 | | | | |
| | | | | | | | 1,000 | | | |
| | | | | | | | | 1,000 | | |
| | | | | | | 3,000 | | | 1,000 | |
| | | | | | | | 2,000 | | | |
| 90 | 4 | 1,178 | 150 | | | | | 2,155 | | |
| | | 152,723 | 18,907 | | | | | | 21,156 | |
| | | | | | | 13,779 | | | | 6,467 |
| | | | | | | | 16,676 | | | |
| | | | | | | | | 9,832 | | |
| | | | | | | | | | 6,467 | |
| | | | | | | | | | | 1,533,947 |
| | | 1,506,464 | 198,853 | | | 1,216,227 | | | | |
| | | 1,190,071 | 150,577 | | | | 1,354,462 | | | |
| | | 8,078,090 | 392,087 | | | | | 1,982,132 | | |
| | | 10,998,721 | 1,361,642 | | | | | | 1,533,947 | |
| 43,195,733 | 1,632,799 | 47,274,614 | 6,240,249 | | 170,000 | 16,494,411 | | | | |
| 44,396,346 | 1,709,259 | 46,597,245 | 5,918,522 | | 400,000 | | 15,868,141 | | | |
| 34,658,746 | 1,386,350 | 38,243,934 | 4,871,512 | 4,184,192 | 192,473 | | | 15,268,731 | | |
| 23,872,397 | 1,039,521 | 33,927,658 | 4,571,644 | 2,634,544 | 129,092 | | | | 11,880,063 | 11,880,063 |

TABLE X.

Showing Mineral Production of British Columbia.

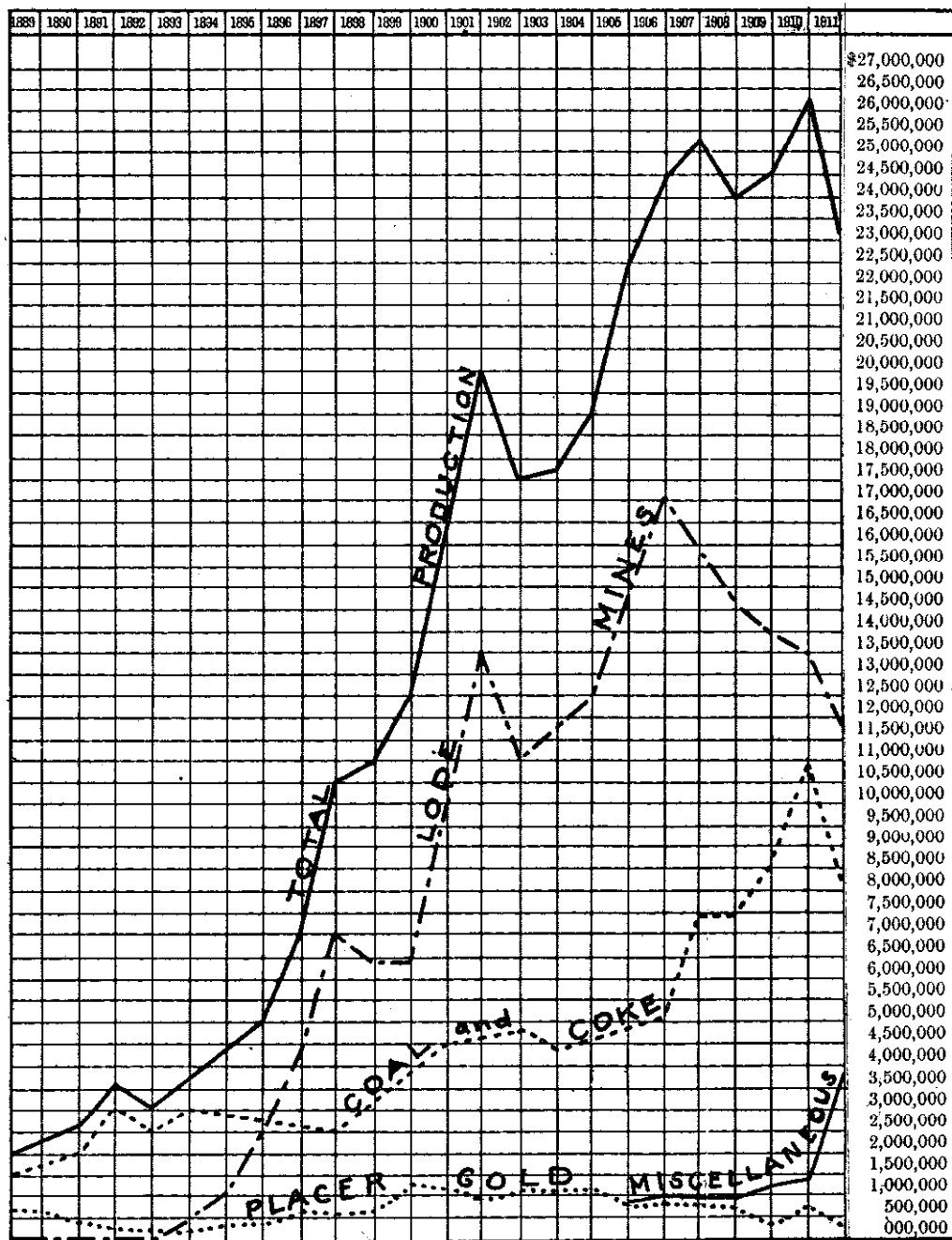


TABLE
SHOWING MINERAL PRODUCTION
OF
BRITISH COLUMBIA

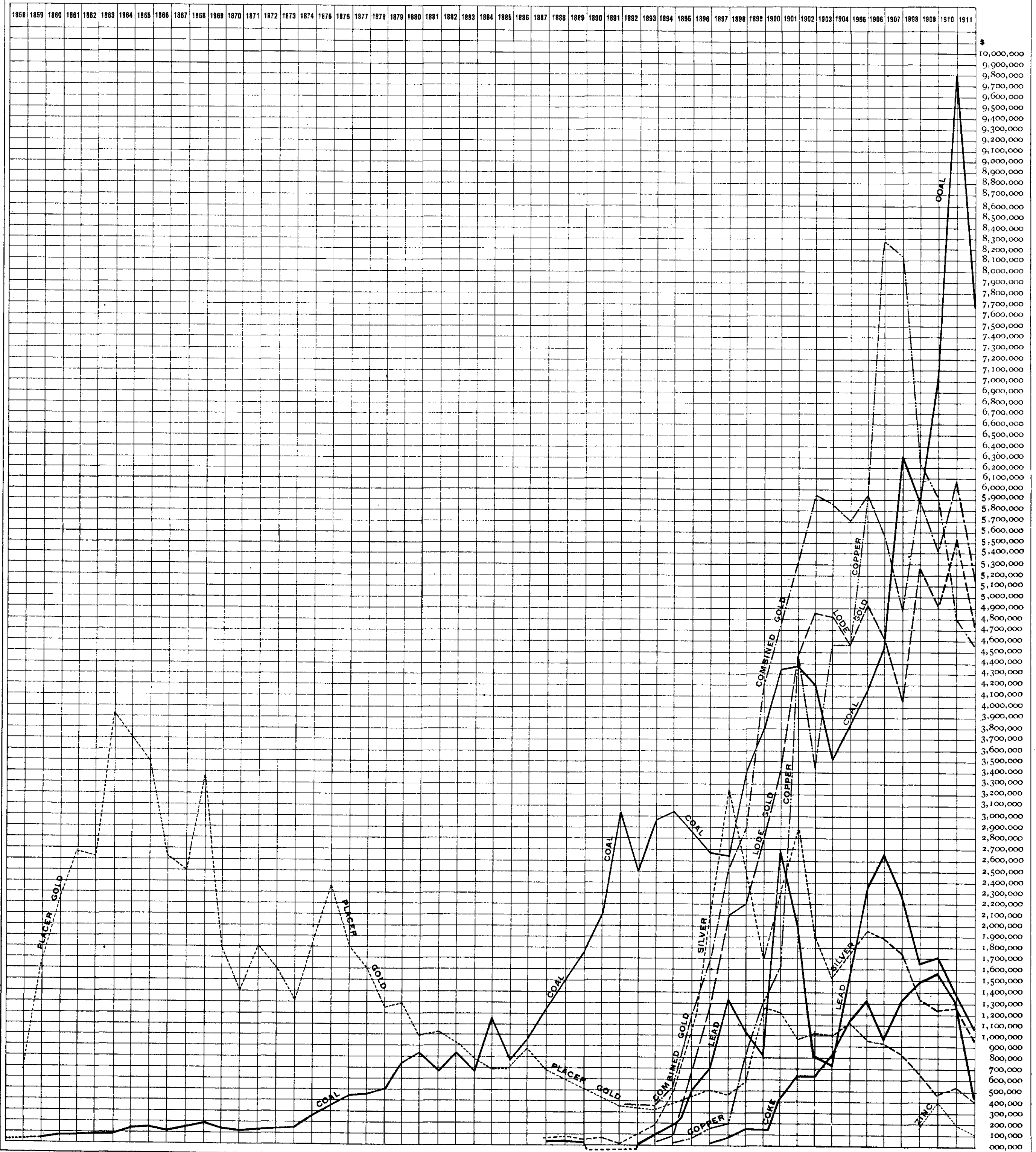









TABLE XI.

Showing Comparative Production in 1911 of Certain Minerals by British Columbia and Other Provinces of Dominion.

| YUKON TERRITORY. | | Gold | \$4,580,000 | Silver†..... | \$25,472 | Coal..... | \$12,780 |
|------------------|--------------------------|-------------------|--|-------------------------------|----------|-----------|----------|
| | Aggregate of Provinces.* | BRITISH COLUMBIA. | | ALL OTHER PROVINCES COMBINED. | | | |
| Gold | \$5,344,085 | \$5,151,513 |  | \$ 192,572 | | | |
| Silver†..... | 16,545,848 | 958,298 |  | 15,587,055 | | | |
| Copper..... | 7,093,258 | 4,571,644 |  | 2,521,614 | | | |
| Lead †..... | 1,069,521 | 1,069,521 |  | NZ. | | | |
| Iron..... | 700,216 | NZ. |  | 700,216 | | | |
| Coal..... | 26,510,875 | 7,675,717 |  | 18,439,123 | | | |
| Coke..... | | 396,030 | | | | | |
| Total..... | \$57,263,303 | \$19,822,718 |  | \$37,440,585 | | | |

* Taken from "Preliminary Report on the Mineral Production of Canada in 1911," corrected by final figures of British Columbia Statistics.

† At the British Columbia valuation.

PROGRESS OF MINING.

This year, unfortunately, the mineral output of the Province proves to be considerably less than it was the preceding year, a fact which has, however, an explanation, without which an improper significance might be attached to the year's diminished production.

For a period of eight months the coal-mines of the East Kootenay District were completely tied up and made no production, owing to a labour dispute incident to the fixing of the "agreement" as to wages for the next few years.

The loss of production of coal and coke alone directly attributable to this shut-down amounted to \$3,324,342, while there was almost as large an indirect loss occasioned by the stoppage of the coal and coke supply of the mines and smelters of the Boundary District.

For the months that operations were carried on at full force the output was more than up to the standard of 1910, and but for the labour troubles it is probable that, instead of a decreased production, the year 1911 would have shown an increase.

The value of the mineral products of the Province for the year 1911 amounts to \$23,499,072, which is considerably less than that of the previous year.

The tonnage of ore mined in the lode mines of the Province during the year 1911 was 1,770,755 tons, a decrease from the preceding year of 445,673 tons, or 20 per cent.

This total tonnage was produced by the various districts in the following proportions: Boundary, 70.25 per cent.; Trail Creek (Rossland), 14.36 per cent.; Fort Steele, 1.74 per cent.; Coast District, 8.09 per cent.; all other districts, 5.56 per cent.

The number of mines from which shipments were made in 1911 was 80, and of these only 45 shipped more than 100 tons each during the year, while but 30 shipped in excess of 1,000 tons each. Of these latter, 6 were in the Nelson Mining Division, 9 in the Boundary District, 5 in the Slocan District, 4 in the Coast District, 3 in the Trail Creek (Rossland) Division, 2 in the Fort Steele Division, and 1 in Kamloops Division.

The "labour employed to the ton of ore mined" forms some criterion of the total cost of mining in a camp, since the cost of labour is in a more or less constant proportion to such total cost. In this respect it is interesting to note in the various districts the number of tons of ore mined to each man employed.

An analysis of the accompanying table shows, approximately, that, taking the Province as a whole, there were 546 tons of ore mined a year for each man employed about the mines. In this respect, however, the districts vary very materially, since, in the Slocan, the figures show 113 tons mined to the man in a year; in the Nelson District, 130 tons; in Trail Creek District, 372 tons; and in the Boundary, 1,201 tons mined to the man employed.

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

The following table shows the number of mines which shipped ore during the year 1911; the districts in which they are situated, and the tonnage produced in each district, together with the number of men employed, both above ground and underground:—

TABLE SHOWING DISTRIBUTION OF SHIPPING MINES IN 1911.

| | Tons of Ore shipped. | No. of Mines shipping. | No. of Mines shipping over 100 Tons in 1911. | MEN EMPLOYED IN THESE MINES. | | |
|-------------------------------------|----------------------|------------------------|--|------------------------------|--------|--------|
| | | | | Below. | Above. | Total. |
| CASSIAR: | | | | | | |
| Atlin, Skeena & Queen Charlotte | 7,099 | 4 | 1 | 58 | 30 | 88 |
| EAST KOOTENAY: | | | | | | |
| Fort Steele | 30,543 | 4 | 3 | 134 | 67 | 201 |
| Windermere-Golden | | | | | | |
| WEST KOOTENAY: | | | | | | |
| Ainsworth | 671 | 8 | 3 | 34 | 4 | 38 |
| Slocan and Slocan City | 45,466 | 19 | 7 | 261 | 139 | 400 |
| Nelson | 39,756 | 17 | 10 | 206 | 100 | 306 |
| Trail Creek | 254,062 | 7 | 5 | 537 | 145 | 682 |
| Other Divisions | 746 | 4 | 2 | 14 | 7 | 21 |
| BOUNDARY: | | | | | | |
| Grand Forks, Greenwood, and Osoyoos | 1,244,819 | 12 | 10 | 760 | 276 | 1,036 |
| Ashcroft-Kamloops | 4,257 | 1 | 1 | 9 | 12 | 21 |
| Similkameen-Vernon | | | | | | |
| LILLOOET | 84 | 1 | | 5 | 3 | 8 |
| COAST | 143,252 | 3 | 3 | 215 | 225 | 440 |
| Total | 1,770,755 | 80 | 45 | 2,233 | 1,008 | 3,241 |

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

TABLE SHOWING NON-SHIPING MINES AND MEN EMPLOYED.

| DISTRICT. | NUMBER OF MINES. | | | MEN EMPLOYED. | | |
|------------------------|------------------|-------|--------|---------------|--------|--------|
| | Working. | Idle. | Total. | Above. | Below. | Total. |
| COAST AND CASSIAR | 5 | 4 | 9 | 55 | 29 | 84 |
| EAST KOOTENAY | 1 | 3 | 4 | 1 | 20 | 21 |
| AINSWORTH | 4 | 10 | 14 | 29 | 11 | 40 |
| SLOCAN | 5 | 11 | 16 | 19 | 9 | 28 |
| NELSON | 3 | 5 | 8 | 28 | 125 | 153 |
| TRAIL CREEK | 0 | 1 | 1 | | | |
| LARDRAU AND TROUT LAKE | 2 | 3 | 5 | 10 | 5 | 15 |
| BOUNDARY | 1 | 9 | 10 | 9 | 3 | 12 |
| Total | 21 | 46 | 67 | 151 | 202 | 353 |

STATISTICAL TABLES.

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

TABLE I. shows the total gross value of each mineral product mined in the Province up to the end of 1911, aggregating \$397,696,722. From this table it will be seen that coal-mining has produced more than any other separate class of mining, a total of \$122,084,343; followed next in importance by placer gold at \$71,639,103, and third by lode gold at \$65,536,580.

The metal gold, obtained from both placer and lode mining, amounts to a value of \$137,175,683, the greatest amount derived from any one mineral, the next important being coal, the total gross value of which, combined with that of coke, is \$122,084,343, followed by copper at \$65,315,049, silver at \$32,053,895, and lead at \$25,715,126.

TABLE II. shows the value of the total production of the mines of the Province for each year from 1892 to 1911 (inclusive), during which period the output has increased about tenfold, and reached a production, for the year 1910, valued at \$26,377,066, or more than double what it was in 1899. The year 1911 shows a gross production of only \$23,499,072, a decrease from last year, due to the shutting-down of coal-mines of East Kootenay for eight months owing to labour disputes, otherwise there would have been an increase to record. The value of the total products of the mines of the Province up to the end of 1911 is \$397,696,722.

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

The table shows that there has been this year a decrease in the production of placer gold of some \$114,000, and at the same time a decrease in the output of lode gold of \$807,867, making a total decrease of \$921,867 in the production of the metal.

The amount of silver produced this year was 1,892,364 oz., having a gross value of \$958,293, a decrease in the number of ounces produced of 557,877, due to a greatly decreased production in the Fort Steele and Nelson Mining Divisions and the Boundary District, only partly compensated for by an increase in the Slocan District. The gross value of the silver product this year shows a decrease from that of last year of \$286,723, which is partly accounted for by a slightly lower market price of silver during this last year.

The table shows an output of lead in 1911 amounting to 26,872,397 lb., valued at \$1,069,521, which is a decrease from the production of the preceding year of 7,786,349 lb. of lead.

The production of copper this year was 36,927,656 lb., valued at \$4,571,644, a decrease in amount of 1,316,278 lb., or about 3.4 per cent. The value of the product was less than that of the preceding year by \$299,868—a decrease of 6.1 per cent.

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

It will be noted that this year again the Coast District has the honour of first place on the list, followed, in order of importance, by the Boundary and East Kootenay Districts, while West Kootenay—for many years our greatest producer—is relegated to fourth place on the list. The Coast and East Kootenay Districts owe a considerable percentage of their output to the coal-mines situated within their limits, whereas, in the other districts, the production is almost entirely from metal-mining.

The Coast District also derives a large proportion of its production from miscellaneous products, such as building materials, and due to the larger cities therein; this year this amounted to \$3,357,212, as is shown in Table V.

In this table, this year, the values of zinc have been distributed to the districts producing them, which has occasioned some changes in this table as compared with the 1909 Report, thus making it differ from the column in a previous report.

TABLE V. is a new table, introduced this year, and is an endeavour to show in some detail the production of those products, such as building materials, previously summarized under miscellaneous products.

While these figures are not as complete as desired, they are at least approximate, and show what an important branch of mineral production this has become.

TABLE VI. gives the statistical record of the placer mines of the Province from 1858 to 1911, and shows a total production of \$71,639,103. The output for 1911 was \$426,000, a decrease, as compared with the previous year, of about 21.1 per cent.

TABLE VII. relates entirely to the lode mines of the Province, and shows the quantities and values of the various metals produced each year since the beginning, in 1887, of such mining in the Province. The gross value of the product of these mines to date is \$188,620,650, or, including the zinc production of 1910 and 1911, \$188,942,215. The production of 1911, including zinc, was \$11,454,063, a decrease from the previous year of \$1,774,668, or about 13.4 per cent., the reasons for which have already been given.

TABLE VIII. contains the statistics of production of the coal-mines of the Province. The total amount of coal mined to the end of 1911 is 34,622,133 tons (of 2,240 lb.), worth \$109,486,674. Of this, there was produced in 1911 some 2,193,062 tons, valued at \$7,675,717, a decrease of 606,984 tons in quantity and of \$2,124,444 in value from the preceding year. In these figures of coal production, the coal used in making coke is not included, as such coal is accounted for in the figures of output of coke. The amount of coal used in making coke in 1911 was 104,656 tons, from which was made 66,005 tons of coke, having a value of \$396,030, a decrease from the preceding year of 152,024 tons, or about 70 per cent., with a decrease in value of \$912,144. While only 66,005 tons of coke were actually made, 73,454 were actually sold; 7,449 tons being taken from the stocks at the mines, and 37 tons were used under the company's boilers. The total value of the output of the collieries of the Province in 1911 was \$8,071,747.

The average selling prices taken this year in the calculation of value of product are the same as those used last year; that for coal being \$3.50 and for coke \$6 per ton of 2,240 lb. The prices used in calculations prior to 1907 were \$3 and \$5 respectively.

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

TABLE IX. gives the details of production of the metalliferous mines of the Province for the years 1908, 1909, 1910, and 1911, and the districts in which such productions were made, showing the tonnage of ore mined in each district, with its metallic contents and its market value.

The total tonnage of ore mined in the Province during the year 1911 was 1,770,755 tons, having a gross value, including building materials, of \$11,880,063.

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

| | | |
|----------------------------------|--------|-----------------------|
| Boundary District..... | 70.30 | per cent. of tonnage. |
| Trail Creek Mining Division..... | 14.35 | " " |
| Coast District | 8.09 | " " |
| Slocan District | 2.56 | " " |
| Nelson Mining Division..... | 2.25 | " " |
| Fort Steele Mining Division..... | 1.73 | " " |
| Other Divisions..... | 0.72 | " " |
| | 100.00 | |

In previous reports there has been included in this table the "miscellaneous products," and in 1910 these were shown distributed to the various districts; the great increase of these products in the past couple of years has rendered it advisable that this table be reserved exclusively for metalliferous products, and so a new table (No. V.) has been started, giving in some detail the output of the miscellaneous products.

In making comparisons of this table with similar tables in previous reports, the fact that "miscellaneous" has been removed will have to be borne in mind.

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

It will be seen that, although coal-mining has been a constantly increasing industry during this whole period of twenty-three years, lode-mining did not begin, practically, until 1894, since when it has risen with remarkable rapidity, though not without interruption, until it reached, in 1906, the \$17,000,000 line, and the total production in 1910 reached the \$26,000,000 line, although it has dropped this year to the \$23,500,000 line.

TABLE XI. compares graphically the output of certain mineral products in British Columbia with that of the combined output of similar products in all the other Provinces of the Dominion, and shows that in 1911 British Columbia produced, in the minerals shown, an amount equal to over 52.9 per cent. of all the other Canadian Provinces combined.

COAL.

The collieries of the Province during the year 1911 produced 2,297,718 tons (2,240 lb.) of coal—a decrease of 841,517 tons, as compared with the preceding year.

This decrease is entirely due to the labour troubles in the East Kootenay field, whereby the collieries of that district were shut down for over eight months.

The decrease of the output in the East Kootenay field amounted to 923,062 tons of coal, which was only partly offset by an increased production in the Coast District of 81,545 tons.

The greater portion of this production—about 72 per cent.—was mined by three companies—the Canadian Collieries and the Western Fuel Company in the Coast District, and the Crow's Nest Pass Coal Company in East Kootenay.

Of the other collieries: In the Coast District, the Pacific Coast Coal Mines produced 208,116 tons; the Nicola Valley Coal & Coke Company, 191,290 tons; and the Vancouver-Nanaimo Coal Company, 72,918 tons, with smaller productions by the Princeton Colliery, the Inland C. & C. Syndicate, and the Diamond Vale Colliery. In the East Kootenay field the Hosmer Mines and the Corbin C. & C. Co. made very appreciable productions, although not nearly as large as in the preceding year.

The collieries of the Coast District are to be credited this year with about 80 per cent. of the total output of coal, due in a large measure to the labour troubles in East Kootenay having diminished the output of that district. The Coast collieries made no coke this year, although some was sold from a large stock that had been left over from previous years.

The gross output of the coal-mines of the Province for the year 1911 was 2,297,718 tons (of 2,240 lb.), in addition to which 748 tons were drawn from stock, making the gross amount of coal distributed 2,298,466 tons.

Of this gross amount, there was sold as coal for consumption in Canada, 1,373,779 tons; sold for consumption in the United States, 573,888 tons; while 38,808 tons were exported to other countries, making the total coal sales for the year 1,986,475 tons.

In addition to the coal sold, there was used in the manufacture of coke 104,656 tons, and 178,242 tons were used under the boilers, etc., of the producing companies, while 29,093 tons were lost in washing.

As has already been noted, there was no coke made in the Coast District, the total coke production having been made in the East Kootenay field, where from 104,656 tons of coal there was produced 66,005 tons (2,240 lb.) of coke—only about 30 per cent. of last year's production, as the mines were closed down for eight months on account of labour troubles.

The coke sales for the Province amounted to 73,454 tons, of which amount 7,486 tons was drawn from stock.

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

| COAL. | Coast District. | Crowsnest Pass District. | Total for Province. |
|---|-----------------|--------------------------|---------------------|
| Sold for consumption in Canada.....(Tons—2,240 lb.) | 1,278,640 | 95,139 | 1,373,779 |
| " export to United States....." | 363,994 | 209,894 | 573,888 |
| " export to other countries....." | 38,808 | ..... | 38,808 |
| Total coal sales..... | 1,681,442 | 305,033 | 1,986,475 |
| COKE. | | | |
| Sold for consumption in Canada.....(Tons—2,240 lb.) | 6,153 | 66,034 | 72,187 |
| " export to United States....." | ..... | 1,267 | 1,267 |
| " export to other countries....." | ..... | ..... | ..... |
| Total coke sales..... | 6,153 | 67,301 | 73,454 |

COLLIERIES OF COAST DISTRICT.

The Coast collieries mined 1,855,661 tons of coal in 1911, of which 2,511 tons were added to stock, making 1,853,150 tons distributed from these collieries in 1911. This amount was distributed thus:—

| | |
|---|-----------------|
| Sold as coal in Canada..... | 1,278,640 tons. |
| " United States..... | 363,994 " |
| " other countries..... | 38,808 " |
| Total sold as coal..... | 1,681,442 tons. |
| Used under companies' boilers, etc..... | 142,615 " |
| Used in making coke..... | ..... |
| Lost in washing..... | 29,093 " |
| | 1,853,150 " |
| Plus coal added to stock..... | 2,511 " |
| Gross output..... | 1,855,661 " |

The total coal sales of the Coast collieries for the year show, as compared with the sales of the previous year, an increase of 201,569 tons, equivalent to 13.6 per cent.

The consumption of coal in that portion of British Columbia served by the Coast collieries—despite the introduction of California fuel-oil—shows this year an increase of 222,779 tons, or about 21 per cent., over the preceding year; the amount exported to the United States is almost exactly the same, only 272 tons greater, but the amount exported to other countries has decreased by 21,482 tons.

From these figures it is apparent that the growth of the Province's coal-consuming enterprises has more than offset the inroads of fuel-oil on the market.

Only one company in the Coast District—the Canadian Collieries, Limited—has ever made coke, but this year the ovens have not been in operation, although the company sold 6,153 tons of coke from stock, and still has 4,636 tons in stock.

The coke sold was entirely for consumption in British Columbia, no export sales having been made.

On Vancouver Island four companies produced coal this year—the Canadian Collieries, Limited, the Western Fuel Company, the Pacific Coast Coal Mines, and the Vancouver-Nanaimo Coal Company; the majority of these companies each operate two, or more, collieries. The combined output of the Island collieries was 1,625,122 tons.

In the Nicola and Princeton valleys of the Coast District, the Nicola Valley Coal & Coke Company produced 191,290 tons of coal; the Princeton Colliery, 23,396 tons; the Inland C. & C. Syndicate (formerly Coal Hill Syndicate), 10,433 tons; and the Diamond Vale Colliery, 4,970 tons.

The total output of this portion of the district was 230,539 tons. The Pacific Coast Colliery Company of Nicola and the Columbia Coal & Coke Company of Coalmont, on the Tulameen river, each mined coal in development-work, but have not as yet entered the market as producers.

EAST KOOTENAY COALFIELD.

In the East Kootenay coalfield, the old agreement as to wages, etc., which had existed between the operators and the employees, expired on March 31st, 1911, and considerable difficulty was experienced in arranging a new one, the negotiations occupying nearly eight months, during which time the collieries of this section of British Columbia and also of the adjoining portion of Alberta were shut down. The new agreement was, however, eventually signed, and holds binding until March, 1915.

The production of the mines of this section during the past year therefore only represents the output for the four months of the year in which the mines were in operation.

There were three companies operating in this district—the Crow's Nest Pass Coal Company, operating two separate collieries, the combined output of which was 320,940 tons; the Corbin Coke & Coal Company, which made an output of 81,718 tons; and the Hosmer Mines, Limited, which produced 39,399 tons of coal, making a gross output for the district for 1911 of 442,057 tons of coal. This gross output is 923,062 tons, or about 67 per cent., less than the output of the previous year.

In addition to the coal mined, 3,259 tons were taken from stock, making the amount of coal distributed from the collieries 445,316 tons.

Of this gross tonnage, 104,656 tons were used in the manufacture of coke, of which there was produced 66,005 tons (2,240 lb.).

In addition to the coke made this year, 1,333 tons were taken from stock, making the coke sales for this year 67,338 tons, as compared with sales in 1910 of 213,677 tons.

Comparisons of the coal, or coke, output of this district during 1911 with the previous year are, however, misleading, as the mines were only worked for four months of the year, but during that period made a production quite up to the average of 1910.

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

| | |
|--|----------------------|
| Sold as coal in Canada | 95,139 tons. |
| " United States | 209,894 " |
| Total sold as coal | 305,033 tons. |
| Used by the company in making coke | 104,656 " |
| " " under boilers | 35,627 " |
| | <hr/> |
| | 445,316 " |
| Less coal taken from stock | 3,259 " |
| | <hr/> |
| | 442,057 " |

GOLD.

The production of placer gold during the past year was worth about **Placer Gold.** \$426,000 as nearly as can be ascertained; great difficulty is found in obtaining reliable figures, since the work is, in many cases, carried out by individuals or unorganized groups of men who keep no books, frequently paying wages, or for supplies, in gold-dust, which, being readily transported, is scattered, and the tax imposed thereon by law is thus evaded.

The production of 1911 is the lowest recorded in the past seventeen years, or since 1894. As compared with the preceding year, it is a decrease of \$114,000, or about 21 per cent.

The reasons for this decreased output are various; probably the most important is that the known and available placer deposits are becoming exhausted, and until new camps shall have been discovered the placer output may be expected to diminish.

This is more particularly true of the smaller enterprises and individual workings, whereas the larger hydraulic-mining concerns have, as a rule, an abundant supply of auriferous gravels, the treatment of which demands a large and continuous supply of water. This water-supply is dependent on the snowfall of the preceding winter and also upon the conditions under which it melts, since adequate storage for the conservation of the water is rarely made.

The snowfall of the winter of 1910-11 was above the average, but it went away rapidly and was not followed by the usual spring and fall rains, thus preventing the customary fall clean-up in several instances, which, could it have been made, would probably have brought the output up to that of the previous year.

The largest production, as usual, was made in the Atlin camp, which is credited this year with an output of \$225,000, which is, however, some \$50,000 less than last year.

More than half the output of this camp was made by the Ruffner Companies operating the properties of the North Columbia Company and the Guggenheim holdings on Tar flats, on Pine creek, although this year's output did not prove as great as last year's.

On Spruce creek, the Spruce Creek Power Company did not operate, but allowed the smaller properties to use all the water, so that they might work out their ground and so leave the company free from annoyance regarding the disposal of its tailings.

McCloskey & Foley, on the *Gladstone* lease, had a successful season, while several smaller operators did fairly well.

On McKee creek, the Pittsburg-British Gold Company had a very fair season, although it was not up to expectations.

Birch creek is reported to have had this year the most successful season in its history.

Productive mining was carried on with only fair success on a number of other creeks.

The only other placer-mining district of any importance in the Province, as far as present production goes, is the old Cariboo District, and here individual mining has entirely given away to hydraulicking.

In this camp the failure of the fall rains prevented a fall clean-up, and the output of the district, including Cariboo and the Quesnel Mining Divisions, shows a decrease of production of about \$54,000.

The Cariboo Mining Division shows a greater loss than this, which is, however, somewhat compensated for by an increase in the Quesnel Division.

In the former of these divisions, the various properties operated by John Hopp made a large, though disappointing, output, and a number of smaller companies did fairly well.

Much work is in progress, installing new plants, and, as these are approaching completion, next year should show a great improvement.

In the Quesnel Division, the two largest enterprises, the Quesnelle Hydraulic Gold Mining Company and the Hobson leases on the North fork of the Quesnel river, only completed their installation late in the season, so that little productive mining was done, although considerable top burden was removed, giving much hope for a successful season this coming year.

The Omineca District still produces a small quantity of gold, but very much short of what it did in past years.

Here the individual miner has had to suspend operations and give way to the larger operator, but, as the distance is so remote, it is not yet practicable to take in necessary machinery. These conditions will only be improved by the nearer approach of railways.

East and West Kootenay and Yale Districts produced some placer gold, but the amount is small and is constantly diminishing.

The value of the gold produced from lode-mining in the Province during the year 1911 was \$4,725,513, a decrease, as compared with the previous year, of \$807,867, or about 14.8 per cent. This decrease is partly due to the lesser production of the Nelson Division, together with a decreased tonnage of ore in the Boundary District, due to the enforced idleness of the mines through the stoppage of the coal and coke supply.

The following are the values of the gold product of the three most important camps: Rossland, \$2,411,837; Boundary, \$1,813,690; and Nelson, \$364,619. About 75 per cent. of the gold production of the Province is obtained from the smelting of copper-bearing ores, the remainder from stamp-milling.

The only large stamp-mill in operation in the Province is at the *Nickel Plate* mine at Hedley, in the Osoyoos Mining Division, which, this past year, milled some 57,500 tons of ore having a value of about \$675,000. There are smaller stamp-mills operating at the *Poorman*, *Queen*, *Athabasca*, *Nugget*, and other mines in the Nelson Division, and also quite a small one in the Lillooet Mining Division.

SILVER.

The total amount of silver produced in the Province during the year 1911 was 1,892,364 oz., valued at \$958,293, a decrease in amount, as compared with the previous year, of 557,877 oz., and in value of \$286,723.

A very large proportion of the silver produced in the Province is found associated with lead-bearing ores, chiefly in the Slocan District, where the important mines are still handicapped by lack of transportation facilities owing to forest fires having destroyed the Kaslo and Slocan Railway and, in some instances, the plants of the mines.

The *St. Eugene* mine in East Kootenay, formerly a large producer of silver and lead, has, temporarily at least, run out of the ore-shoot, and made a very much decreased output, which was, however, partly compensated for by the reopening, by the Consolidated Company, of the *Sullivan* mines.

The Slocan District—including the Ainsworth, Slocan, Slocan City, and Trout Lake Mining Divisions—produced about 49 per cent. of the the total Provincial output of silver this year, and the Fort Steele Mining Division about 17 per cent., all from argentiferous galena.

LEAD.

The lead production of the Province for the year 1911 was 26,872,397 lb. of lead, having a market value of \$1,069,521, showing, as compared with the previous year, a decrease in amount of 7,786,349 lb. of lead, or 22.4 per cent., and a decrease in value of \$316,829, or 22.8 per cent.

The average market price of this metal for the year 1911 was a little lower than for the previous year.

The causes militating against the output of silver even more seriously affected the production of lead; but it is expected that this trouble will be largely remedied by next year.

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

| | | | |
|-----------------------------|------------|------------------|---------------------|
| Fort Steele M.D. produced.. | 17,158,069 | lb. lead = 63.82 | per cent. of total. |
| Ainsworth .. | 289,009 | " | 1.09 " " |
| Slocan .. | 6,705,571 | " | 24.96 " " |
| Nelson .. | 1,928,836 | " | 7.19 " " |
| Trout Lake .. | 514,314 | " | 1.91 " " |
| All others .. | 276,598 | " | 1.03 " " |
| | 26,872,397 | | 100.00 |

COPPER.

The amount of copper in ores mined in the Province in 1911, and smelted during the year, was 36,927,656 lb. fine copper, valued at the average New York market price for copper at \$4,571,644. These figures do not take into account smelter charges; but a deduction of 5 lb. of copper to the ton of ore has been made, as representing approximately the amount of copper lost in slags at smelting.

As compared with the preceding year, there is, therefore, a decreased production in amount of 1,316,278 lb., and in value of \$299,868. There is a large increase in the Coast District and a slight decrease in the Trail Creek (Rossland) Division; while the Boundary District shows the large decrease of 9,027,626 lb.—due to the stopping of the largest mine for want of coke—which is only partly compensated for by the increase in the Coast District of 7,920,631 lb. of copper.

The following table shows the production of the various districts for the years 1909, 1910, and 1911:—

| | 1909. | 1910. | 1911. | |
|-------------------|----------------|----------------|----------------|-----------|
| Boundary District | 40,603,042 lb. | 31,354,985 lb. | 22,327,359 lb. | = 60.46 % |
| Rossland | 3,509,909 " | 3,577,745 " | 3,429,702 " | 9.29 " |
| Coast & Cassiar | 1,297,722 " | 3,078,090 " | 11,017,872 " | 29.83 " |
| Yale-Kamloops | ..... | 1,178 " | 152,723 " | .42 " |
| Nelson | 186,572 " | 231,936 " | ..... | .... |
| | 45,597,245 " | 38,243,934 " | 36,927,656 " | 100.00 " |

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

Boundary, 0.892 per cent.; Coast, 3.67 per cent.; and Rossland, 0.675 per cent.

ZINC.

The total quantity of zinc produced in 1911 was 2,634,544 lb., valued at \$129,092, the New York price, less 15 per cent., being taken as the basis of valuation.

This comparatively small production was made chiefly by the *Van Roi*, assisted by the *Hewitt* mine, both situated near Silverton, in the Slocan, and was obtained as a by-product concentrate from the concentration of lead-silver ores.

The *Whitewater* mine, formerly a large producer of zinc concentrates, and the *Lucky Jim* mine, the only mine in the Province mining ore for its zinc contents, are both on the line of the Kaslo & Slocan Railway, which was destroyed by forest fires and has not as yet been rebuilt, so that they have been without rail connection and consequently could not ship.

A process designed to separate the values of the lead-zinc-silver ores of the Slocan has been experimented with at Nelson, but this has not as yet reached a stage of commercial application; this process is further described under the Nelson Mining Division.

OTHER MINERALS.

Although, undoubtedly, there are in the Province numerous iron-ore deposits of very considerable size and exceptionally free from injurious elements, none of these have been utilized, as there is no market for iron-ore, and consequently little development-work has been done.

In the Coast District the iron-ores are all magnetites, as far as have been developed in any quantity, and, although these sometimes carry sulphur, as pyrite, they are singularly free from other impurities.

So far as is at present known, there is no body of hæmatite or other ore of iron, such as would be desirable to mix with the magnetites for blast-furnace smelting.

This fact, together with the present price of coke on the Coast, of from \$7 to \$8 a ton, with little likelihood of its being less while the present price of coal continues, does not seem to justify the expectation of an iron-smelting industry here until these conditions are altered.

Whether it will be found possible to smelt the iron-ores of the Coast with anthracite coal from the recently discovered coalfields of the upper Skeena river, it is too early to predict, until the general character of the fuel is more clearly demonstrated and proper transportation facilities to the Coast have been provided.

As to the electro-thermic smelting of such iron-ores into commercial pig-iron, the process has not as yet been sufficiently perfected, although it is looked upon as one of the possibilities of the future.

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

During the past year a great deal of excitement was created in the Province by reports of the finding, by A. G. French, of platinum in commercial quantity in certain dykes near Nelson.

These reports were based upon statements, credited to A. Gordon French, that he had personally determined platinum, and metals of that group, and found them to exist in commercial quantities in dykes in the *Granite-Poorman* mine and other localities adjacent to Nelson.

The wide publicity given to these statements by the press and otherwise occasioned the staking of innumerable claims on dykes in that vicinity.

The importance of the discovery, if true, was recognized by this Bureau, and steps were taken to try to confirm it, but so far the results have been decidedly negative, and this Bureau is not able to confirm the existence of platinum or any metals of that group in the vicinity of Nelson.

The details of investigations made are given elsewhere in this Report.

BUILDING MATERIALS.

The growth of cities, with the necessity for fireproof building material, has created an industry that promises to rival any other branch of mineral production.

The past year, although the statistical returns are not as complete as desired, a production of about \$3,547,262 is accounted for, the details of which production are given in Table V., on page 9.

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

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

A detailed description of the more important quarries was given in the report of this Bureau for 1904.

In the interior of the Province, the Canadian Marble & Granite
Marble. Company opened a marble-quarry on the line of the Lardo-Trout Lake Railway, about eight miles from Lardo. This company has, so far, shipped only the rough blocks of the marble which were elsewhere sawn into slabs, etc., but during the past year the company has been engaged in erecting dressing-works, which are not yet in running order. The product shipped from the quarry has been small.

A coarsely crystalline whitish marble, not suitable for cutting into slabs, has been quarried on the shore of Kootenay lake, and used for building purposes in Nelson.

The Nootka Marble Quarries, on Nootka sound, on the west coast of Vancouver Island, that were opened up in 1908, have not made any important shipments. The quarry has not been operated since July, 1909.

The production of red brick has increased during the past year about
Red Brick. 25 per cent., and now amounts in value to over \$400,000. The demand, however, keeps well ahead of even the increased supply, particularly in the Coast cities, so that approximately half the brick used in Vancouver is imported. The plants in the vicinity of Vancouver, besides being increased in size, are being fitted with more modern appliances and should be able to meet outside competition. The price of common brick ranged from \$8 to \$11 per thousand, according to quality and demand.

The only company producing firebrick in the Province is the Clayburn
Firebrick. Company, Ltd., with a plant at Clayburn, where the beds of clay are of the age of the coal-measures. This company made approximately 1,400 M. firebrick, worth about \$43,000, and 2,700 M. front or face brick, worth about \$98,000. Besides this the company made a large number of common brick, tiles, drain-pipes, etc.

The B.C. Pottery Co. at Victoria West manufactures drain and
Pottery, Drain- sewer pipe, chimney-tiles, etc., the chief item in their sales account being
pipe, and Tile. drain and sewer pipe. The output for the year approached \$150,000. The company derives its clay partly from the coal-mines of the Canadian Collieries, Ltd., at Comox, and partly from a shale-quarry recently opened up on the west coast of Vancouver Island.

The manufacture of lime is conducted in a small way at a large
Lime. number of points in the Province, but only on the Coast has any attempt been made at more extensive operations. In the neighbourhood of Victoria, on Esquimalt harbour, Raymond & Sons have three kilns in operation, and there are kilns on Saanich arm. On Texada island—in addition to the old plant at Marble bay—a new and extensive plant has been erected at Blubber bay. The limestone being used is of exceptional purity, but in some instances the limestone-beds are cut by igneous dykes which have to be rejected, and this somewhat increases the costs of quarrying.

The only company manufacturing cement in the Province is the
Portland Cement. Vancouver Portland Cement Co., with works at Tod inlet, on the Saanich arm, about twelve miles from Victoria. The capacity of these works at present is from 1,200 to 1,500 barrels a day, and this past year the company manufactured over 420,000 barrels of cement, valued in the neighbourhood of \$650,000. The raw materials, limestone and clay, are quarried on the company's property adjoining the works. The company has doubled the capacity of the plant, installing electric power to take the place of, or supplement, the steam plant, and introducing many labour-saving appliances

Concrete construction has become so extensive on the Coast that Crushed Rock companies have been formed to supply suitable material for such work. and Gravel. Near Vancouver harbour four companies have opened up quarries in a granite rock, and have erected crushing and sizing plants and bins for the manufacture of crushed rock for concrete-making and for road-making in Vancouver. The output of these stone quarrying and crushing plants, in the vicinity of Vancouver alone, amounted last year to \$250,000.

Near Vancouver and Victoria, companies have been formed for supplying washed sand and gravel, properly screened to size; at least some of those companies have installed a system of mining the gravel by hydraulic streams and the carrying of the product to the screens by the water used. The value of the sand and gravel produced for use in these two cities amounted during the past year to over \$360,000.

BUREAU OF MINES.

WORK OF THE YEAR.

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

The routine work of the office, and the preparation and publication of the Report for the year just ended, followed by the examination in the field of as many of the mines and mining districts as the season would permit, together with the work of the Laboratory and instruction of students, fully occupied the staff for the year. The staff of the Bureau consists of the Provincial Mineralogist, the Provincial Assayer, and an assistant in the Laboratory, with a clerical assistant in the office.

After the report for the preceding year had been issued, the Provincial Mineralogist, with assistants, held an examination at Victoria of candidates for Certificates of Competency as Assayers, which lasted a week, after which he was fully occupied with necessary office-work until the season was sufficiently advanced for field-work.

In February, 1911, the Provincial Mineralogist attended, at Nanaimo, a meeting of the Western Branch of the Canadian Mining Institute, of which he was chairman.

The meeting dealt particularly with the coal resources of the Province, and a number of valuable papers were read. The meeting was attended by all the coal-mine officials and a number of miners from the district, while the United States Geological Survey sent a representative from Washington, D.C.

In May a second meeting of the Institute was attended; this meeting was held at Trail; after the meeting the smelting plant of the Consolidated M. & S. Company was visited, and a hurried run taken through the company's mines at Rossland.

In July the Provincial Mineralogist and a small party proceeded to Hazelton, where, after some difficulty and delay—as the normal conditions were upset by the railroad-construction proceeding in the district—a pack-train was secured from the Indians, who alone had horses for hire at that time, and, with Indian packers only, he proceeded to examine the various mineral claims in the district within possible reach of the approaching railway transportation.

From a number of these claims samples of galena, carrying high values in the precious metals, had been received, although the development-work done in there was very superficial. Notes on the inspection of these claims will be found in the general report on the Omineca Mining Division.

The trip embraced Four-mile camp, Nine-mile camp, Rochers Déboûlés, and others, near Hazelton, and was extended to the headwaters of the Telkwa river, to Milk Creek camp, Howson basin, and also to the claims on the south side of Hudson Bay mountain and the headwaters of the Zymoetz river.

This trip occupied until September 4th, when a return was made to Victoria, when, after a few days spent in the office, a second trip into the field was made—this time to the Slocan District—and, as a preliminary to this, a third meeting of the Western Branch of the Canadian Mining Institute was attended at New Denver, and various properties in the vicinity were visited in company with the members of the Institute attending the meeting.

The special object of the visit to the Slocan at this time was to investigate the various attempts at development-in-depth, through which deep ore-deposits had been found, and it is pleasant to be able to report that these attempts have proved eminently successful in such a large percentage of cases as to greatly encourage and substantiate the belief that the ores of the Slocan do extend to a considerable depth, and to revive the hope that the productive days of the Slocan are in no way measured. A report of these investigations is contained in the general report on the Slocan District, contained in the body of this Report.

In December a meeting of the Board of Examiners for Assayers was held in Victoria, when the meeting was adjourned until January, as the Government Laboratory had been moved back to Superior street and the repairs had not advanced sufficiently to permit of an examination being held there.

ASSAY OFFICE.

The following is a summary of the work of the Assay Office of the Bureau for the year 1911, as reported by the the Provincial Assayer, Herbert Carmichael:—

The building of the new wing of the Government Buildings necessitated the removal of the Mineral Building and Laboratories back to Superior street. These operations began on the 1st of September and were not quite completed at the end of the year; all assay and analytical work had to stop, and only such mineral determinations were made as could be done with little apparatus.

This interruption of the regular work is reflected in a falling-off in the fees collected, as noted below, otherwise the amount would have been fully up to the year previous.

During the year 1911 there were made by the staff in the Government Assay Office 1,098 assays or quantitative determinations, which is lower than the number made during the previous year; of these, a number were for the Bureau of Mines, or for the other Departments, for which no fees were received. The fees collected by the office were as follows:—

| | |
|--|----------|
| Fees from assays..... | \$264 00 |
| " melting and assaying gold-dust and bullion..... | 120 00 |
| " assayers' examinations..... | 95 00 |
| Total cash receipts..... | \$479 00 |
| Determinations and examinations made for other Government Departments for which no fees were collected..... | 250 00 |
| Value of assaying done..... | \$729 00 |

The value of gold melted during the year was \$9,853, in 32 lots, as against \$15,163 in 39 lots in 1910.

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

EXAMINATION FOR ASSAYERS.

REPORT OF HERBERT CARMICHAEL, SECRETARY OF BOARD OF EXAMINERS.

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

An examination was held at Victoria under the Act on the 24th April and following days, at which two candidates came up for examination and both passed.

Another examination was set for the 11th December, but owing to the unfinished condition of the Government Laboratory consequent on its removal to Superior street, the Board of Examiners decided to adjourn it to a convenient date in February.

Other meetings of the Board of Examiners were held during the year, and the Board recommended that three licences to practise assaying be granted without examination under subsection (2), section 2, of the Act. In accordance with these recommendations, certificates have been duly issued by the Honourable the Minister of Mines.

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

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

Under section 2, subsection (1).

| | | | |
|--------------------------|----------------------|-------------------------|--------------------|
| Ayres, D. A. | Moyie. | Farquhar, J. B. | Vancouver. |
| Austin, John W. | Hazleton. | Fingland, John J. | |
| Backus, Geo. S. | Britannia Beach. | Grosvenor, F. E. | Vancouver. |
| Baker, C. S. H. | Greenwood. | Hamilton, Wm. J. | Grand Forks. |
| Barke, A. C. | | Hannay, W. H. | Rossland. |
| Belt, Sam'l Erwin | Greenwood. | Hart, P. E. | |
| Bernard, Pierre. | Monte Christo, Wash. | Hawkins, Francis | Silverton. |
| Bishop, Walter. | Grand Forks. | Hawes, F. B. | Ladysmith. |
| Buchanan, James. | Trail. | Hook, A. Harry. | Greenwood. |
| Campbell, Colin. | New Denver. | Hurter, C. S. | |
| Carmichael, Norman. | Clifton, Arizona. | Irwin, Geo. E. | Vancouver. |
| Church, George B. | | John, D. | Haileybury, Ont. |
| Cobeldick, W. M. | Scotland. | Kiddie, Geo. R. | Observatory Inlet. |
| Collinson, H. | Stewart. | King, R. | Greenwood. |
| Comrie, George H. | Vancouver. | Kitto, Geoffrey B. | Ladysmith. |
| Crerar, George | | Lang, J. G. | |
| Cruikshank, G. | Trail. | Langley, A. S. | Crofton. |
| Day, Athelstan. | Dawson. | Ley, Richard N. | Nelson. |
| Dedolph, Ed. | Kaslo. | Lindsay, W. W. | Rossland. |
| Dockrill, Walter R. | Chemainus. | Longworth, F. J. | Greenwood. |
| Dunn, G. W. | Rossland. | Martin, S. J. | Hazleton. |

Under section 2, subsection (1)—Concluded.

| | | | |
|---------------------------|-----------------|------------------------------|-----------------|
| Marsh, Richard | Spokane, Wash. | Steven, Wm. Gordon | |
| Marshall, H. Jukes | Vancouver. | Stewart, James W | Portland Canal. |
| Marshall, William S | Ladysmith. | Stimmel, B. A. | Trail. |
| Miles, Arthur D | | Sundberg, Gustave | Mexico City. |
| Mitchell, Charles T | Grand Forks. | Tally, Robert E | Spokane, Wash. |
| McCormick, Alan F | Ruth, Nevada. | Thomas, Percival W | |
| MacDonald, Alex. C | Vancouver. | Tretheway, John H | |
| Nicholls, Frank | Norway. | Turner, H. A | |
| O'Sullivan, John | Vancouver. | Vance, John F. C. B | Vancouver. |
| Parker, Robt. H | | Van Agnew, Frank | Siberia. |
| Parsenow, W. L | Victoria. | Vaughan-Williams, V. L | California. |
| Perkins, Walter G | Basin, Montana. | Wales, Roland T | |
| Pickard, T. D | Vancouver. | Watson, Wm. J | Ladysmith. |
| Richmond, Leigh | Duncan, E.C. | Welch, J. Cuthbert | Butte, Mont. |
| Robertson, T. R | | Wells, Ben T | Ladysmith. |
| Rodgers, Ch. B | Vancouver. | West, Geo. G | Vancouver. |
| Rombauer, A. B | Butte, Mont. | Whittaker, Delbert E | Victoria. |
| Schroeder, Curt. A | | Widdowson, E. Walter | Nelson. |
| Segsworth, Walter | Toronto, Ont. | Williams, W. A | Grand Forks. |
| Sharpe, Bert N | | Williams, Eliot H | Nelson. |
| Sim, Charles John | England. | Wimberly, S. H | Nevada, U.S.A. |
| Snyder, Blanchard M | | | |

Under section 2, subsection (2).

| | | | |
|--------------------------------|--------------------|-----------------------------|--------------------------|
| Archer, Allan | | Musgrave, William N | Mexico City. |
| Brennan, Charles Victor | Nova Scotia. | Mussen, Horace W | Siberia. |
| Browne, R. J | Rossland. | McArthur, Reginald E | |
| Browne, P. J | Nelson. | McDiarmid, S. S | |
| Bryant, Cecil M | Vancouver. | McGinnis, Wm. C | Queen Charlotte Islands. |
| Blaylock, Selwyn G | Trail. | McKay, Robt. B | Vancouver. |
| Burwash, N. A | | McLellan, John | Queen Charlotte Islands. |
| Cartwright, Cosmo T | Ottawa. | McMurtry, Gordon O | |
| Cavers, Thomas W | Rossland. | McNah, J. A | Trail. |
| Clothier, George A | Stewart. | McPhee, W. B | |
| Cole, Arthur A | Cobalt, Ont. | McVicar, John | Edmonton, Alta. |
| Cole, G. E | Rossland. | MacLennan, F. W | Rossland. |
| Cole, L. Heber | Ottawa, Ont. | Newton, W. E | Silverton. |
| Conway, E. J | | Outhett, Christopher | Kamloops. |
| Coulthard, R. W | Bellevue, Alta. | Pemberton, W. P. D | Victoria. |
| Cowans, Frederick | | Reid, J. A | Greenwood. |
| Dawson, V. E | Trail. | Ritchie, A. B | |
| Dixon, Howard A | Toronto, Ont. | Rose, J. H | |
| Galbraith, M. T | | Scott, Oswald Norman | |
| Gilman, Ellis P | Vancouver. | Shannon, S | |
| Green, J. T. Raoul | Blairmore, Alta. | Sharpe, G. P | Midland, Ont. |
| Guess, George A | | Shorey, P. M | Trail. |
| Gwillim, J. C | Kingston, Ontario. | Sloan, David | Three Forks. |
| Heal, John H | | Stevens, F. G | Mexico. |
| Hilliary, G. M | Idaho, U.S.A. | Sullivan, Michael H | Trail. |
| Holdich, Augustus H | England. | Sutherland, T. Fraser | |
| Johnston, William Steele | Lachine, Que. | Swinney, Leslie A. E | |
| Kaye, Alexander | Vancouver. | Thomson, H. Nellis | Anaconda, Montana. |
| Kendall, George | Vancouver. | Thomson, Robt. W | |
| Kilburn, Geo. H | | Watson, A. A | Olalla. |
| Lathe, Frank E | Grand Forks. | Watson, Henry | |
| Lay, Douglas | Silverton. | Workman, Ch. W | |
| Lee, Fred. E | Trail. | Wright, Richard | Rossland. |
| Lewis, Francis B | South Africa. | Wynne, Lewellyn C | |
| Merrit, Charles P | | Yuill, H. H | Silverton. |
| Murphy, C. J | | | |

Under section 2, subsection (3).

| | | | |
|---------------------------|------------|----------------------------|------------------|
| Carmichael, Herbert | Victoria. | McKillop, Alexander | Vancouver. |
| (Provincial Assayer.) | | Pellew-Harvey, Wm | London, England. |
| Harris, Henry | Australia. | Robertson, Wm. F | Victoria. |
| Hedley, Robt. R | Vancouver. | (Provincial Mineralogist.) | |
| Kiddie, Thos | Vancouver. | Marshall, Dr. T. R | London, England. |
| Sutton, W. J | Victoria. | | |

PREVIOUSLY ISSUED UNDER THE "BUREAU OF MINES ACT, 1897," SECTION 12.

Pinder, W. J

Thompson, James B

EXAMINATIONS FOR COAL-MINE OFFICIALS.

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

The certificates granted on the recommendation of such Board and the requirements shall be as follows:—

"In no case shall a certificate of competency be granted to any candidate until he shall satisfy the Board of Examiners—

"(a.) If a candidate for a manager, that he is a British subject and has had at least five years' experience in and about the practical workings of a coal-mine, and is at least twenty-five years of age; or, if he has taken a degree in scientific and mining training, including a course in coal-mining at a university or mining school approved by the Minister of Mines, that he has had at least four years' experience in and about the practical working of a coal-mine:

"(b.) If a candidate for overman, that he has had at least five years' experience in and about the practical working of a coal-mine, and is at least twenty-three years of age:

"(c.) If a candidate for shiftboss, fireboss, or shotlighter, that he has had at least three years' experience in and about the practical working of a coal-mine, is the holder of a certificate of competency as a coal-miner, and is at least twenty-three years of age:

"(d.) A candidate for a certificate of competency as manager, overman, shiftboss, fireboss, or shotlighter shall produce a certificate from a duly qualified medical practitioner or St. John's or other recognized ambulance society, showing that he has taken a course in ambulance-work fitting him, the said candidate, to give first aid to men injured in coal-mining operations.

"For the purposes of this section the experience demanded by such section shall be of such character as the Board shall consider of practical value in qualifying the candidate for the position to which such class of certificate applies.

"Experience had in a mine outside of the Province may be accepted should the Board consider such of equal value."

Any certificate is considered as including that of any lower class.

EXAMINATION FOR MINERS.

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

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

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS**FIRST-, SECOND-, AND THIRD-CLASS CERTIFICATES.***Report of Secretary of Board, Tully Boyce.*

I beg to submit the Annual Report covering the transactions of the above Board for the year ending December 31st, 1911.

The Board of Appointment of Examiners consists of Thos. R. Stockett, of Nanaimo, Chairman; George Williams, of Nanaimo, Vice-Chairman; Tully Boyce, of Nanaimo, Secretary; Andrew Bryden, of Merritt; and David G. Wilson, of Hosmer.

Towards the end of the year the Board sustained the loss, by resignation, of two active members: John John, of Wellington, who has removed from the Province, and F. H. Shepherd, M.P., who is representative in the House of Commons at Ottawa. The Honourable the Minister of Mines has not yet made appointments to fill the vacancies.

The meetings are held in the office of the Board at Nanaimo. Examinations were held for First-, Second-, and Third-class Certificates at Nanaimo, Cumberland, Merritt, and Fernie, on May 9th, 10th, and 11th, 1911.

The total number of candidates at this examination was as follows: For first-class, 24 (of which 13 failed); for second-class, 24 (of which 16 failed); for third-class, 66 (of which 30 failed); total number coming up for examination, 114.

The number of failures at this examination was both unprecedented and unaccountable, as the questions set were of the usual practical nature and no more technical than on previous occasions:

Owing to the large number of failures, the Board decided to hold another examination for First-, Second-, and Third-class Certificates at Nanaimo, Cumberland, Merritt, and Fernie, on October 3rd, 4th, and 5th, 1911.

The total number of candidates at this examination was as follows: For first-class, 17 (of which 11 failed); for second-class, 23 (of which 14 failed); for third-class, 39 (of which 8 failed); total number coming up for examination, 79.

The work of the candidates on this occasion was a slight improvement on the previous examination, but not up to the expectations of the Board.

The Board has no intention of lowering the standard of the examinations, so intending candidates, to be successful, must devote more time to study.

The fullest information as to the standard of efficiency required and copies of previous questions in printed form may be had by applying to the Secretary at Nanaimo.

For 1912 the Board has decided to hold an examination for First-, Second-, and Third-class Certificates at Nanaimo, Cumberland, Merritt, and Fernie, on May 7th, 8th, and 9th, 1912, at which it is hoped the intending candidates will show a marked improvement over the work of 1911.

I append hereto a list of the candidates who successfully passed the examinations in the various classes.

LIST OF SUCCESSFUL CANDIDATES AT EXAMINATIONS HELD ON MAY 9TH, 10TH, AND 11TH,
AND ON OCTOBER 3RD, 4TH, AND 5TH, 1911.

FIRST-CLASS CANDIDATES.

| NAME. | DATE. | No. |
|---------------------------|--------------------|-----|
| Andrew W. Baxter..... | June 10th, 1911 | |
| James Crowder | " | |
| James A. H. Church..... | " | |
| David Davies | " | |
| Joseph Foy | " | |
| Robert Fairfoull..... | " | |
| Clifford Humphries..... | " | |
| George Kellock | " | |
| D. A. Macauley..... | " | |
| Frank David Peacock | " | |
| James Strang..... | " | |
| Robert Bonar..... | October 28th, 1911 | |
| Nathaniel Howells | " | |
| J. T. Musgrave | " | |
| J. W. Powell..... | " | |
| A. E. Smith | " | |
| J. E. Spicer | " | |

SECOND-CLASS CANDIDATES.

| NAME. | DATE. | No. |
|-------------------------|--------------------|-------|
| John H. Brownrigg | June 10th, 1911 | B 124 |
| D. McMillan | " | B 125 |
| John M. Gillespie | " | B 126 |
| Thomas Mather..... | " | B 127 |
| George Luck..... | " | B 128 |
| Joseph Neen | " | B 129 |
| Abner G. Horrocks..... | " | B 130 |
| Matthew Stafford | " | B 131 |
| William Reid..... | October 28th, 1911 | B 132 |
| J. A. McDonald..... | " | B 133 |
| R. J. Brown | " | B 134 |
| S. K. Mattishaw..... | " | B 135 |
| James L. Brown | " | B 136 |
| James E. Knowles..... | " | B 137 |
| A. W. Courtney | " | B 138 |
| M. T. Raynes..... | " | B 139 |
| James Renny | " | B 140 |

THIRD-CLASS CANDIDATES.

| NAME. | DATE. | No. |
|-------------------------------|--------------------|-------|
| Eddy Limb..... | June 10th, 1911 | C 393 |
| Norman Huby..... | " | C 394 |
| William Strang..... | " | C 395 |
| William Beveridge..... | " | C 396 |
| Robinson Wilson..... | " | C 397 |
| James Martin..... | " | C 398 |
| Ernest Leonard Warburton..... | " | C 399 |
| Thomas Strang..... | " | C 400 |
| A. Derbyshire..... | " | C 401 |
| William Whitehouse..... | " | C 402 |
| William Reid..... | " | C 403 |
| John Samuel Williams..... | " | C 404 |
| Lewis Clark..... | " | C 405 |
| Joseph W. Horbury..... | " | C 406 |
| James Coulthard..... | " | C 407 |
| Robert S. Brown..... | " | C 408 |
| Isaac Dykes..... | " | C 409 |
| John Littler..... | " | C 410 |
| John Bennie..... | " | C 411 |
| James Brown..... | " | C 412 |
| David Irvine..... | " | C 413 |
| John Miles..... | " | C 414 |
| Robert Barker..... | " | C 415 |
| John Loxton..... | " | C 416 |
| Matthew Littler..... | " | C 417 |
| Robert Littler..... | " | C 418 |
| Alexander McLachlan..... | " | C 419 |
| Andrew Cairnes..... | " | C 420 |
| John Mackie..... | " | C 421 |
| William Bauld..... | " | C 422 |
| Robert D. Brown..... | " | C 423 |
| Jonathan Henney..... | " | C 424 |
| John Donnachie..... | " | C 425 |
| William James Keenan..... | " | C 426 |
| Peter McKenzie..... | " | C 427 |
| George Loxton..... | " | C 428 |
| John Quinn..... | October 28th, 1911 | C 429 |
| Alexander Allen..... | " | C 430 |
| William W. Clarkstone..... | " | C 431 |
| Stewart Lynch..... | " | C 432 |
| Arthur Challoner..... | " | C 433 |
| Alexander Orr..... | " | C 434 |
| James Glen..... | " | C 435 |
| Alexander Livingstone..... | " | C 436 |
| John Anderson..... | " | C 437 |
| Edward Wilkinson..... | " | C 438 |
| Walter Steele..... | " | C 439 |
| John Chester..... | " | C 440 |
| James Quinn..... | " | C 441 |
| John McKinley..... | " | C 442 |
| Hollis Camamile..... | " | C 443 |
| John Hamilton..... | " | C 444 |
| Allen Ford..... | " | C 445 |
| Peter Myers..... | " | C 446 |
| J. T. Taylor..... | " | C 447 |
| John McDonald..... | " | C 448 |
| Thomas Biggs..... | " | C 449 |
| Robert Baxter..... | " | C 450 |
| Robert Brown..... | " | C 451 |
| T. J. Fitzpatrick..... | " | C 452 |
| James Fairfoull..... | " | C 453 |
| Thomas Archibald..... | " | C 454 |
| Robert Doodson..... | " | C 455 |
| John W. Shipley..... | " | C 456 |
| Herbert Webb..... | " | C 457 |
| J. H. Richardson..... | " | C 458 |
| George Dingsdale..... | " | C 459 |

Registered List of Holders of Certificates of Competency as Coal-mine Officials.

FIRST-CLASS CERTIFICATES.—SERVICE CERTIFICATES ISSUED UNDER SECTION 39, "COAL MINES REGULATION ACT, 1877."

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

FIRST-CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL MINES REGULATION ACT, 1897."

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

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

| NAME. | DATE. |
|----------------------|----------------------|
| Baxter, Andrew | June 10th, 1911 |
| Biggs, J. G. | July 22nd, 1908 |
| Bonar, Robert | October 28th, 1911 |
| Bridge, Edward | July 22nd, 1908 |
| Caulfield, B. | May 1st, 1909 |
| Church, James A. H. | June 10th, 1911 |
| Crowder, James | " 10th, " |
| Darbyshire, James | November 9th, 1907 |
| Davidson, W. A. | May 1st, 1909 |
| Davies, David | June 10th, 1911 |
| Devlin, Henry | May 1st, 1909 |
| Elliott, Daniel | November 9th, 1907 |
| Emmerson, Joseph | " 9th, " |
| Evans, Evan | " 9th, " |
| Fairfoull, Robert | June 10th, 1911 |
| Foy, Joseph | " 10th, " |
| France, Thos. | November 22nd, 1906 |
| Fraser, Norman | March 4th, 1905 |
| Freeman, H. N. | May 1st, 1909 |
| Galloway, C. F. J. | July 22nd, 1908 |
| Graham, Charles | November 14th, 1905 |
| Graham, Thomas | " 9th, 1907 |
| Gray, James | " 27th, 1909 |
| Heathcote, Elijah | March 4th, 1905 |
| Henderson, Robert | November 27th, 1909 |
| Holden, James | May 1st, " |
| Howells, Nathaniel | October 28th, 1911 |
| Humphries, Clifford | June 10th, " |
| Jackson, Thos. R. | November 9th, 1907 |
| James, William | July 22nd, 1908 |
| Keith, Thomas | November 9th, 1907 |
| Kellock, George | June 10th, 1911 |
| Kinsman, A. D. | September 10th, 1910 |
| Knox, T. K. | July 27th, 1909 |
| Lancaster, W. | " 22nd, 1908 |
| Lockhart, Wm. | May 1st, 1909 |
| Macauley, D. A. | June 10th, 1911 |
| McCulloch, J. | September 10th, 1910 |
| McGuickie, Thomas | July 22nd, 1908 |
| McMillan, J. H. | September 10th, 1910 |
| McVicar, Samuel | May 1st, 1909 |
| Millar, John K. | November 22nd, 1906 |
| Montgomery, John W. | May 1st, 1909 |
| Mordy, Thomas | September 10th, 1910 |
| Musgrave, J. T. | October 28th, 1911 |
| Newton, John | July 22nd, 1908 |
| Peacock, Frank David | October 28th, 1911 |
| Powell, J. W. | June 10th, " |
| Saville, Luther | July 22nd, 1908 |
| Shanks, John | May 1st, 1909 |
| Shaw, Alex | November 14th, 1905 |
| Shenton, T. J. | September 10th, 1910 |
| Shone, Samuel | May 1st, 1909 |
| Sloan, Hugh | November 27th, " |
| Smith, A. E. | October 28th, 1911 |
| Smith, Joseph | July 22nd, 1908 |
| Spicer, J. E. | October 28th, 1911 |
| Spruston, T. A. | November 7th, 1909 |
| Stevens, L. C. | " 27th, " |
| Stewart, R. T. | September 10th, 1910 |
| Strachan, Robert | March 4th, 1905 |
| Strang, James | June 10th, 1911 |
| Thomas, J. D. | September 10th, 1910 |
| Thorne, B. L. | " 10th, " |
| Wallbank, J. | " 10th, " |
| Williams, Thos. H. | November 22nd, 1906 |
| Wylie, John | July 22nd, 1908 |

SECOND-CLASS CERTIFICATES OF SERVICE.

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

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

| NAME. | DATE. | Cer. No. |
|--------------------------|----------------------|----------|
| Adamson, Robert | September 10th, 1910 | B 120 |
| Anderson, Robert | " 10th, 1910 | B 119 |
| Barclay, Andrew | July 29th, 1905 | B 25 |
| Bastian, John | November 2nd, 1907 | B 42 |
| Bevis, Nathaniel | September 10th, 1910 | B 123 |
| Biggs, J. | May 1st, 1909 | B 94 |
| Biggs, John G. | November 2nd, 1907 | B 40 |
| Brace, Thomas | " 27th, 1909 | B 96 |
| Bridge, Edward | October 23rd, 1906 | B 33 |
| Brown, David | September 10th, 1910 | B 108 |
| Brown, James L. | October 28th, 1911 | B 136 |
| Brown, John C. | " 23rd, 1906 | B 39 |
| Brown, R. J. | " 28th, 1911 | B 134 |
| Brownrigg, John H. | June 10th, " | B 124 |
| Bushell, J. P. | May 1st, 1909 | B 81 |
| Carroll, Henry | July 22nd, 1908 | B 62 |
| Caulfield, Bernard | October 23rd, 1906 | B 30 |
| Cawthorne, L. | May 1st, 1909 | B 93 |
| Churchill, James | July 22nd, 1908 | B 65 |
| Commons, Wm. | September 10th, 1910 | B 115 |
| Cook, Joseph | July 22nd, 1908 | B 64 |
| Courtney, A. W. | October 28th, 1911 | B 138 |
| Crawford, David | May 1st, 1909 | B 88 |
| Cunliffe, T. | " 1st, " | B 78 |
| Daniels, David | November 2nd, 1907 | B 53 |
| Darbyshire, James | October 23rd, 1906 | B 32 |
| Davies, Stephen | September 10th, 1910 | B 113 |
| Devlin, Henry | November 2nd, 1907 | B 44 |
| Dunsmuir, John | " 14th, 1905 | B 26 |
| Dykes, J. W. | May 1st, 1909 | B 77 |
| Eccleston, Wm. | " 1st, " | B 87 |
| Evans, Evan | March 11th, 1905 | B 2 |
| Fairfoull, R. | May 1st, 1909 | B 83 |
| Finlayson, James | July 29th, 1905 | B 21 |
| Foster, W. R. | November 27th, 1909 | B 102 |
| France, Thos. | " 14th, 1905 | B 27 |
| Francis, Enoch | May 1st, 1909 | B 86 |
| Francis, James | July 22nd, 1908 | B 63 |
| Freeman, Henry N. | November 2nd, 1907 | B 45 |
| Gardner, John | July 22nd, 1908 | B 68 |
| Gillespie, Hugh | " 29th, 1905 | B 24 |
| Gillespie, John | October 23rd, 1906 | B 36 |

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

| NAME. | DATE. | Cer. No. |
|----------------------|----------------------|----------|
| Gillespie, John M. | June 10th, 1911 | B 126 |
| Graham, Chas. | March 4th, 1905 | B 1 |
| Gray, David. | May 1st, 1909 | B 76 |
| Henderson, Robert. | July 22nd, 1908 | B 60 |
| Horrocks, Abner G. | June 10th, 1911 | B 130 |
| Howells, N. | November 27th, 1909 | B 97 |
| Hudson, George. | September 10th, 1910 | B 121 |
| Hughes, John C. | " 10th, " | B 109 |
| Jackson, Thos. R. | March 4th, 1905 | B 5 |
| James, David. | November 2nd, 1907 | B 58 |
| Jarrett, Fred. | May 1st, 1909 | B 84 |
| Jaynes, Frank. | September 10th, 1910 | B 111 |
| John, Howell. | " 10th, " | B 122 |
| Johnson, Moses. | May 1st, 1909 | B 75 |
| Jones, William. | July 29th, 1905 | B 20 |
| Jones, William T. | " 22nd, 1908 | B 66 |
| Jordon, Thos. | November 27th, 1909 | B 104 |
| Knowles, James E. | October 28th, 1911 | B 137 |
| Lancaster, William. | November 2nd, 1907 | B 50 |
| Lee, Robert John. | September 10th, 1910 | B 110 |
| Lockhart, William. | October 23rd, 1906 | B 34 |
| Luck, George. | June 10th, 1911 | B 128 |
| Massey, H. | November 27th, 1909 | B 99 |
| Mather, Thomas. | June 10th, 1911 | B 127 |
| Mattishaw, S. K. | October 28th, " | B 135 |
| Matusky, A. | May 1st, 1909 | B 91 |
| Mazay, W. J. | November 27th, " | B 101 |
| Merryfield, William. | July 22nd, 1908 | B 61 |
| Miard, Hy. E. | September 10th, 1910 | B 107 |
| Middleton, Robert. | July 22nd, 1908 | B 72 |
| Monks, James. | November 2nd, 1907 | B 55 |
| Morgan, John. | " 2nd, " | B 43 |
| Morris, John. | July 22nd, 1908 | B 67 |
| Morton, Robert W. | " 22nd, " | B 59 |
| Musgrove, J. | May 1st, 1909 | B 90 |
| McDonald, J. A. | October 28th, 1911 | B 133 |
| McFegan, W. | November 27th, 1909 | B 106 |
| McGuckie, Thomas M. | October 23rd, 1906 | B 35 |
| McKelvie, J. | May 1st, 1909 | B 92 |
| McKendrick, And. | September 10th, 1910 | B 112 |
| McKinnell, David. | October 23rd, 1906 | B 37 |
| McMillan, D. | June 10th, 1911 | B 125 |
| McPherson, James E. | July 22nd, 1908 | B 73 |
| Neen, Joseph. | June 10th, 1911 | B 129 |
| Nellist, David. | March 4th, 1905 | B 6 |
| Newton, John. | October 23rd, 1906 | B 31 |
| Newton, Wm. | September 10th, 1910 | B 116 |
| O'Brien, George. | May 1st, 1909 | B 82 |
| Ovington, John. | November 2nd, 1907 | B 52 |
| Parkinson, T. | May 1st, 1909 | B 80 |
| Parnham, Charles. | November 2nd, 1907 | B 49 |
| Rankin, Geo. | " 27th, 1909 | B 103 |
| Raynes, M. T. | October 28th, 1911 | B 139 |
| Reid, Thomas. | July 29th, 1905 | B 23 |
| Reid, Wm. | October 28th, 1911 | B 132 |
| Renny, James. | " 28th, " | B 140 |
| Richards, Thomas. | November 2nd, 1907 | B 57 |
| Rigby, John. | July 29th, 1905 | B 29 |
| Roberts, Ebenezer. | September 10th, 1910 | B 117 |
| Robinson, William. | July 22nd, 1908 | B 69 |
| Rogers, George. | May 1st, 1909 | B 79 |
| Russell, Daniel. | November 2nd, 1907 | B 41 |
| Russell, John. | " 2nd, " | B 47 |
| Saville, Luther. | " 2nd, " | B 51 |

SECOND-CLASS CERTIFICATES ISSUED UNDER "COAL MINES REGULATION ACT FURTHER
AMENDMENT ACT, 1904."—*Concluded.*

| NAME. | DATE. | Cer. No. |
|---------------------------|----------------------|----------|
| Shaw, Alex | July 29th, 1905 | B 19 |
| Somerville, Alex | March 4th, " | B 4 |
| Spruston, Thos. A. | November 2nd, 1907 | B 46 |
| Stafford, Matthew | June 10th, 1911 | B 131 |
| Stewart, J. M. | May 1st, 1909 | B 95 |
| Stockwell, William | November 2nd, 1907 | B 56 |
| Thomas, J. B. | " 27th, 1909 | B 105 |
| Thomas, Joseph D. | October 23rd, 1906 | B 38 |
| Thompson, Joseph | September 10th, 1910 | B 114 |
| Tonge, Thomas | July 22nd, 1908 | B 71 |
| Vanhulle, Peter | November 2nd, 1907 | B 54 |
| Virgo, J. | May 1st, 1909 | B 89 |
| Watson, Adam G. | November 14th, 1905 | B 28 |
| Webber, John Frank | March 4th, " | B 3 |
| Wesledge, W. | November 27th, 1909 | B 98 |
| White, John | " 2nd, 1907 | B 48 |
| Williams, Watkin | September 10th, 1910 | B 118 |
| Wilson, Thomas | July 22nd, 1908 | B 74 |
| Wilson, W. | " 22nd, " | B 70 |
| Worthington, Joseph | May 1st, 1909 | B 85 |
| Wyllie, John B. | July 29th, 1908 | B 22 |

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

| NAME. | DATE. | Cer. No. |
|-------------------------|----------------------|----------|
| Adamson, Robert | May 1st, 1909 | C 323 |
| Aleen, Alexander | October 28th, 1911 | C 430 |
| Almond, Alex | " 1st, 1907 | C 252 |
| Almond, W. | July 22nd, 1908 | C 286 |
| Anderson, John | October 28th, 1911 | C 437 |
| Archibald, Thomas | " 28th, " | C 454 |
| Baggaley, J. | July 22nd, 1908 | C 300 |
| Barker, Robert | June 10th, 1911 | C 415 |
| Barlow, B. R. | May 1st, 1909 | C 337 |
| Barnes, B. J. | " 1st, " | C 346 |
| Bauld, Wm. | June 10th, 1911 | C 422 |
| Baxter, Robert | October 28th, " | C 450 |
| Beeton, D. H. | May 1st, 1909 | C 338 |
| Bennie, John | June 10th, 1911 | C 411 |
| Beveridge, Wm. | " 10th, " | C 396 |
| Biggs, John | March 4th, 1905 | C 210 |
| Biggs, Thomas | October 28th, 1911 | C 449 |
| Birchell, Richard | " 1st, 1907 | C 266 |
| Blewett, Ernest | July 22nd, 1908 | C 298 |
| Bradley, William | " 22nd, " | C 291 |
| Bridge, Edward | " 29th, 1905 | C 223 |
| Briscoe, F. | " 22nd, 1908 | C 309 |
| Brown, David | November 1st, 1909 | C 348 |
| Brown, James | September 10th, 1910 | C 364 |
| Brown, James | June 10th, 1911 | C 412 |
| Brown, John | September 10th, 1910 | C 392 |
| Brown, Robert | October 28th, 1911 | C 451 |
| Brown, Robert D. | June 10th, " | C 423 |
| Brown, Robert S. | " 10th, " | C 408 |
| Brown, Thomas | July 22nd, 1908 | C 278 |
| Brownrigg, J. H. | " 22nd, " | C 276 |
| Bullen, Thomas | September 10th, 1910 | C 379 |
| Bushell, Jas. P. | October 1st, 1907 | C 264 |

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

| NAME. | DATE. | Cer. No. |
|---------------------|----------------------|----------|
| Cairnes, Andrew | June 10th, 1911 | C 420 |
| Calverly, Joseph | September 10th, 1910 | C 375 |
| Camamile, Hollis | October 28th, 1911 | C 443 |
| Catchpole, Charles | July 29th, 1905 | C 227 |
| Caulfield, J. | May 1st, 1909 | C 321 |
| Challoner, Arthur | October 28th, 1911 | C 433 |
| Cheetham, Ben | July 22nd, 1908 | C 311 |
| Chester, John | October 28th, 1911 | C 440 |
| Clark, Lewis | June 10th, " | C 405 |
| Clarkstone, Wm. W. | October 28th, " | C 431 |
| Clifford, William | July 22nd, 1908 | C 313 |
| Commons, William | " 22nd, " | C 304 |
| Cooke, Joseph | March 4th, 1905 | C 209 |
| Coulthard, James | June 10th, 1911 | C 407 |
| Crawford, David | March 4th, 1905 | C 208 |
| Cunningham, G. F. | November 11th, " | C 229 |
| Cunliffe, Thos. | October 1st, 1907 | C 265 |
| Davis, William | May 1st, 1909 | C 339 |
| Derbyshire, A. | June 10th, 1911 | C 401 |
| Dewar, Alex. | September 10th, 1910 | C 369 |
| Devlin, Edward | October 23rd, 1906 | C 241 |
| Dingsdale, Geo. | " 28th, 1911 | C 459 |
| Doherty, J. J. | May 1st, 1909 | C 340 |
| Dollemore, F. J. G. | " 1st, " | C 328 |
| Doney, John | March 4th, 1905 | C 211 |
| Donnachie, John | June 10th, 1911 | C 425 |
| Doodson, Robert | October 28th, " | C 455 |
| Douglas, D. B. | " 23rd, 1906 | C 235 |
| Dykes, Isaac | June 10th, 1911 | C 409 |
| Dykes, Joseph W. | October 1st, 1907 | C 248 |
| Evans, D. | July 22nd, 1908 | C 284 |
| Ewart, Alex. | September 10th, 1910 | C 374 |
| Fairfoull, James | October 28th, 1911 | C 453 |
| Fitzpatrick, T. J. | " 28th, " | C 452 |
| Ford, Allen | " 28th, " | C 445 |
| Francis, James | " 1st, 1907 | C 250 |
| Freeman, H. G. | November 14th, 1905 | C 230 |
| Frew, A. | " 27th, 1909 | C 360 |
| Frodsham, Vincent | July 22nd, 1908 | C 282 |
| Garbett, Richard | September 10th, 1910 | C 377 |
| Glen, James | October 28th, 1911 | C 435 |
| Graham, John | July 22nd, 1908 | C 292 |
| Hallinan, W. | May 1st, 1909 | C 343 |
| Halsall, J. | July 22nd, 1908 | C 307 |
| Hamilton, John | October 28th, 1911 | C 444 |
| Harwood, Fred | September 10th, 1910 | C 384 |
| Harvie, George | " 10th, " | C 378 |
| Hayes, Edward | May 1st, 1909 | C 320 |
| Heaps, Robert | September 10th, 1910 | C 373 |
| Henney, Jonathan | June 10th, 1911 | C 424 |
| Hilley, Fred | July 22nd, 1908 | C 290 |
| Hilton, R. G. | September 10th, 1910 | C 376 |
| Hodson, R. H. | March 4th, 1905 | C 216 |
| Horbury, Joseph W. | June 10th, 1911 | C 406 |
| Horrocks, A. G. | May 1st, 1909 | C 324 |
| Horwood, S. | July 22nd, 1908 | C 312 |
| Howells, Nathaniel | May 1st, 1909 | C 316 |
| Huby, Norman | June 10th, 1911 | C 394 |
| Hutchison, Ben | November 14th, 1905 | C 232 |
| Hutchison, F. | " 27th, 1909 | C 358 |
| Irvine, David | June 10th, 1911 | C 413 |
| Jarrett, Fred. J. | October 1st, 1907 | C 256 |
| Jaynes, Frank | July 22nd, 1908 | C 277 |
| Jemson, J. W. | March 4th, 1905 | C 205 |
| Jenkins, John | September 10th, 1910 | C 390 |

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

| NAME. | DATE. | Cer. No. |
|---------------------------|----------------------|----------|
| John, Howel | July 22nd, 1908 | C 305 |
| Johnson, Moses | October 1st, 1907 | C 258 |
| Jones, W. T. | March 4th, 1905 | C 221 |
| Joyce, W. | November 27th, 1909 | C 361 |
| Judge, Peter | September 10th, 1910 | C 391 |
| Keenan, Wm. James | June 10th, 1911 | C 426 |
| Kirkeberg, H. S. | November 27th, 1909 | C 350 |
| Lancaster, William | October 23rd, 1906 | C 243 |
| Lane, Joseph | " 1st, 1907 | C 254 |
| Leeman, T. | May 1st, 1909 | C 345 |
| Lewis, Benj. J. | September 10th, 1910 | C 386 |
| Liddle, John | July 29th, 1905 | C 228 |
| Limb, Eddy | June 10th, 1911 | C 393 |
| Littler, John | " 10th, " | C 410 |
| Littler, Matthew | " 10th, " | C 417 |
| Littler, Robert | " 10th, " | C 418 |
| Livingstone, Alex. | October 28th, " | C 436 |
| Loxton, George | June 10th, " | C 428 |
| Loxton, John | " 10th, " | C 416 |
| Lynch, Stewart | October 28th, " | C 432 |
| Mackie, John | June 10th, " | C 421 |
| Makin, J. Wm. | September 10th, 1910 | C 385 |
| Malone, Patrick | October 1st, 1907 | C 247 |
| Mansfield, A. | May 1st, 1909 | C 336 |
| Manson, T. H. | July 22nd, 1908 | C 280 |
| Marsh, John | October 1st, 1907 | C 270 |
| Martin, James | June 10th, 1911 | C 398 |
| Mason, J. | July 22nd, 1908 | C 297 |
| Massey, Henry | May 1st, 1909 | C 317 |
| Mather, Thomas | July 22nd, 1908 | C 293 |
| Mattishaw, Samuel K. | October 23rd, 1906 | C 237 |
| Matusky, Andrew | " 1st, 1907 | C 259 |
| Mawson, J. T. | November 27th, 1909 | C 359 |
| Merrifield, George | October 23rd, 1906 | C 239 |
| Merrifield, William | " 23rd, " | C 236 |
| Miles, John | June 10th, 1911 | C 414 |
| Millar, Peter | September 10th, 1910 | C 388 |
| Mitchell, C. | May 1st, 1909 | C 322 |
| Mitchell, Henry | September 10th, 1910 | C 366 |
| Monks, James | November 14th, 1905 | C 234 |
| Moore, George | October 23rd, 1906 | C 242 |
| Moore, J. | May 1st, 1909 | C 335 |
| Moreland, Thomas | July 22nd, 1908 | C 299 |
| Morgan, John | " 29th, 1905 | C 224 |
| Myers, Peter | October 28th, 1911 | C 446 |
| McAlpine, John | March 4th, 1905 | C 217 |
| McBroom, Al. | July 2nd, 1908 | C 287 |
| McCulloch, James | May 1st, 1909 | C 315 |
| McDonald, John | October 28th, 1911 | C 448 |
| McFegan, W. | May 1st, 1909 | C 319 |
| McGarry, M. | " 1st, " | C 326 |
| McGuckie, Thomas | July 29th, 1905 | C 226 |
| McKelvie, J. | " 22nd, 1908 | C 285 |
| McKenzie, Peter | June 10th, 1911 | C 427 |
| McKinley, John | October 28th, " | C 442 |
| McLachlan, Alex. | June 10th, " | C 419 |
| McLean, M. D. | September 10th, 1910 | C 389 |
| McLellan, William | March 4th, 1905 | C 219 |
| McLeod, James | July 22nd, 1908 | C 296 |
| McMillan, D. | September 10th, 1910 | C 363 |
| McNay, Carmichael | July 22nd, 1908 | C 306 |
| McNeill, Adam T. | " 22nd, " | C 281 |
| McNeill, Robert | September 10th, 1910 | C 387 |
| Neen, Joseph | November 27th, 1909 | C 352 |
| Nelson, Horatio | October 1st, 1907 | C 263 |

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

| NAME. | DATE. | Cer. No. |
|--|----------------------|----------|
| O'Brien, Charles..... | November 27th, 1909 | C 349 |
| Orr, Alexander..... | October 28th, 1911 | C 434 |
| Oswald, Geo. L..... | September 10th, 1910 | C 370 |
| Owen, T..... | May 1st, 1909 | C 347 |
| Parker, L..... | " 1st, " | C 341 |
| Parkinson, T..... | July 22nd, 1908 | C 289 |
| Perry, James..... | March 4th, 1905 | C 215 |
| Philips, T..... | November 27th, 1909 | C 356 |
| Pickup, A..... | July 22nd, 1908 | C 310 |
| Pieton, W..... | May 1st, 1909 | C 333 |
| Plank, Samuel..... | November 14th, 1905 | C 233 |
| Price, Walter..... | September 10th, 1910 | C 371 |
| Puckey, Wm. R..... | " 10th, " | C 368 |
| Quinn, James..... | October 28th, 1911 | C 441 |
| Quinn, John..... | " 28th, " | C 429 |
| Rallison, R..... | July 22nd, 1908 | C 279 |
| Rankin, George..... | " 22nd, " | C 275 |
| Ratcliffe, Thomas..... | October 1st, 1907 | C 253 |
| Raynor, Fred..... | " 1st, " | C 257 |
| Reid, Robert..... | September 10th, 1910 | C 383 |
| Reid, Wm..... | June 10th, 1911 | C 403 |
| Reilly, Thomas..... | July 22nd, 1908 | C 303 |
| Renny, Jas..... | November 27th, 1909 | C 354 |
| Richards, James..... | " 1st, 1907 | C 249 |
| Richards, Samuel..... | October 23rd, 1906 | C 244 |
| Richardson, J. H..... | " 28th, 1911 | C 458 |
| Rigby, John..... | July 29th, 1905 | C 225 |
| Roberts, E..... | May 1st, 1909 | C 327 |
| Robinson, M..... | " 1st, " | C 332 |
| Roper, William..... | July 22nd, 1908 | C 274 |
| Russell, Robert..... | November 27th, 1909 | C 351 |
| Rutledge, Edwin..... | July 22nd, 1908 | C 302 |
| Saville, E. O..... | October 1st, 1907 | C 251 |
| Scott, Henry..... | July 22nd, 1908 | C 294 |
| Shanks, David..... | September 10th, 1910 | C 372 |
| Sharp, James..... | May 1st, 1909 | C 325 |
| Sharples, J. T..... | September 10th, 1910 | C 380 |
| Shearer, L..... | May 1st, 1909 | C 330 |
| Shenfield, W..... | November 27th, " | C 357 |
| Shipley, John W..... | October 28th, 1911 | C 456 |
| Shooter, Joseph..... | " 1st, 1907 | C 261 |
| Shortman, J..... | May 1st, 1909 | C 331 |
| Simister, J. H..... | November 27th, " | C 353 |
| Simister, W..... | May 1st, " | C 334 |
| Skelton, Thos..... | " 1st, " | C 344 |
| Smith, A. E..... | September 10th, 1910 | C 367 |
| Smith, Joseph..... | March 4th, 1905 | C 207 |
| Smith, Thos. J..... | October 1st, 1907 | C 271 |
| Sparks, Edward (C 314 issued in lieu of C 255 destroyed by Fernie fire) .. | " 1st, " | C 255 |
| Spencer, G..... | May 1st, 1909 | C 329 |
| Sprusten, R. L..... | November 27th, " | C 355 |
| Spruston, Thomas A..... | March 4th, 1905 | C 206 |
| Stafford, M..... | September 10th, 1910 | C 382 |
| Steele, Walter..... | October 28th, 1911 | C 439 |
| Stewart, James M..... | " 23rd, 1906 | C 240 |
| Stockwell, William..... | " 23rd, " | C 238 |
| Strang, Thomas..... | June 10th, 1911 | C 400 |
| Strang, Wm..... | " 10th, " | C 395 |
| Suik, George..... | May 1st, 1909 | C 318 |
| Taylor, Charles M..... | March 4th, 1905 | C 213 |
| Taylor, J. T..... | October 28th, 1911 | C 447 |
| Taylor, Leroy..... | September 10th, 1910 | C 381 |
| Thomas, Thomas..... | " 10th, " | C 365 |
| Thomas, John B..... | November 14th, 1905 | C 231 |
| Thomas, Joseph..... | March 4th, " | C 220 |

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL MINES REGULATION ACT FURTHER
AMENDMENT ACT, 1904."—*Concluded.*

| NAME. | DATE. | Cer. No. |
|---------------------------------|--------------------|----------|
| Thomas, Warriett | October 1st, 1907 | C 273 |
| Thompson, Thomas | " 1st, " | C 267 |
| Thompson, Joseph | " 1st, " | C 269 |
| Thomson, Duncan | March 4th, 1905 | C 218 |
| Wallace, Fred | October 1st, 1907 | C 260 |
| Warburton, Ernest Leonard | June 10th, 1911 | C 399 |
| Watson, Adam G | March 4th, 1905 | C 212 |
| Watson, George | July 22nd, 1908 | C 288 |
| Watson, William | October 22nd, 1906 | C 246 |
| Webb, Herbert | " 28th, 1911 | C 457 |
| Weeks, John | March 4th, 1905 | C 214 |
| White, John | October 22nd, 1906 | C 245 |
| Whitehouse, Wm | June 10th, 1911 | C 402 |
| Wilcock, J | July 22nd, 1908 | C 308 |
| Wilkinson, Edward | October 28th, 1911 | C 438 |
| Williams, John Sam | June 10th, " | C 404 |
| Williams, Watkin | " 22nd, 1908 | C 301 |
| Wilson, Robinson | " 10th, 1911 | C 397 |
| Wilson, Thomas | October 1st, 1907 | C 272 |
| Wilson, William | " 1st, " | C 262 |
| Winstanley, H | July 22nd, 1908 | C 283 |
| Wintle, Thomas A | " 29th, 1905 | C 222 |
| Worthington, J | " 22nd, 1908 | C 295 |

COAL-MINES OFFICIALS.

Third-class Certificates issued under "Coal Mines Regulation Act Further Amendment Act, 1904," sec. 38, subsec. (2), in exchange for Certificates issued under the "Coal Mines Regulation Act Amendment Act, 1901."

| Name. | Date. | Certificate No. | Name. | Date. | Certificate No. |
|--------------------------|----------------|-----------------|------------------------|----------------|-----------------|
| Adam, Robert..... | Oct. 12, 1904 | C 42 | Malpass, James | Nov. 7, 1904 | C 113 |
| Addison, Thos..... | Dec. 10, 1904 | C 52 | Marsden, John | May 3, 1904 | C 21 |
| Aitken, James..... | Oct. 24, 1904 | C 44 | Marshall, Howard | Dec. 6, 1905 | C 127 |
| Alexander, Wm..... | Feb. 17, 1905 | C 72 | Matthews, Chas..... | April 27, 1904 | C 9 |
| Allsop, Harry | Oct. 11, 1904 | C 34 | Miard, Harry E..... | March 3, 1905 | C 76 |
| Ashman, Jabez | Feb. 5, 1907 | C 131 | Middleton, Robt..... | Feb. 11, 1905 | C 71 |
| Aughinvole, Alex..... | March 29, 1905 | C 89 | Miles, Thos..... | Aug. 10, 1904 | C 31 |
| Barclay, Andrew | April 27, 1904 | C 19 | Miller, Thos. K..... | Feb. 21, 1905 | C 74 |
| Barclay, James..... | April 27, 1904 | C 20 | McKenzie, John R..... | Oct. 12, 1904 | C 40 |
| Barclay, John..... | April 17, 1905 | C 111 | McKinnell, David..... | March 29, 1905 | C 99 |
| Berry, James..... | Feb. 11, 1905 | C 70 | McKinnon, Arch'd..... | April 3, 1905 | C 102 |
| Bickle, Thos..... | Oct. 11, 1904 | C 37 | McMillan, Peter..... | March 29, 1905 | C 94 |
| Biggs, Henry..... | April 10, 1905 | C 110 | McMurtrie, John..... | March 29, 1905 | C 96 |
| Black, John S..... | April 3, 1905 | C 108 | Moore, Wm. H..... | June 17, 1905 | C 119 |
| Bowie, James..... | May 13, 1905 | C 116 | Morris, John..... | Dec. 27, 1904 | C 57 |
| Briscoe, Edward..... | Oct. 10, 1906 | C 129 | Myles, Walter..... | April 3, 1905 | C 100 |
| Campbell, Dan..... | March 29, 1905 | C 93 | Nash, Isaac..... | June 1, 1904 | C 120 |
| Carr, Jos. E..... | Oct. 11, 1904 | C 36 | Neave, Wm..... | Oct. 12, 1904 | C 43 |
| Carroll, Harry..... | March 29, 1905 | C 98 | Nellist, David..... | April 27, 1904 | C 13 |
| Clarkson, Alexander..... | April 27, 1904 | C 18 | Nelson, James..... | April 27, 1904 | C 16 |
| Collishaw, John..... | Feb. 7, 1905 | C 68 | Newton, John..... | Oct. 12, 1904 | C 39 |
| Comb, John..... | March 23, 1904 | C 2 | Nimmo, Jas. P..... | April 3, 1905 | C 103 |
| Cosier, Wm..... | March 29, 1905 | C 86 | O'Brien, Geo..... | Feb. 6, 1905 | C 66 |
| Courtney, A. W..... | Nov. 2, 1904 | C 45 | Pengelly, Richard..... | Dec. 27, 1904 | C 58 |
| Crawford, Frank..... | April 6, 1904 | C 7 | Perrie, Jas..... | March 15, 1905 | C 81 |
| Daniels, David..... | April 27, 1904 | C 12 | Perry, James..... | June 13, 1904 | C 27 |
| Davidson, David..... | April 3, 1905 | C 106 | Pounder, Geo..... | Oct. 16, 1905 | C 125 |
| Davidson, John..... | March 29, 1905 | C 87 | Price, Jas..... | Nov. 8, 1904 | C 50 |
| Devlin, Henry..... | Oct. 12, 1904 | C 41 | Rafter, Wm..... | March 29, 1905 | C 95 |
| Dobbie, John..... | Nov. 27, 1905 | C 126 | Reid, Thos..... | Nov. 3, 1904 | C 47 |
| Dudley, James..... | March 22, 1905 | C 114 | Reid, James..... | March 23, 1904 | C 1 |
| Duncan, Thomas..... | Aug. 29, 1906 | C 128 | Reid, Wm..... | Dec. 15, 1904 | C 54 |
| Dunlap, Henry..... | Nov. 21, 1904 | C 51 | Richards, Thos..... | April 27, 1904 | C 14 |
| Dunn, Geo..... | Dec. 19, 1904 | C 56 | Ross, John..... | April 3, 1905 | C 101 |
| Dunsmuir, John..... | March 29, 1905 | C 90 | Roughhead, George..... | Jan. 30, 1907 | C 130 |
| Eccleston, Wm..... | March 15, 1905 | C 80 | Ryan, John..... | Dec. 28, 1904 | C 59 |
| Evans, Evan..... | March 13, 1905 | C 78 | Sanders, John W..... | April 3, 1905 | C 107 |
| Evans, W. H..... | March 14, 1905 | C 79 | Shenton, Thos. J..... | July 25, 1904 | C 30 |
| Fagan, David..... | April 6, 1905 | C 109 | Shepherd, Henry..... | June 13, 1904 | C 26 |
| Farmer, Bernard..... | Jan. 31, 1905 | C 64 | Smith, Ralph..... | March 7, 1905 | C 77 |
| Farquharson, John..... | April 27, 1904 | C 17 | Smith, Geo..... | March 29, 1905 | C 84 |
| Findlayson, James..... | June 6, 1904 | C 25 | Somerville, Alex..... | March 24, 1904 | C 3 |
| Fulton, Hugh T..... | April 3, 1905 | C 105 | Stauss, Chas. F..... | Feb. 9, 1905 | C 69 |
| Gibson, Edward..... | May 30, 1905 | C 118 | Steele, Jas..... | March 29, 1905 | C 92 |
| Gilchrist, Wm..... | March 29, 1905 | C 85 | Stewart, Duncan H..... | March 28, 1904 | C 4 |
| Gillespie, Hugh..... | April 6, 1904 | C 8 | Stewart, John..... | April 3, 1904 | C 104 |
| Gillespie, John..... | April 6, 1904 | C 5 | Stewart, Daniel W..... | May 16, 1904 | C 23 |
| Gould, Alfred..... | April 17, 1906 | C 112 | Stoddart, Jacob..... | Feb. 21, 1905 | C 73 |
| Green, Francis..... | Oct. 11, 1904 | C 38 | Strachan, Robt..... | April 27, 1904 | C 15 |
| Handlen, Jas..... | June 16, 1904 | C 122 | Strang, James..... | April 27, 1904 | C 10 |
| Harmison, Wm..... | Feb. 3, 1905 | C 65 | Thomas, John..... | March 29, 1905 | C 97 |
| Haworth, Geo..... | March 29, 1905 | C 88 | Tunstall, James..... | June 15, 1904 | C 121 |
| Hescott, John..... | Jan. 16, 1905 | C 62 | Vass, Robt..... | Dec. 12, 1904 | C 53 |
| Hutchison, Archie..... | Sept. 8, 1905 | C 123 | Vater, Charles..... | April 6, 1904 | C 66 |
| John, David..... | Nov. 8, 1904 | C 49 | Walkem, Thos..... | Dec. 16, 1904 | C 55 |
| Johnson, Geo..... | May 9, 1904 | C 124 | Webber, Chas..... | Sept. 13, 1904 | C 32 |
| Johnson, Wm. R..... | March 1, 1905 | C 75 | Webber, Charles F..... | Sept. 13, 1904 | C 33 |
| Kerr, Wm..... | March 29, 1905 | C 91 | Whiting, Geo..... | May 29, 1905 | C 117 |
| Lander, Frank..... | Jan. 9, 1905 | C 61 | Wilson, Austin..... | Feb. 7, 1905 | C 67 |
| Landfear, Herbert..... | Jan. 27, 1905 | C 63 | Wilson, Thos..... | April 27, 1904 | C 11 |
| Lewis, Thos..... | Oct. 11, 1904 | C 35 | Woodburn, Moses..... | March 29, 1905 | C 83 |
| Lockhart, Wm..... | Jan. 6, 1905 | C 60 | Yarrow, Geo..... | Nov. 3, 1904 | C 46 |

CARIBOO DISTRICT.

CARIBOO MINING DIVISION.

REPORT BY C. W. GRAIN, GOLD COMMISSIONER.

I have the honour to submit herewith my report on the progress of the mining industry in the Cariboo Mining Division for the year ending December 31st, 1911.

I have to report that the output of the district remains very much the same as last year, *instead of somewhat larger, as was confidently hoped would be the case.* This was caused partly by unforeseen accidents, etc., but was chiefly by shortage of water. The scarcity of water is still the great drawback to more successful mining in this district, as will undoubtedly continue to be the case until some method is adopted for conserving and controlling the available supply, considerable of which escapes during the high-water period, as was clearly shown this year.

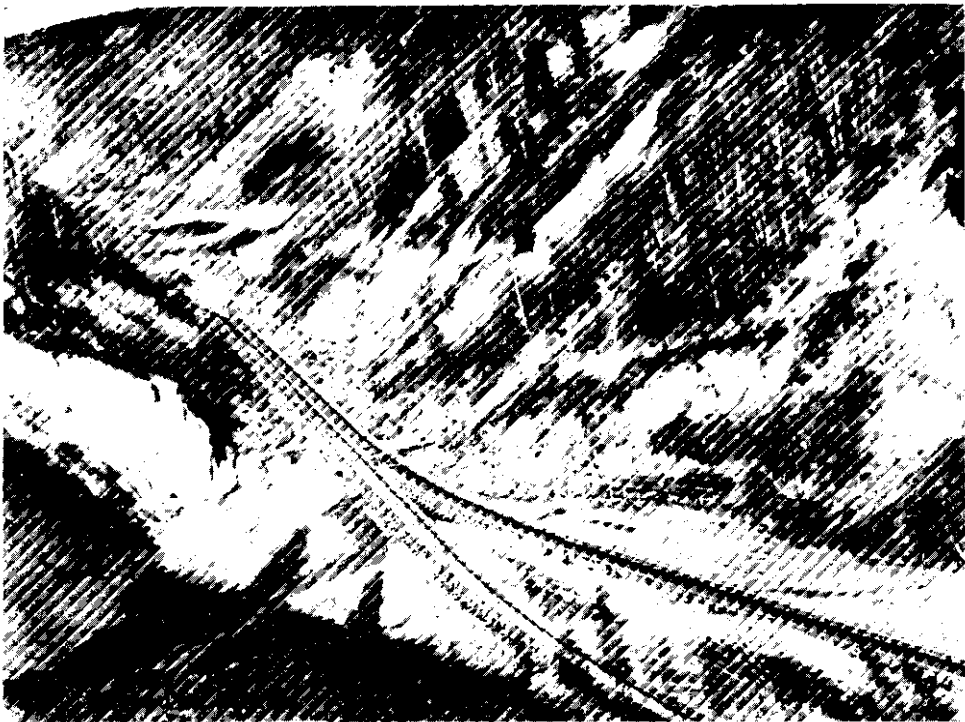
During the winter of 1910-11 there was more than an ordinary snowfall, the heaviest for some years, and a plentiful supply of water was looked for, and if the snow had gone off right such would have been the case. As it was, the spring was late and it was nearly June when piping commenced; the days were then very warm, and the nights were also warm for that time of year; consequently the flow of water was in nowise checked during the night, and therefore there was more water than could be conveniently handled, so that considerable quantities had to be let go to waste.

The past summer was exceptionally dry; as far as I can gather, it was the dryest for many years. All these circumstances caused the piping season to be very short.

After the dry summer it was naturally hoped that the fall would be wet; consequently the managers of the working claims regulated their work with this end in view. I regret to have to report that they were disappointed, there being very little fall rain, and consequently no fall clean-up.

There are in good standing in this Division at the present time 336 placer leases and about twenty placer claims, a considerable number of which were in active operation during the past year, employing between three and four hundred men and producing, as near as I can gather, somewhere about \$200,000.

During the past season there were 252 mineral claims recorded, the greater number of these being in the vicinity of Fort George and Tête Jaune Cache, although a few are in this immediate vicinity. It is yet too early to say anything definite about the values of these, and it is needless to say that until railroad transportation is available operations in connection with these claims is impracticable; but I am of the opinion that, when the transportation problem is solved, many of these claims may be worked and give a good account of themselves. This same lack of transportation also retards the development of considerable placer ground in this immediate vicinity.



General view.



B.C. Bureau of Mines.

Monitors at work.

Quesnelle Hydraulic Gold Mining Co.—Quesnel River.

WILLIAMS CREEK AND TRIBUTARIES.

Regarding the properties which have been worked on this creek during the past season, all of which are under the management of John Hopp, I beg to quote from a report kindly handed in by Melbourne Bailey:—

The John Hopp Mines—Four hydraulic claims were operated during the season of 1911. The *Forest Rose*, *Stouts Gulch*, *Lowhee*, and *Mosquito Creek* plants employed an average of sixty-five men. The outlook for a good water-supply was most promising at the beginning of the season, as there was above the average depth of snow in the mountains. A backward spring delayed the flow of water, and it was not until the first of June that full pipe-heads were obtained. Warm weather setting in caused rapid melting of the snow, with the result that only a portion of the water could be utilized in hydraulicking, the balance running to waste through the water-gates in the ditches. This unfavourable condition, coupled with a very dry summer and fall, resulted in a very short hydraulicking season. The returns from the comparatively small amounts of gravel washed, however, were very satisfactory, and fully justify the large expense that has been incurred in equipping these claims to operate on a large scale.

During the season construction-work was carried on at the Ella Lake reservoir and Lowhee Creek dams, the former being carried up an additional height of 14 feet, making a storage height of water in this reservoir of 40 feet, while the Lowhee dam was completed to its full height of 20 feet.

At Mosquito creek new sluice-flumes were constructed on the *Williams* claim, with a view of operating that claim in connection with the present *Alabama* plant.

At the *Forest Rose* claim a sluice-flume has been constructed on a higher level than the present flume, with a view of running off the upper gravels directly into Williams creek. The flumes and ditch of the *Burns* plant was thoroughly overhauled and repaired, with the intention of using them in the opening-up of Olalla creek next season.

LITTLE VALLEY CREEK.

On this creek the West Canadian Deep Leads, Ltd., continued the work which has been going on since 1908—namely, the sinking of a three-compartment shaft to reach bed-rock. I understand that bed-rock has been struck at a depth of between 260 and 270 feet, and it is the intention to sink somewhat deeper and then to run a series of drives to crosscut the presumed old channel.

Considerable difficulty was experienced in the last 100 feet of the shaft, on account of the increased volume of water encountered, which at times rendered working in shaft an impossibility. I understand that two extra pumps are now being installed, and it is expected that no further trouble will arise from this source.

From twenty-five to thirty men are employed on these works.

LIGHTNING CREEK AND TRIBUTARIES.

On the property of the Lightning Creek Gold and Gravels Drainage Co., Ltd., at Wingdam, where a large amount of money has been spent in machinery and development-work, I have to report that no work was done. Reports recently received indicate that there is hope, and even probability, that work will be resumed during the coming season.

The Lightning Creek (British Columbia) Hydraulic Mining Co., Ltd., continued their work on the ground known as the *South Wales* ground. During the past season the Venture Mining Company, on Peters creek, continued work, and L. Ford informs me that they drifted

down-stream until they lost the bed-rock ; they then crosscut the channel and got very good prospects. Owing to an increase of water they were forced to shut down, as the pump was not large enough to handle the water. Next season it is the intention of the company to install a hydraulic lift.

The Wormwold Creek Mining Co., whose property consists of four leases on Wormwold creek, has three shifts working on prospecting tunnels, and very good prospects were obtained. This work had to be resorted to, as, owing to the dryness of the season, there was not enough water to run their overshot wheel, which furnishes power for hoist and pumps.

The Four Leaf Clover Hydraulic Mining Co., which acquired four leases on Perkins gulch, installed a No. 1 hydraulic plant, and worked during the past season with very good results.

The Copper Creek Company, Ltd., under the management of C. M. Edwards, formerly of Fort Steele, was actively employed on its property on Sugar creek. Over 9,000 feet of ditch was put in, and considerable money was spent on building roads, which was absolutely necessary before the piping could be hauled in. They reported that everything is now in shape for next season, and, as this ground has been most carefully prospected by Mr. Edwards, I hope to receive a more promising account of this property by next fall.

Hydraulicking operations were carried on as usual on the properties of the *China Creek* hydraulic, the *Nugget* gulch, the *Waverly*, and a few other small companies, all of which properties suffered through the dryness of the season.

My report would be incomplete without some allusion to the important hydraulic gold-mining enterprise which the Quesnelle Hydraulic Gold Mining Company has undertaken on Twenty-mile creek, near Quesnel river. This undertaking has involved an expenditure of close on \$1,000,000. There is no need for me to describe either the intentions or the work of the company, as this was fully dealt with in last year's report by the Provincial Mineralogist ; I therefore consider it enough to say that when I last saw Mr. DuBois, the general manager of the company, he informed me that everything was running smoothly, and, considering the short run that they had had, the results were more than satisfactory. In next year's report I have every hope of being able to state that the company is rapidly being repaid for its enormous preparatory outlay.

OFFICE STATISTICS—CARIBOO MINING DIVISION.

| | |
|---|-----|
| Free miners' certificates issued to individuals | 446 |
| " " " companies | 8 |
| Mineral claims recorded | 252 |
| Placer claims recorded | 3 |
| " " re-recorded | 41 |
| Miners' leave of absence | 22 |
| Certificates of work issued | 20 |
| " improvements issued | 1 |
| Placer-mining leases issued | 46 |
| Water licences issued | 28 |
| Conveyances and other documents recorded | 75 |

General Revenue Receipts.

| | |
|---------------------------------|-------------|
| Free miners' certificates | \$ 2,690 50 |
| Mining receipts, general | 9,780 10 |
| Leaves of absence | 52 50 |
| Land sales | 434,194 82 |
| Land revenue | 336 00 |

Carried forward.....\$447,053 92

General Revenue Receipts—Concluded.

| | |
|------------------------------|---------------------|
| <i>Brought forward</i> | \$447,053 92 |
| Water revenue | 2,606 00 |
| Revenue tax | 1,632 00 |
| Real-property tax | 1,636 11 |
| Personal-property tax | 1,094 24 |
| Wild-land tax | 62,535 77 |
| Income-tax | 63 55 |
| Licence, spirit | 2,301 25 |
| " trade | 610 00 |
| " game | 300 00 |
| J.P. court fines | 305 00 |
| Miscellaneous | 1,756 93 |
| Total | \$521,894 77 |

QUESNEL MINING DIVISION.

REPORT BY E. C. LUNN, MINING RECORDER.

I have the honour to submit herewith my report on mining operations in the Quesnel Mining Division of the Cariboo District for the year ending December 31st, 1911.

From the point of view of revenue, the situation is much the same as last year. The Bullion Mining Company and the Cariboo Gold Mining Company properties still remain unworked.

I am indebted to H. W. DuBois, manager of the Quesnelle Hydraulic Gold Mining Company, of Hydraulic, B.C., for the following report:—

"The company started operations on August 18th and closed on November 7th, owing to the extremely cold snap experienced on that date. The work done last season was mainly of such a preliminary nature as would enable the maximum operations to be carried on during the season of 1912. On this account no clean-up was made, as the gold-content of the gravel washed last season will be recovered next season. The water system worked without any interruption whatever, and the only difficulties of operation encountered were due to the excessive wear of the stone and wood paving in the sluice. This trouble will be remedied by the introduction of high-carbon steel plates, which have been used elsewhere successfully. The head of the sluice will be provided with manganese-steel rails placed transversely. The manganese steel has been adopted owing to its great resistance to wear caused by gravel passing over it in such large quantities. This material will be installed early next season, so it is expected to mine a large yardage."

I am indebted to Thomas Graham for the following facts relative to Keithley creek and adjacent properties:—

"The late J. B. Hobson hydraulicked on Spanish creek, a tributary of the North fork of the Quesnel river, about six miles from Keithley creek, with a crew of twelve men; the clean-up, it is reported, was \$20,000, which is regarded as most satisfactory. Opposite this property, on the other bank of Quesnel river, S. Henderson and others intend hydraulicking a deposit of gravel which averages about 11 cents a yard.

The *Luce* hydraulic, on Snowshoe creek, was operated with a crew of nine men, but, although all expenses were met by the output, the balance was insufficient to pay any dividend.

There is steady prospecting going on on Snowshoe, Martin, Keithley, and Goose creeks, but until a wagon-road has been constructed from Quesnel Forks to Keithley creek, a distance of twenty miles, prospecting and mining must necessarily be on a limited scale, the expenses of living and operating being somewhat high, flour being \$14 per 100 lb. and powder \$20 per 50-lb. box.

The prospects for quartz-mining in the Keithley section are very good. Free gold can be panned from many of the outcrops. Galena is also plentiful. H. W. Brown has made some locations of free-milling gold quartz on Snowshoe creek, and is having several tons of supplies packed into Keithley this winter.

Reports from the Clearwater district of Quesnel lake suggest the discovery of a rare mineral much in demand for incandescent lamps. Duluth parties made a trip up the lake to investigate the find, and it is reported they were satisfied.

The Water Tight Dipper Dredge and Mining Company, Ltd., of Calgary, proposes installing a dredge at Quesnel Forks, to operate on the Quesnel river between the Forks and Seven-mile creek.

OFFICE STATISTICS—QUESNEL MINING DIVISION.

| | |
|------------------------------------|-----|
| Free miners' certificates..... | 123 |
| " " (company)..... | 1 |
| " " (special)..... | 1 |
| Certificates of work..... | 15 |
| Placer claims recorded..... | 12 |
| Mineral claims recorded..... | 32 |
| Bills of sale, transfers, etc..... | 18 |

QUESNEL MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

As supplementing the report of the Mining Recorder, the following data is given regarding the operations of the Quesnelle Hydraulic Gold Mining Company.

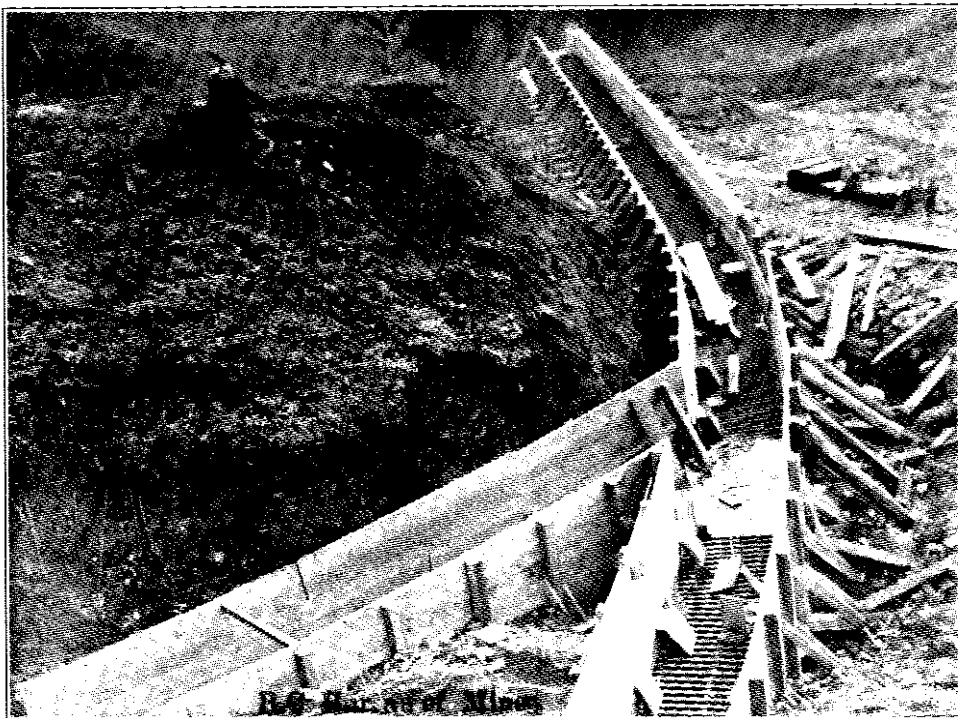
A general description of the plant—then in course of construction—was given by the writer on pages 47 *et seq.* of last year's report; since then the installation has been completed, and Mr. DuBois has kindly supplied the following information and the illustrations:—

The experience with the water-supply ditch-line from Swift river proved very satisfactory; owing to the excessively light rainfall of the season, the water-supply system was put to a severe test—at first 40,000,000 gallons in twenty-four hours was diverted, but this was increased to 60,000,000 gallons (about 4,000 miners' inches). The ditch system is some twenty-five miles long and includes three inverted siphons—a tunnel through a summit and a heavy cut (a plan and profile of the line is given herewith). Experience has shown that this entire length can be taken care of safely with only five men.

A most important feature of the water system not mentioned in last year's report was the construction of a pooling reservoir, capable of holding 10,000,000 gallons of water, which water will be used in the "booming method" of mining—i.e., allowing the water of the ditch-line to collect in the pooling reservoir during the dark part of the night, when the pit is not being worked, and letting it out during working hours, thereby increasing the effective supply of water, equivalent to greatly increasing the effective capacity of the ditch-line.



Sluiceway.



Sluiceway.

Quesnelle Hydraulic Gold Mining Co.

In order to use the greatly increased quantity of water, larger "Giants" are to be installed, the intake-pipe for which will be 18 inches in diameter, the water being used under a head of 500 feet.

The experience of the short run of last summer indicates that the plant will handle better than 10,000 cubic yards a day, and that this operation can be carried on by sixteen men.

The sluiceways were lined last season with diorite blocks, or boulders, but experience showed that the wear on these was excessive and that the maintenance cost would be high. With the idea of reducing this cost, with the delays consequent on such repairs, and at the same time greatly increasing the carrying efficiency of the water, it has been decided to pave the sluices with high-grade carbon-steel rolled plates, such as have been successfully used by Mr. Hamshaw in the Atlin District. These plates are now on the ground, having been taken in while sleighing lasted, and will be put in place the first thing in the spring.

These plates are $\frac{1}{2}$ inch thick and 58 inches square, made of steel, containing from 0.80 to 1.20 per cent. carbon. The physical tests to which they were subjected before shipment showed that, while they are extremely hard, they have not the usual brittleness of high-carbon steel. These plates will be placed in the sluice, 2 inches apart, with the upper end of each plate $\frac{1}{2}$ inch lower than the lower end of the preceding one, the details of which are shown in the accompanying sketch. This arrangement is expected to minimize the wear, while the plates, being square, can be turned around should wear develop in any particular part.

The head of the sluiceway is to be paved with 40-lb. manganese-steel rails, laid transversely, as shown in the accompanying sketch. These, owing to their hardness and resistance to abrasion, should have a greater life than the ordinary steel rails, while the method of laying them should provide a good riffle for the catching of the gold.

THE LATE JOHN B. HOBSON.

It seems not inappropriate to record in the Report of this Bureau, with deep regret, the death, on January 9th, 1912, of J. B. Hobson, and to acknowledge the great debt that hydraulic placer-mining in this Province owes to this man, who has done more than any other to demonstrate the possibilities in British Columbia of this branch of mining, particularly in the Quesnel District, where his interests and endeavours were centred.

It is not the purpose of these notes to go into the history of Mr. Hobson's long career as an hydraulic-mining engineer, nor to speak of his strong personality as a man, since a very full account of his career has been given by E. Jacobs in the pages of the *Canadian Mining Journal* for February 1st and 15th; but the writer cannot let this opportunity pass without expressing his feeling of personal loss of a consistent and loyal friend and of an experienced, competent, and level-headed engineer, whose opinion he always found given frankly and disinterestedly.

The late Mr. Hobson was born in Ireland in 1844, moving with his parents to New York in 1848, where they resided until 1857, when the family moved to California, where Mr. Hobson studied mining engineering and metallurgy, becoming closely identified with many of the large quartz-mining and deep-gravel placer-mining enterprises of that State.

After an extended and varied practical experience with hydraulic placer-mining in California, Mr. Hobson became attached to the Geological Department of the California State Mining Bureau, and the result of his field-work constitutes a valuable part of the annual reports of the State Mineralogist for those years.

Owing to the experience and eminence which he had gained in California, Mr. Hobson was invited, in 1892, by certain of the directorate of the Canadian Pacific Railway to visit and explore the vast fields of deep auriferous gravels known to exist in the Cariboo District of British Columbia.

As a result of this visit, Mr. Hobson and his associates organized the Consolidated Cariboo Hydraulic Mining Company and the Horsefly Hydraulic Mining Company, opening up and operating the properties of these companies—the former at Bullion, on the Quesnel river, a few miles from Quesnel Forks, and the latter on the Horsefly river, a short distance above Harper's Camp. These properties were the largest and most modern attempts at hydraulic mining then ever undertaken in British Columbia, and have since served as models upon which others have been based.

Thus Mr. Hobson was not only the pioneer of hydraulicking on a large scale in British Columbia, but he was the father of the industry.

The weak point in these large enterprises proved to be a shortage of water, preventing a growth of operations; in an attempt to remedy this, necessitating the raising of more capital, the control of the Consolidated Cariboo went to Messrs. Guggenheim, of New York, who undertook to supply the money to bring an abundant supply of water in from Spanish lake, so that it seemed as though Mr. Hobson's great ambition was to be realized through a sufficiency of water-supply.

As has been repeatedly pointed out in these reports, in the Cariboo the amount of gold to be recovered seems to be directly proportionate to the quantity of water available for washing.

In 1906 Mr. Hobson was enabled to expend some \$200,000 towards this undertaking, and work was actively resumed in 1907, continuing until July of that year, when the controlling interests of the company, for reasons known to themselves only, ordered all work to be abandoned.

This abandonment of his most cherished scheme seemed to have broken Mr. Hobson in health and spirits, but his indomitable energy carried him through, and he started in 1909—at the age of sixty-five—to open up and equip with suitable plant certain placer leases that he held personally on the North fork of Quesnel river, near the mouth of Spanish creek, bringing the water in from Spanish lake. A description of these works is given elsewhere.

The fall of 1911 saw this plant fully equipped and ready for production this next season, with good prospects of success.

The great strain consequent to the establishment of this new and extensive plant, with the limited capital at his disposal, proved too much for Mr. Hobson's strength, and he died just at the time when success seemed assured, and without having been able to enjoy the fruits of years of arduous and efficient effort.

CASSIAR DISTRICT.

ATLIN MINING DIVISION.

REPORT OF J. A. FRASER, GOLD COMMISSIONER.

I have the honour to submit my report on mining operations in the Atlin Mining Division of Cassiar District for the year ending December 31st, 1911.

Although there were about as many people in the district as during the season of 1910, the output was not quite so large, nor was the aggregate revenue quite so great, there being a slight falling-off almost all along the line, chiefly in connection with the operations of the companies, in the way of lesser amounts paid in lease and water rentals and reduced output, which, for reasons subsequently mentioned herein, was not up to that of last year.

The scarcity of water for mining purposes on some of the creeks largely accounted for the decreased output of gold.

I regret to say that the contemplated schemes for the diversion of certain outlying streams, mentioned in last year's report, were not carried out, and the prospective benefits were therefore not realized.

The mineral (quartz) and coal deposits throughout the district did not receive the attention that their surface indications seemed to warrant, nor was development prosecuted in anything like a vigorous manner, except in one or two instances, and the results of the season's operations in this direction were disappointing.

A number of very regrettable casualties which occurred during the season contributed to the restriction of development and the consequent disappointment above mentioned.

In the first place, I may mention the death of Webster Brown, C.E., of Seattle, who was drowned in the Taku river while en route, in charge of a small party, to investigate the coal-deposits recently located in that vicinity, and to secure, if possible, a feasible route for a railway from tide-water to that part of the district. Mr. Brown's untimely death suspended all activity in that direction.

The next event of a similar nature was the sudden death of Thadee Obalski, M.E., in September last, two days after his arrival from Paris (France), ostensibly to undertake the entire development of a group of leases on a new or unworked creek, with a view to installing a hydraulic plant thereon. Needless to say, nothing has been done in that connection.

The third event of a like nature was the sad accident, on October 5th, by which Stanley McLellan and his wife were killed by an avalanche of snow which swooped down upon them in their cabin at the *Ben M'Chree* mine, at the extreme south-west end of Taku arm, and carried everything before it.

This cabin had been built of stone, far up the mountain-side, and everything was apparently in good order for the prosecution of development throughout the winter, but this catastrophe so upset the plans that all development-work was abandoned.

McKEE CREEK.

On this creek the Pittsburg-British Gold Company, under the management of Fletcher T. Hamshaw, opened up early and commenced sluicing on May 20th, continuing, as the water-supply would permit, until October 25th.

A force varying from four to twenty-five men, with an average of twelve, was employed throughout the season, with encouraging results while the water-supply remained at all efficient; but the company was again handicapped, as in former seasons, by a shortage of water, so that after September 1st no attempt was made to wash pay-gravel, the meagre supply of water available being used in washing away the overburden of barren gravel as far it could be reached, preparatory to another season's operations.

Notwithstanding the scarcity of water, about 450,000 cubic yards of gravel was moved, of which about 30,000 cubic yards was pay-gravel, the balance being the overburden.

The yield from the pay-gravel was quite up to that of former seasons, and the advantage from the removal of the overburden a season in advance cannot fail to afford beneficial results, as sluicing may be commenced so much earlier; and, as the whole available water-supply (when at its best) can be utilized in washing pay-gravel, much larger clean-ups may be expected. About \$25,000 was expended in mining and development-work during the season.

It is intimated that the outlying portions of this company's holdings will be systematically prospected during the coming season, in addition to the active mining of the known pay-streaks as above mentioned.

The latter part of the season the management of affairs was in the hands of Clarence M. Hamshaw.

There were no individual mining operations on the creek.

PINE CREEK.

On Pine creek the North Columbia Gold Mining Company, under the management of J. M. Ruffner, operated throughout the season upon its own holdings, as well as upon those of the Atlin Consolidated Mining Company adjacent on the north bank of the creek. A force, varying in number, the maximum of which was about sixty men, was employed throughout the season, and from six to fifteen monitors, mostly large size, were kept pretty constantly in operation during the season.

The reported output was not up to that of last year, but for what reason I cannot say.

This company did considerable prospecting upon its leases during the season with a portable drill, but with what results I am unable to say.

On the Pine Creek Flume Company, Ltd.'s, property, known as the *Menzies* group of leases on Pine creek, C. L. Queen, with a donkey-engine and scraper outfit, expended a considerable amount in prospecting, building ditches, etc., without any appreciable returns in gold won; I do not think bed-rock was reached during the season.

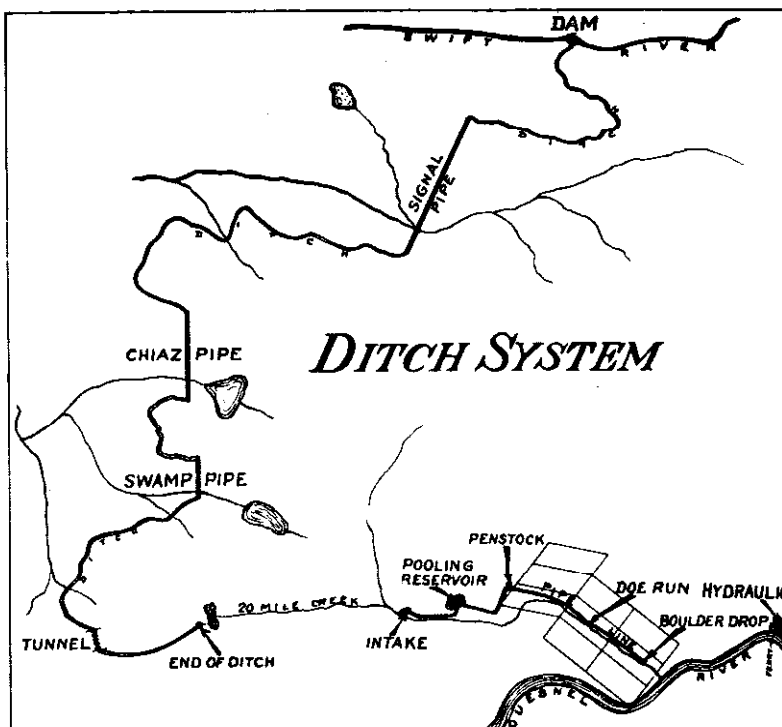
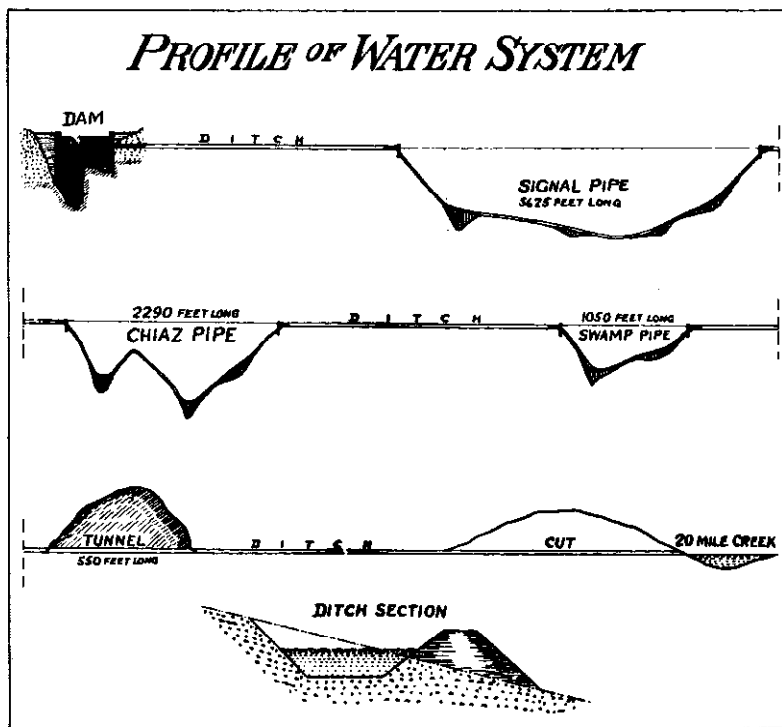
Several individual miners were operating on this creek during the season and realized very fair returns. They confined their operations principally to resluicing and working over old tailings.

No mining worth mentioning was done on Gold creek or Gold Run.

SPRUCE CREEK.

On this creek about seventy men were engaged in mining during the season, with about the same returns as last season.

The Spruce Creek Power Company, Ltd., being hampered by the continual struggle for water and dump-room, decided to suspend operations for a season or two in order to allow the individual operators with whom they were coming in conflict the use of all the water, so that they might the more speedily work out their claims and eventually leave the company opportunity to more peaceably and economically work its properties; consequently there was no hydraulic mining on this creek during this season.



Quesnelle Hydraullic Gold Mining Co.

On the *Gladstone* hydraulic lease McCloskey & Foley continued their drifting operations with success, and closed a very successful season's operations about the end of October. A small force is operating on the lease this winter and is reported to have struck richer ground than any hitherto discovered.

On the *Calder* lease a force of five men sank an incline and discovered good "pay," but unfortunately encountered more water than their appliances could handle and were "drowned out." They sank another shaft with similar results, so that, while there is good "pay" on bed-rock, their season's operations were practically lost, except for the experience gained. Next season will see them at it again.

On the *Sutton* group of leases (so called) (the *Poker*, *Joker*, and *Croker*), Isaac Matthews did considerable prospecting by means of drifts and tunnels, disclosing the existence of good pay-gravel, apparently similar to that found on the *Gladstone* lease. From six to ten men are drifting and sluicing on said property this winter.

Above the Columbia canyon Charles Gairns expended about \$5,000 in prospecting some leases, but without satisfactory results, as he failed to reach bed-rock.

The other individual operations on the creek were mostly exploratory, some of them giving promise of satisfactory results so soon as bed-rock is reached and the inevitable flow of water thereon is brought under control.

BIRCH CREEK.

From fourteen to seventeen men were engaged in mining on this creek during the season, and, I believe, secured the best returns ever obtained from similar operations on this creek. The reported output last year was 25 per cent. better than that of the previous year, and this season's reported output was about 33 per cent. greater than that of last year, although about the same number of men was employed during each of those seasons.

During the season of 1911 the hydraulic work was carried on under the superintendence of H. Peplow Pearse, as for several years past.

Actual sluicing was commenced on April 15th, but for a time it was mainly directed towards the removal of the snow and ice accumulated in the pits.

During the season 61,000 square feet of bed-rock was uncovered and considerable dead-work was done preparatory to the construction of a new flume and ditch-line, which will give a head of about 240 feet, and which it is intended shall be ready for next season's operations.

The individual operators on the upper part of the creek did very well also.

BOULDER CREEK.

About the same number of men were mining on this creek as in 1910, but as the *Société Minière de la Colombie Britannique* did nothing except through laymen, who were principally doing dead-work, the output of gold was not so large as usual.

The elaborate system of drainage and underground placer-mining referred to in last year's report unfortunately has not been practically tested, because the deep-gravel pay-streak, for the working of which it was intended, was not found where expected, and a whole year has been spent in underground dead-work searching for it—so far, without locating it.

RUBY CREEK.

The Placer Gold Mines Company, under the management of T. M. Daulton, continued the development-work commenced two years ago, which consisted principally in hydraulicking a channel down to bed-rock, working up-stream on grade.

Bed-rock was struck a little over 200 feet up-stream from where work was suspended last fall, but, not finding pay-gravel at that point, the cutting was widened in both directions until the channel-wash was struck on the east side of the creek on September 9th, after which date such water as was available was used in washing pay-gravel.

Work was commenced on May 1st, and a force of from nine to eighteen men (with an average of fourteen) was kept employed until October 20th, when they closed down. About \$19,000 was expended in development during the season, but operations were much hampered through scarcity of water, and consequently anticipated results were not realized; still the management seemed well satisfied.

WRIGHT CREEK.

The same number of men was employed on this creek as in 1910—viz., an average of four—but I regret to say the returns were not so satisfactory. Work was commenced on May 20th and closed down on October 18th. A small hydraulic plant was used, and over 20,000 cubic yards of gravel was moved and sluiced.

OTTER CREEK.

On the upper portion of this creek the Otter Creek Development Company, under the management of J. E. Moran, with a force of five men, commenced operations on May 1st and continued until October 25th.

About 40,000 cubic yards of gravel, from banks about 30 feet in height, was washed down hydraulically, and, although the returns were a little better than those of the previous season, they were still rather disappointing.

On the lower part of Otter creek the Maluin Syndicate, with W. H. Brethour as manager, with a force of from five to fifteen men (with an average of seven), commenced operations on April 6th and continued until October 2nd. Prospecting, by means of shafts as during the previous season, was continued for a short time and then abandoned for a Keystone driller, with which twenty-one holes were sunk to bed-rock at alternate cross-sections on the creek, the results from which were very encouraging; in fact, I believe that in no instance did they fail to find gold where bed-rock was reached; the average depth of the channel was found to be about 44 feet.

Hydraulic operations were prosecuted from August 2nd to September 30th, and a large quantity of overburden disposed of.

A new ditch, about 8,000 feet farther up than the present working ditch, was commenced and partially constructed; when completed it is expected to supply water at a vertical head of 298 feet.

An additional supply of hydraulic pipe, aggregating 5,300 feet in length and averaging 30 inches in diameter, is expected in upon the opening of navigation, so that good results may be expected during the next season.

WILSON CREEK.

On this creek seven or eight men were operating during the season, and most, if not all, of them made good wages for the time of working, but not as much gold was reported as for the previous season.

There are five men on the creek this winter getting out timber, etc., for next season's operations.

O'DONNELL RIVER.

On this stream Robert McKee, as manager for the Canadian-Alaska Exploration Company, commenced operations on the *Gold Hill* group of leases on July 9th, and between then and September 20th installed a steam sawmill, a steam pumping and hoisting outfit; built a shaft-house large enough to cover all his plant, including the sawmill; sank a shaft 26 feet (size 10 by 12 feet), timbered with 8- by 8-inch timbers; dug a water-supply ditch 3,000 feet in length; built a stable for four horses and two bunk-houses for his men, besides other work. He employed from eleven to fifteen men during the above period, and reports having expended about \$8,000 on the work and property.

Although equipped with two pumps, he found that he was unable to manipulate them so as to control the inflow of water, so he closed down for the season without reaching bed-rock, but expects to return to camp before opening of navigation with proper and sufficient equipment to complete his prospecting operations, after which he contemplates the installation of either a steam-shovel or dredging plant, being sanguine that the prospects on reaching bed-rock will justify it.

LINCOLN CREEK.

The leaseholders on this creek commenced operations about midsummer, but, not being equipped with proper pumping apparatus, they do not appear to have accomplished much in the way of ascertaining what values are to be found in the gravel. They closed down early, but the property is now under bond to a representative of capital who has undertaken its development.

There appears to have been the usual amount of desultory prospecting on outlying creeks throughout the district, but no new discoveries have been reported.

On Canyon creek, a tributary of the Inklin river, where new discoveries were reported last year, some miners sank 42 feet to a stratum of "slump" (so called), which filled their shaft as fast as they could empty it, and they were unable to reach bed-rock. Above this slump was a stratum of hard clay, upon or above which they found some gold, but not sufficient to pay for working. They have abandoned it.

I regret to have to report rather a tragic ending to this expedition. It appears that the men who did the above prospecting became discouraged, and returned to Juneau and Douglas (Alaska) early last summer.

One of their number named Edward Ehrlich, however, decided to remain in the country, and his partners therefore left him well supplied with provisions, etc. He was not known to be in the district until, in December last, another prospector named Myers, also from Douglas, went across to Canyon creek and found Ehrlich dying from scurvy. Myers left him well supplied with wood and provisions and went to Nahlin Telegraph-station to report the matter to me. I immediately arranged for a relief party to return and bring him in if alive, or bury him if dead. This party found him dead, and buried him in one of his own prospect-holes.

The last entry in Ehrlich's diary was dated December 26th, 1911, and the relief party arrived there January 2nd, 1912.

MINERAL CLAIMS.

Another season has passed without much more than the necessary development-work to keep them in good standing being done on most of the mineral locations throughout the

district, and even the few properties, the active development and exploitation of which were confidently expected to be undertaken by the bondees, were, with two or three exceptions, left practically untouched.

On the *Engineer* group on Taku arm little or nothing was done by the bondee, but the owners did some surface prospecting which revealed several new ledges and shoots of ore, disclosing the existence of a larger area of gold-bearing rock than had hitherto been discovered. The principal reason, perhaps, why more work was not done was on account of pending litigation with reference to a portion of the property. This matter has been adjusted.

On the *Ben McChree* property, situated at the south-west end of Taku arm, considerable development-work was done by the owners, McLellan & Partridge, before the catastrophe in October through which McLellan and his wife lost their lives, since which time nothing has been done in the line of development.

The assay values obtained from samples of this ore were high, and a considerable quantity was sent to a smelter, but what the returns were I have not been able to learn. The indications are that active development will be undertaken again as soon as matters can be adjusted with the McLellan Estate.

Assessment-work was done on a number of claims on both sides of Taku arm and on the Big Horn river, and apparently there is quite an area of highly mineralized ground in that vicinity.

On the *Oppenhoff* group, situated on Crooked creek, between Lake Bennett and Tutchi lake, work was suspended pending the results of certain experiments made with a view of determining the best system of treatment for this ore, there being a large percentage of antimony in it.

I have reason to believe that the assay values are high, the ore-body large, the facilities for operation, water-power, etc., excellent; all encouraging the belief that there will be a producing mine at that point in the near future.

KLEHINI—RAINY HOLLOW.

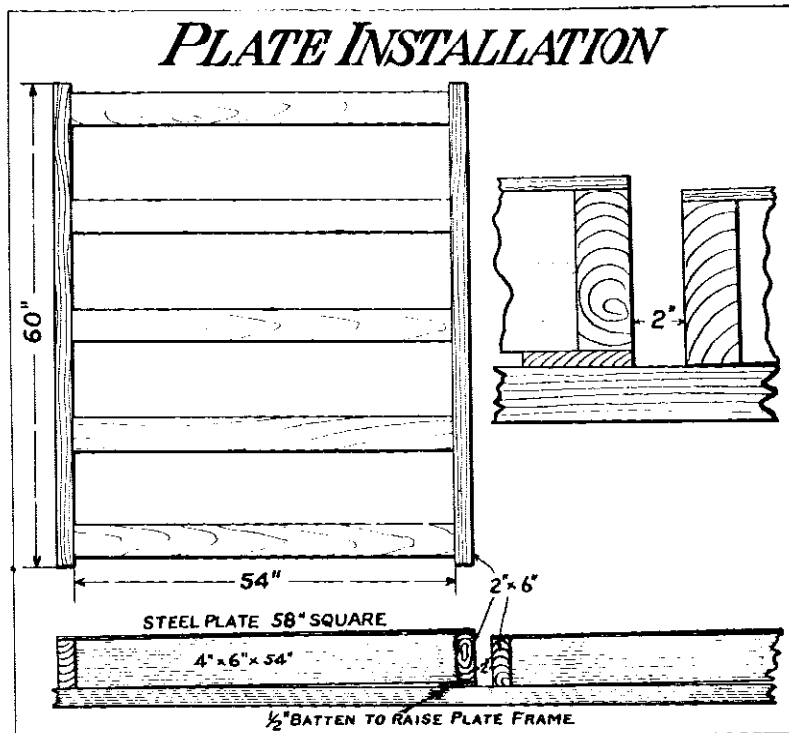
A large number of the best claims in this vicinity were bonded in 1910, as mentioned in my report for that year, but I regret to say that the bondees did little or nothing except upon the *Three Guardsmen* group, so that a whole year has been practically lost as far as development is concerned.

On the *Three Guardsmen* group some development-work was done by the option-holders, but they all failed to meet their payments and the bonds have lapsed. The confidence of the owners, however, does not appear to be at all shaken, as they are developing and procuring Crown grants for their properties as their means will permit.

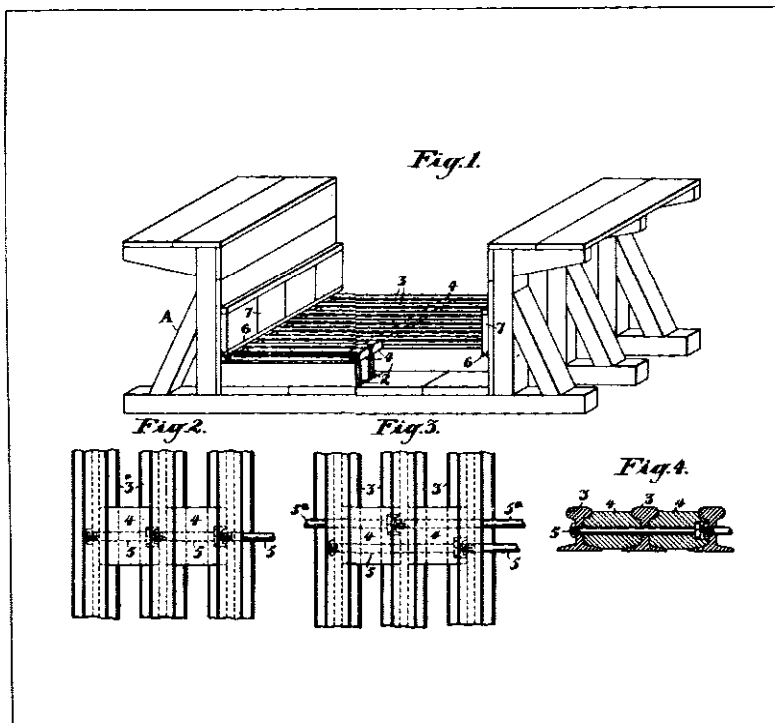
I may say that a shipment of about 30 tons of ore from the *Maid of Erin* (bornite) mineral claim was sent to a coast smelter, from which the returns were over \$100 per ton, but no larger shipments were made from any of the properties.

No material improvement can be looked for until rail transportation to tide-water is provided.

Nothing worth mentioning was done during the year towards the development of the coal-deposits mentioned in previous reports, nor of the hydro-magnesite deposits which lie adjacent to Atlin townsite.



High-carbon-steel-plate Installation.



Manganese-steel-rail Installation—Quesnelle Hydraulic Gold Mining Co.

OFFICE STATISTICS—ATLIN MINING DIVISION.

| | |
|---|-----------------------|
| Free miners' certificates (individual) | 382 |
| " " (companies) | 9 |
| " " (special) | 6 |
| Placer records | 23 |
| " re-records (273, representing 290 claims) | 273 |
| Leaves of absence (representing 121 claims) | 39 |
| Groupings | 6 |
| Permissions | 5 |
| Bills of sale (placer) | 47 |
| " (hydraulic) | 42 |
| " (mineral) | 31 |
| Mineral records | 92 |
| Certificates of work | 221 |
| Abandonments | 1 |
| Filings | 27 |
| Certificates of improvements | 21 |
| Crown grants issued | 14 |
| Certificates of improvements advertised, not yet issued | 11 |
| Gold reported (individuals)—2,246 oz. Value | \$35,573 00 |
| " (companies) 10,473 " " | 162,920 00 |
| Totals | 12,719 " \$198,493 00 |
| Royalty paid (individuals) | 444 80 |
| " (companies) | 3,018 40 |
| Total | \$3,463 20 |

Revenue collected during 1911.

| | |
|---|--------------|
| Water revenue (annual rentals) | \$ 944 05 |
| " (records) | 230 00 |
| Timber royalty | 87 45 |
| Free miners' certificates (individual) | 1,846 25 |
| " " (companies) | 850 00 |
| " " (special) | 90 00 |
| Mining receipts (lease rentals) | 6,705 00 |
| " (" deposits) | 180 00 |
| " (other sources) | 3,548 20 |
| Leaves of absence | 302 50 |
| Licences (liquor) | 952 50 |
| " (trade) | 195 00 |
| Fines and forfeitures | 150 50 |
| Registry fees | 4 00 |
| Marriage licences | 5 00 |
| Law stamps | 34 90 |
| Revenue tax | 666 00 |
| Assessment Act— | |
| Real-property tax | 258 85 |
| Personal-property tax | 113 95 |
| Wild-land tax | 23 55 |
| Income-tax | 24 30 |
| Mineral-tax | 3,463 20 |
| Crown-granted mineral claims | 660 50 |
| Interest | 50 |
| Miscellaneous receipts | 2 00 |
| Total | \$ 24,338 20 |

STIKINE AND LIARD MINING DIVISIONS.

REPORT OF J. CARTMEL, GOLD COMMISSIONER.

I have the honour to submit the annual report on mining operations in the Stikine and Liard Mining Divisions of Cassiar District for the year ending December 31st, 1911.

The season's work, I regret to say, has been productive of practically no returns, as it consisted mainly of prospecting and development work, some of which, however, will doubtless bear results in the near future.

PLACER.

Thibert creek was the scene of considerable activity this year. The Boulder Creek Company has taken a lease of the old Thibert Creek Mining Company's property on that creek, and, under the management of Warburton Pike, was engaged in the construction of a flume to bring water on to the property at a point a mile and a half down-stream from the old workings, at which point the ground presents far less difficulty than at the upper workings, the banks being comparatively low and defended by rock in place, which will render impossible a repetition of the disastrous slides which so hampered former operations, besides giving access to a much greater area of ground and making it possible to obtain a better head of water. The lumber for building the flume was cut at the company's mill at Dease lake, and several men are engaged this winter hauling it on to the ground in readiness for an early start next spring. Grading and trestling was carried out as far as possible during the summer, and it is expected that the flume will be completed by the middle of next August, in time for a short run before the close of the season. Seventeen men were employed.

On Little Deloire creek, a tributary of Thibert, several men were working. The Mitchell Brothers, on their leases, by means of a dam and automatic gate, moved a considerable quantity of dirt, calculated at 20,000 cubic yards, but did not manage to reach bed-rock. Their ground is known to be good, and they expect to be able to get on "pay" next summer. They were considerably hampered by some of their dams being washed out by the high water, but are now in a position to control the water next year.

On Dease creek several outfits worked, the most important operations being those on the *White Horse* lease, the property of John Hyland. Nine men worked on this property, and a sum of about \$3,500 was expended on machinery, labour, etc. A 12- by 12-foot shaft was sunk to a depth of 26 feet, but, the pumps being unable to handle the water, it had to be abandoned without bed-rock being reached. However, work was immediately commenced on another shaft in a more favourable place, and if they are successful in reaching bed-rock the operations will be continued during the winter.

On McDame creek A. E. Radford and associates have done considerable work on six leases recently granted. Such work consists of twelve prospecting shafts, varying in depth from 6 to 30 feet, open-cuts and tunnels to the extent of 350 feet, in nearly all of which very encouraging prospects were found. These operations have proven the existence of an old channel of McDame creek running through the greater portion of the property. A preliminary survey of a ditch-line was run from a tributary of McDame, from which it is claimed from 2,000 to 3,000 miners' inches of water can be obtained for a period of five months during the summer, and brought on to the property under a good head at a not unreasonable cost. A substantial story-and-a-half log-cabin was built in the fall, and these parties seem justified in the belief that they have a very promising hydraulic property. Several other parties worked on this creek and its tributaries, but with what success I am unable to say.

Some desultory mining and prospecting was carried out on several creeks other than those mentioned, but, I believe, with no results worth recording.

MINERAL.

The Iskut Mining Company's property on Iskut river, mention of which was made in last year's report, was the scene of the only noteworthy activity in quartz-mining, and to F. E. Bronson, Deputy Collector of United States Customs, Wrangel, Alaska, one of the owners, I am indebted for the following interesting report :—

"My inspection of our properties more than confirmed the reports which had been brought out by the men who have been engaged there for the past six years, as to the mineralization of the country.

"I have sent to J. O'Sullivan, of Vancouver, for assay, some fifteen samples and shall be glad to apprise you of results. We had a smelter test of one of our leads in 1909, which showed \$44.11 to the ton, of gold, silver, and copper. We have stripped this lead for a long distance, and have crosscut it at 14 feet depth with two tunnels. We propose next year to go in on this lead with a tunnel about 50 feet below the present workings, and, after striking the ore, to follow the lead. Picked rock from the dump I saw would run much higher than this smelter test. We started this year a tunnel on a silver-lead which showed high values on the surface, and developed a strong vein fully 6 feet wide of ore. Slightly north of this we started another tunnel on a lead showing galena, and as we go in it looks better all the time. We are in only 12 or 15 feet, but we have it faced and the lead stripped for quite a distance, and hope for a good assay. This is 4 feet wide. We have made a large open-cut on the *Mermaid* claim, blowing out the shoulder of the cliff near a watercourse. There are a number of stringers giving promise. We have sent samples from all workings.

"The most impressive of all our showings is that at the *Red Bluff*. Here Nature has stripped the formation, the mountain being too precipitous for vegetation. A strong lead, which continues from where we are working to the top of the mountain, is about 5 feet in width with loose walls. This no doubt continues down the mountain under the vegetation to Quartz creek. Alongside this lead, and separated only by the thin loose wall above referred to, is a shoot about 4 feet wide of rock, which I expect the assay to show valuable.

"Streams abound running down Johnnie ridge (named by the Canadian Boundary Survey), and, indeed, all of the discoveries have been made where erosion has exposed the formation. The entire mass of this mountain is impregnated with mineral, and all the assays which have been made for the Iskut Mining Co. (over ten in number) show values. Johnnie ridge is very near the contact between granite and limestone, which probably occurs between this mountain and the Twin glacier, on the opposite side of the Iskut above the South fork. It is five miles long and 3,500 feet high, as determined by the Boundary Survey. The Iskut Mining Co. holds thirteen claims here, on nine of which it expects to apply for Crown grants next year."

There have been very few new locations, and the majority of mineral claims in these divisions are now held under Crown grant, the owners doubtless intending to bide their time until better transportation facilities are available.

COAL.

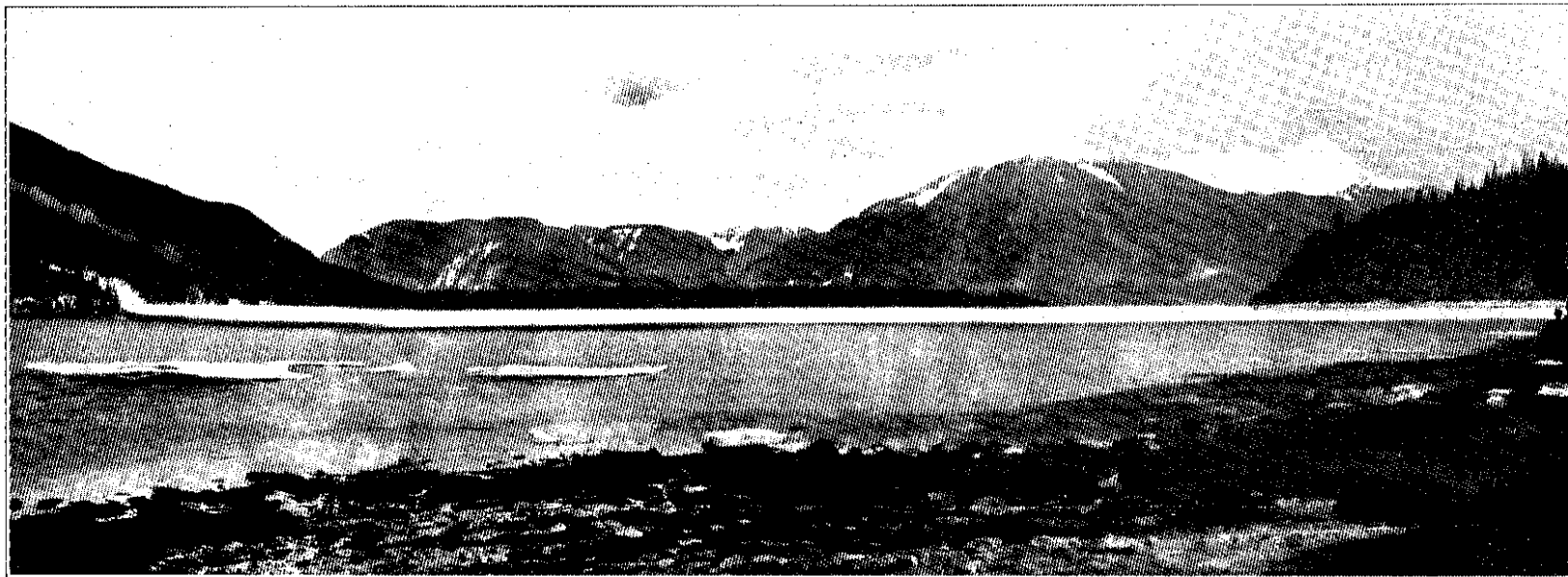
A very important discovery of coal has recently been made at the headwaters of the Stikine river, in the southern portion of the district, and from all accounts the area is very considerable and the coal of a greatly superior quality, being an anthracite. Seventy claims have already been located and licences covering same applied for by parties from Hazelton.

Three claims, at the headwaters of the Klappan river, about thirty miles from the aforementioned property, have also been staked and applied for by parties from Telegraph Creek, the coal being of similar quality; and I learn from these locators that there is undoubtedly a large area of coal land in that section, but, as the formation is very much broken in places, it was not deemed expedient to locate more at the present time.

This discovery of anthracite coal is certainly one of great importance, and augurs well for the future of that portion of the district, which, owing to its distance from the present routes of travel, has heretofore received little or no attention.

OFFICE STATISTICS--STIKINE AND LIARD MINING DIVISIONS.

| | |
|---|------------------|
| Revenue collected from free miners' certificates..... | \$ 402 50 |
| " " mining receipts, general..... | 2,027 10 |
| " " other sources | 2,211 45 |
| Total | <hr/> \$4,641 05 |



Head of Alice Arm—Observatory Inlet.

SKEENA DISTRICT.

SKEENA AND BELLA COOLA MINING DIVISIONS.

REPORT BY J. McMULLIN, GOLD COMMISSIONER.

I have the honour to submit herewith my annual report as Gold Commissioner for the Skeena and Portland Canal Mining Divisions for the year ending December 31st, 1911.

Some activity has been shown during the year by prospectors and mining-men at Goose bay and Alice arm, on Observatory inlet.

GOOSE BAY.

At Goose bay the Granby Consolidated Mining and Smelting Co. is doing work, employing a large number of men, and it is expected that a 2,000-ton smelter will be erected on the property.

The Pacific Metal Company is also operating, employing a small force of men on the *Red* group, where a diamond drill is in operation. Mr. Parker is quite satisfied with the outlook, and contemplates operating on a larger scale this spring.

The *Bonanza* group is expected to open up this spring. This property is reported to contain large bodies of copper-ore.

There are several other properties in this locality which I expect will soon be opened up.

ALICE ARM.

Ewen Morrison did considerable work on the *Black Bear* group, bonded from J. C. Roundy, and towards the end of October shipped some 60 tons to the Ladysmith smelter.

The Alice Arm Mohawk Mines, Ltd., was organized to take over the *Mohawk* group of claims, and during the winter some work was done. The work is being done on a white-quartz ledge from 16 to 24 inches wide, carrying good values in silver and gold.

A number of other claims have been located in this vicinity and some work done, giving good promise. Surface assays have been taken during the summer, and the number of claims on which good values have been found has made it very encouraging for the prospector. The values have run as high as \$400 in many cases.

BELLA COOLA MINING DIVISION.

A few claims have been recorded in this district this year, but very little work appears to have been done.

OFFICE STATISTICS—SKEENA AND BELLA COOLA MINING DIVISIONS.

| | |
|--|-----|
| Free miners' certificates..... | 603 |
| Mining claims recorded..... | 369 |
| Placer claims recorded..... | 125 |
| Certificates of work issued..... | 303 |
| Bills of sale recorded..... | 62 |
| Certificates of improvements issued..... | 11 |

Revenue.

| | |
|---------------------------------|------------|
| Free miners' certificates | \$3,170 25 |
| Mining receipts | 4,731 90 |
| Total | \$7,902 15 |

SKEENA MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

UNUK RIVER DISTRICT.

The following notes on the portion of the Unuk River district lying in this Province, written by J. W. Daily, have been kindly supplied by R. T. Elliott, of Victoria, and are included as this Bureau has no official information regarding the district. This district forms the extreme northern portion of the Skeena Mining Division, and is at present only accessible through Alaskan Territory :—

I beg to submit herewith statement dealing with the resources and location of Unuk river; the information contained therein is authentic in every detail and as complete as can be obtained.

The Unuk river starts in a low divide in northern British Columbia; it is sixty miles in length and flows in a southerly direction, emptying into salt-water at Burrows bay, which is an arm of Behm canal.

The distance of Behm canal, taking it from the East arm, is approximately 120 miles from Prince Rupert, and gives an outlet into Dixon entrance, which is easily approached from the Pacific ocean; there is also a short outlet through the West arm of Behm canal, which can be approached through Clarence straits from the main ocean.

The Unuk river is divided from Portland canal on the east and the Stikine river on the west by a high range of mountains paralleling the river its entire length. The watershed between Portland canal and the Unuk river is divided by a glacier extending thirty-five miles, parallel with the river, the waters from the east of this glacier flowing into a tributary of the Portland canal, the water on the west side of the glacier flowing into the Unuk river, thus making it impossible to construct roads to connect the Unuk river with Portland canal. At the headwaters of the Unuk river there is a low divide, and a natural pass leading into the Iskut River country, giving a direct outlet to Laketon, Telegraph Creek, and the Dease Lake country. The resources of the Unuk river are chiefly quartz-mining and placer-dredging, with an abundance of timber, consisting of spruce and hemlock. The mineral lies almost entirely in British Columbia; there is no break in the Coast granite between Burrows bay and the International Boundary-line. In 1900 the Unuk River Mining and Dredging Company purchased a group of five claims from Ceperley, Rounsefell & Company; for two years development-work continued on the property; in 1903 the construction of a wagon-road was started from deep water on Burrows bay to the quartz properties on Sulphate creek, a distance of forty-two miles—twenty-seven miles of this road being in Alaska, fifteen miles in British Columbia. The company has completed twenty-five miles of the road in Alaska and ten miles in British Columbia; about five miles have yet to be completed in British Columbia and two miles in Alaska. Several groups of claims have been located in this vicinity; there are six claims one-half mile north of the boundary-line on the east side of the river, showing a large

body of low-grade ore, containing copper, gold, silver, and lead. Four miles farther north there are three claims owned by Divilbliss, Mackenzie & Buck, showing gold values at \$40 to the ton. Six miles north of the boundary-line seven claims have been located and some tunnel-work done on them; this ledge is 100 feet wide and runs the entire length of the seven claims, carrying silver, copper, gold, and lead. At what is known as Glacier creek, about nine miles north of the boundary-line, there are two claims located, carrying free gold on the surface to the amount of \$10 to the ton; on the opposite side of the river two claims were located this summer, showing a high percentage in copper. Twelve miles up from the boundary-line is a group of five claims owned by Ceperley, Rounsefell & Company, of Vancouver, on which several hundred feet of tunnel-work has been done, showing a large amount of mineral, carrying gold, silver, and lead. L. T. Watson also has some claims located near the Ceperley group, the value of which I am unable to state. Three miles farther north the Unuk River Mining and Dredging Company owns five quartz claims, on which a large amount of work has already been done, much ore now being in sight on the ground. This company also holds a lease for dredging and prospecting of five miles in the bed of Unuk river; machinery is on the ground and work was started drilling and prospecting it this summer, the company expecting to continue next summer. This tract of dredging-ground consists of about 6,000 acres of land. The work done on the ground this summer showed good value. Mr. Divilbliss also holds a lease of four miles of the river-bed; while there is still unlocated in this country many well-defined ledges and a large area of country not prospected. Once this road is opened up the country will, in my opinion, fast develop into one of the most promising mining districts in British Columbia. On the Unuk river there is ample water-power to run any machinery necessary for mining or even for electric railroad.

A report was made on this district and submitted to the Canadian Government by Fred. Eugene Wright, of the United States Geological Department, who visited the Unuk River mining region of British Columbia in 1905.

This report can be found in the Geological Survey Department of Canada for the year 1905, and was reproduced in the Report of Minister of Mines of British Columbia in 1906, on pages 68 *et seq.*

ALICE ARM CAMP.

The following reports on the *Hidden Creek* mines of Goose bay, Observatory inlet, and the *Alderbarab* or *Black Bear* group of Alice arm, were made by Donald G. Forbes, mining engineer, of Victoria, B.C., who, acting under instructions from the Hon. the Minister of Mines, made an examination of these properties for the benefit of this Bureau:—

HIDDEN CREEK MINES.

The *Hidden Creek* mines, owned and operated by the Granby Consolidated Mining and Smelting Company, are situated in the eastern foothills of the Burniston range of mountains, which rise to an elevation of 5,710 feet, and at this point separate Portland canal from Observatory inlet. The mines are distant one mile direct and two miles by road from Goose bay, Observatory inlet. Goose bay can be reached from the town of Prince Rupert by steamer in about ten hours. The Dominion Government telegraph-line to Stewart passes through the property, and an office has been opened at the landing with a resident operator, appointed by the Dominion Government.

Geology.—The rock formation in which the ore-bodies occur may be best described as an argillaceous schist; it has been subject to very considerable alteration, and in some places the fissile structure of the argillaceous bands has disappeared and the rock appears to be massive. This rock formation can be traced for several miles along the shore of the inlet to the adjacent

islands, and extends nearly to the summit of the mountains to the west of the property, where the Coast granites are found. The ore-bodies are at some points cut by intrusive dykes, but these dykes have no influence on the nature of the ore, nor on its commercial value.

Description of Ore.—The ore consists for the most part of massive iron-pyrites, with some pyrrhotite, chalcopyrite, and a little bornite, carrying small quantities of gold and silver. In some portions of the ore-bodies both iron and copper pyrites occur in a quartz gangue, while some lime and a little alumina can be found associated with the ore at most points. The gold and silver values vary with the copper-contents of the ore; with a 2-per-cent. copper, these values, together, equal about \$1 per ton, and increase in about the same proportion as the copper-content advances.

General Characteristics of Ore-bodies.—Two main ore-bodies have been proved to exist on the property; both appear to dip to the west, or towards the main range of mountains. Sufficient exploration-work has not yet been done to definitely determine the extent or nature of these deposits. At present the eastern ore-body, known as *No. 1*, looks as if it would prove to be a large lens; it has been proved for a length of over 700 feet in a north-and-south direction, and its width, with both the northern and southern ends of the workings still in ore, is not less than 180 feet. The *No. 2* or *Western* ore-body appears to be in the form of a chimney, roughly 500 feet in diameter, but, like *No. 1*, its limits have not been definitely determined.

Development-work.—A considerable amount of open-cut work has been done on the surface of both ore-bodies, at an elevation of from 600 to 900 feet above the sea-level, and several short tunnels have been driven. These workings were all covered with snow and could not be inspected at the time of my visit. This work definitely proved the existence of large bodies of ore, but was of little value for economic mining or in determining the value of the ore-bodies; it had therefore been decided to drive a working tunnel into the hill, at an elevation of 530 feet above sea-level, to cut both deposits.

The 530-foot Level.—This level has been driven from the south-east side of the hill and has cut the two ore-bodies, known as *No. 1* and *No. 2*.

No. 1 ore-body was cut at 355 feet from the portal of the tunnel, and the tunnel passed out of ore at 555 feet, and was continued northward through country-rock, *No. 2* ore-body being cut at 805 feet.

Development has been vigorously pushed forward on *No. 1* ore-body; the best ore has been located by surface work to the south of the main tunnel, and it has been proved in that direction, at this level, for 600 feet, the faces of the drifts being still in ore. Diamond drills have been extensively used in prospecting-work, and, where the drill-holes have afterwards been drifted out, the assay values of drifts have corresponded as nearly as could be expected with the assay results obtained from the drill-holes.

Considerable diamond-drill work has been done below this level, and tends to show that the ore-body exists and maintains its value to the next level (elevation 385 feet), while one hole, *No. 12*, has been carried down, at an angle of 45 degrees, to sea-level and left off in 11 per cent. copper-ore.

In *No. 2* ore-body drifts *No. 4* and *No. 5* have been driven north and west from the main tunnel; the face of *No. 4* is still in ore, while *No. 5* broke through to the surface, all in ore. Drill-hole *No. 16* is also in ore, thus proving an ore-chimney of considerable size, the actual limits of which have not yet been determined. Development-work is still being pushed forward, and is at present being confined principally to *No. 1* ore-body; sixty men being employed underground.

The 385-foot Level.—This level is being pushed forward with a view to cutting both ore-bodies, and will be used as the chief working tunnel, the ore from the upper workings passing through it to the crushers and bins, which will discharge at 100 feet above sea-level to the conveyors of the smelting plant, which it is at present proposed to erect near the beach at Goose bay.

Ore Reserves.—At the present early stage of development it is not possible to give complete and exact estimates to the "ore in sight" in the mine and its value, but it may be safely stated that there is available for extraction above the 530-foot level not less than 4,500,000 tons of ore, containing 1.8 per cent. copper and a combined value of \$1 in gold and silver. The management also states that it has sufficient 4- to 5-per cent. ore "in sight" that could be sent to Customs smelter, to more than repay the expenditure on the property, in the event of a smelter not being erected. Up to date no ore has been shipped by the present company. Ten cubic feet of ore in place are reckoned to the ton.

Mining.—The cost of extracting ore from these mines should be very moderate; the ore is massive in character and the country-rock very solid, so it will be practicable to remove nearly all the pay-ore between the levels, only sufficient being left in place to keep the levels open. Very little timber will be required, except for chutes. The ore varies much in toughness in some places, drilling and breaking well with machine drills, while in other parts progress is slow.

Machinery.—The present machinery equipment of the mine consists of a 14- by 22-inch Rand duplex air-compressor, driven by a Pelton wheel, and a small electric generator driven by a turbine, used for lighting purposes, both of which are located at sea-level. At the mine, a small hoist, used on surface tramway to bring supplies from the 385-foot level to the 530-foot level, a drill-sharpening machine and one diamond drill, and as many rock-drills as the capacity of the compressor will allow, are in use. A small sampling-mill is being erected. Plans for the erection of a smelter and converter plant, having a capacity of 2,000 tons of ore a day, are being considered, but it is probable that the whole plant will not be erected at once.

Sufficient water-power for all purposes is available for the greater part of the year, but an auxiliary steam plant will be required during the winter months, for the creeks, being glacial, run low for several months in winter.

Sufficient timber for mining purposes can be obtained in the neighbourhood, but being all spruce and hemlock it makes poor fuel, and coal will be probably used for the steam plant.

The property being situated close to salt-water, the working conditions are as favourable as can be obtained in this Province, and I consider the property a mine of great promise; in fact, the best that I have seen in British Columbia for many years.

My thanks are due to the management, who placed their plans and the data they had collected at my disposal for the purposes of this report.

The following results were obtained from samples handed to the Provincial Government Assayer. The samples were taken with a view to showing the class of ore in *No. 1* and *No. 2* ore-bodies, and were not intended to represent the average value of the ore in the mine:—

| Sample of Ore. | Gold. Ounces per Ton. | Silver. Ounces per Ton. | Copper. Per Cent. Wet Assay. |
|-----------------------------------|--------------------------|----------------------------|---------------------------------|
| No. 2 ore-body, No. 4 drift | Trace | 0.40 | 1.87 |
| No. 1 " No. 10 " | " | 0.44 | 1.76 |
| No. 2 " No. 6 " | " | 5.56 | 8.62 |
| No. 1 " No. 2 " | " | 1.50 | 7.50 |

ALDERBARAB GROUP.

The *Black Bear*, *Full Chance It*, and *Alderbarab* mineral claims are situated at the head of Alice arm, Observatory inlet, sixteen miles from Goose bay, about one mile by trail from salt-water, and an elevation of 740 feet by barometer.

Geology.—The country-rock in the neighbourhood of the workings is schist; it is reported that no granite exists near the claims, although it appears to form the backbone of the mountains to the west of the property.

General Characteristics of Ledge.—At the time of my visit to the claims the surface was covered with from 5 to 6 feet of snow, and it was impossible to examine the surface of the claims or the outcroppings of the small ledge that has been partially opened up on the *Black Bear* claim, which, it is stated, can be traced on the surface for 650 feet. The ledge dips 25 to 30 degrees to the south-east, the strike being south 45 degrees west, in the lower tunnel. The ledge is rather flat in the No. 1 tunnel and somewhat broken up; the hanging-wall and foot-wall are both schist, and the ledge, from 2 to 6 inches wide where it carries values, is frozen hard to the walls. The ledge has all the characteristics of a bedded vein and follows the dip and strike of the schist formation. The ledge is exposed in section on a steep side-hill, denudation having taken place at right angles to the bedding of the formation.

Development-work.—The principal development-work has been done on the *Black Bear* claim, and consists of two tunnels, driven into the mountain, 50 feet apart vertically, and between the tunnels an open-cut following the outcrop of the vein.

Upper Tunnel.—The upper tunnel, at an elevation of 740 feet above sea-level, has been driven into the mountain a distance of 34 feet. It started on high-grade ore, from which sample No. 4 was taken, the width of ore being from 4 to 6 inches. This ore gave out when the tunnel had been driven a few feet, and the drift was continued northward, away from the strike of the ore, for a distance of 64 feet from portal of tunnel. As nothing was found, they started to drive west from the point where the ore gave out, following a slip in the country-rock, on which occasional bunches of quartz occurred. At the time of my visit, there was about 4 feet of barren-looking quartz in the face of the drift, from which No. 5 sample was taken, the face of the drift being 34 feet from portal of tunnel. The face of this drift appears to be too far to the northward, as the slip on which the ore occurred near the portal of the tunnel runs about parallel to the direction of the lower tunnel, and it is probable that, if a continuation of the ore is found, it will be on the same slip as it was on the surface, and in the lower tunnel workings.

The Lower Tunnel.—The lower tunnel, 690 feet above sea-level, was started in the same 6-inch vein of high-grade ore as the upper workings, and has been driven, south 45 degrees west, a distance of 63 feet, following the vein. A small quantity of ore has been stoped out near the portal of the tunnel, but this ore pinched to a string about 20 feet from the portal of the tunnel. No. 2 sample was taken 10 feet from the portal of the tunnel; width of ore, 6 inches. No. 3 sample was taken 20 feet from the portal of the tunnel; width of ore, 4 inches. No. 1 sample was taken at 53 feet from the portal of this tunnel; width of ore, 2 inches. The face of the tunnel is in broken ground and the ledge could not be distinguished from the country-rock.

Shipment to Smelter.—A shipment of 123,064 lb., net dry weight, was sent to the Ladysmith smelter in 1911. This ore was taken from the upper and lower tunnels and from the open-cut between them, and was hand-picked. The shipment gave the following results:—

TYEE COPPER COMPANY, LADYSMITH,
November 23rd, 1911.

Smelter Statement.

Prices—Silver = $56\frac{1}{8}$; gold = \$19. Less .90. Net, 50.51 cents. Alderbarab Claim, Alice Arm, ex "Vadso."

| Lot. | WEIGHT IN POUNDS. | | | Cu. per Cent. Dry. | ASSAY PER TON. | | Total Value per Ton. | Cost Treatm't per Ton. | Net Price per Ton. | Amount. |
|-------|-------------------|------------------|-------------------------------|--------------------|---------------------------|---------------|----------------------|------------------------|--------------------|------------|
| | Wet Weight. | Per Cent. Moist. | Net Dry Weight. | | Silver. Ounces. | Gold. Ounces. | | | | |
| No. 1 | 126,000 | 2.33 | 123,064 Silica = Iron = | 83.02 % | 119.01 | 0.115 | \$82 29 | \$ 5 97 | \$56 32 | \$3,465 48 |
| | | | | 3.60 | | | | | | |
| | | | | 79.42 | Excess silica @ 5 cents = | | | 3 97 | | |
| | | | | | Smelting | | | 2 00 | | |
| | | | | | Freight | | | 5 97 | | 192 25 |
| | | | | | | | | | | \$3,273 23 |

(Signed)

W. J. WATSON,
Smelter Manager.

Although some of the ore in this property is undoubtedly of high grade, it has not yet been found in sufficient width or quantity in the ledge that has been opened up to pay for the cost of development mining and treatment. The ledge opened up is undoubtedly a bedded vein, and there are no signs of any considerable movement along the plane on which it occurs; in the event of any tightening of the strata I should expect it to practically pinch out.

A party of working miners investing little but their own time, a few tools and some provisions, might make wages from working the property, as far as present development has exposed its value.

The following assays were made by the Provincial Government Assayer:—

| Samples. | Gold. Ounces per Ton. | Silver. Ounces per Ton. | Lead. |
|---|-----------------------|-------------------------|--------|
| No. 1—10 feet from face of lower tunnel, ore 2 inches. | Trace | 86.76 | .... |
| No. 2—10 feet from entrance of lower tunnel, ore 6 inches. | 0.2 | 75.40 | .... |
| No. 3—20 feet from entrance of lower tunnel, ore 4 inches. | 0.4 | 19.48 | .... |
| No. 4—Ore near portal of upper tunnel, width 4 inches. | Trace | 739.80 | 7.87 % |
| No. 5—Face of left-hand upper tunnel, quartz 4 feet. | Trace | 0.80 | .... |

NOTE.—Mr. Forbes is evidently of the opinion that the work done in the upper tunnel has been misdirected, and that the ore-seam, there found at the portal, was not followed, so that no conclusive results, either way, as to the continuity of the ore-body is given by these upper workings.

PORTLAND CANAL MINING DIVISION.

REPORT BY JOHN CONWAY, MINING RECORDER.

I have the honour to submit herewith my annual report for the Portland Canal Mining Division for the year ending December 31st, 1911.

During the year considerable progress has been made in the development of a number of properties. Four mines have been worked continuously—the *Portland Canal*, *Stewart*, *Ben Bolt*, and *Red Cliff*. The Portland Canal Mining Co. shipped in the neighbourhood of 1,500 tons of concentrates, but the price realized was comparatively low. A movement is on foot with a view to the amalgamation of several of the adjoining properties on Glacier creek, including the *Portland Canal*, *Stewart*, *Glacier Creek*, *Portland Wonder*, and *O.K.* mine, as work done on all of these properties shows them to be, on the average, low grade, and it is realized that the future working of these properties must be done on a large basis to ensure profitable returns, which will necessitate a considerable outlay of capital.

The Canadian North-eastern Railway completed the railroad to the *Red Cliff* mine early in August; it was the original intention of the Red Cliff Mining Co. to ship ore, but the plans were changed.

The new locations made in this division during the year are distributed as follows: Maple bay and vicinity, 15; Georgia river, 27; Marmot river, 30; Salmon river, 156; Bear river, 104; Glacier creek, 34; Bitter creek, 32; American creek, 37; making a total of 435.

MAPLE BAY.

On the *Comstock* group, owned by the Comstock Mining Partnership, a considerable amount of surface work has been done, consisting of open-cuts and stripping, with the result that a large body of ore has been shown up, carrying good values in gold and copper.

Statutory assessment-work has been recorded on the several groups owned by Collison & Noble.

GEORGIA RIVER.

On the group of claims consisting of the *John D.*, *Danny*, *J. P. Morgan*, *Guggenheim*, *Lookout*, and *Charlotte*, owned by E. Fish and associates, a pit has been sunk to a depth of 8 feet and a series of open-cuts made on the vein; assays have given good values in gold and silver.

MARMOT RIVER.

Iron Pot group, consisting of six claims owned by Herbert P. Heming, of Victoria. Work recorded, 50 feet of tunnel and a series of open-cuts.

Princess May claim, owned by the First New B.C. Goldfields, Canada, Ltd. Work done, 62 feet of tunnel.

Benfer and associates own a group of eighteen claims, on which a considerable amount of surface work has been done and a shaft sunk 25 feet. This group is now under bond to H. P. Heming, and further work on all of these properties will be commenced early in March.

SALMON RIVER.

The Salmon Bear River Mining Co. is developing a group of claims consisting of the *Hazleton*, *Rupert*, *Essington*, *Simpson*, *Pictou*, *Cascade Falls No. 4*, and *Cascade Falls No. 8*, situated on Cascade creek, a tributary of Salmon river. Operations commenced on the 16th



Klua-tan-tan Valley—Headwaters Skeena River.



Valley of the Skeena River—near its source.

May, and were continued until the 15th of December, on the *Pictou* claim; the work consisted of a series of crosscuts and stripping on the vein, which averages from 15 to 25 feet in width and carries galena and arsenical iron-pyrites. On the *Cascade Falls No. 4* the surface showing is from 75 to 100 feet in width; a short tunnel was run in on this vein, on the foot-wall, a distance of 15 feet; the face of this tunnel is in ore, carrying good values in gold, silver, and lead. Sixty feet farther down the hillside, a crosscut was made from the foot-wall across the vein to the hanging-wall, a distance of 90 feet, which showed the vein to be well mineralized for the whole width. At a point 20 feet from the foot-wall, a tunnel was run in a distance of 12 feet, and the face is in ore. At a point 400 feet farther down, a main tunnel was started and is in a distance of 100 feet; this tunnel when driven 400 feet will have a depth of 600 feet. The company has built permanent camps and intends to resume operations at the earliest possible date.

Cascade Falls Mining Co., Ltd., owns the following claims: *Cascade Falls No. 2*, *Cascade Falls No. 3*, *Cascade Falls No. 7*, *Mainland*, and *Rapid Transit*, situated on Cascade creek. The company started work on the ground during the latter part of September; tunnels were started to crosscut the main vein at two points—the first or No. 1 tunnel about 60 feet east and about 80 feet lower than the big open-cut on the surface, and the second or No. 2 tunnel was started about 300 feet easterly on the vein and 200 higher in elevation. No. 1 tunnel cut the vein at 130 feet in, giving a depth on the dip of 150 feet. At date it is into the ore about 6 feet, and, so far, the ore has proven identical with that in the open-cut above, consisting of galena and iron-pyrites. No. 2 tunnel is being driven to crosscut the vein at a depth of 100 feet, at approximately the same distance in. It is now in about 60 feet. In both tunnels stringers of quartz varying from 10 to 18 inches have been encountered. One of these stringers in the upper tunnel carried a small amount of grey copper. The company is continuing operations during the winter with a force of six men. (Report furnished by Frank B. Hume, engineer in charge.)

The *Big Missouri* group, situated at the head of Salmon river, is the oldest group on the river, having been located in the summer of 1904. A considerable amount of work has been done on this property, showing the existence of large ore-bodies with values in gold and silver. On the *Tip Top* claim, in a small crosscut the average values for a distance of $4\frac{1}{2}$ feet are good. On the *Buena Vista* claim a tunnel has been run for 36 feet. On the *Big Missouri* a crosscut tunnel has been run for about 60 feet, which will have to be continued a further 50 feet to strike the ore-body, of which there is a big surface showing. On the *Terminus* a strike was made last fall of an ore-body that is at least 50 feet in width.

On the *Yellowstone* group, work consists of a series of open-cuts and stripping; the surface showings average 50 feet in width, with values in gold and silver. Both of the above-mentioned groups are owned by D. Lindeborg and associates.

Boundary group consists of *Boundary No. 1*, *Boundary No. 2*, *Boundary No. 4*, and *Missing Link Fraction*, situated on Myrtle creek, and is owned by D. L. McIntomney. Work consists of 40 feet tunnel and a series of open-cuts.

BEAR RIVER.

On *Summit* group, consisting of eight claims situated at the head of Bear river, owned by D. L. McIntomney and associates, work has been done consisting of 100 feet of tunnel and a series of open-cuts.

International Mining Co. recorded 197 feet tunnel on the *Mammoth* group, situated on the west side of Bear river.

On the Portland Star Mines, Ltd., *Abitibi* group, the work recorded was 56 feet of tunnel and series of open-cuts.

Red Cliff Extension Mining Co., *Red Cliff Extension* group, has work recorded of 80 feet tunnel and series of open-cuts.

Red Cliff Mining Co. has carried on development-work steadily during the year. The company has now working four levels, viz. : 100, 200, 300, and 400 feet ; nearly all of the development-work of late has been confined to the 400-foot level, where 1,517 feet of drifting has been done. The 300-foot level is now being opened up ; the work done on this level amounts to 170 feet of drifting. On the 200-foot level, crosscuts and drifts aggregating 450 feet of work have been done, opening up two ore-bodies. On the 100-foot level, where the first mining-work was done, a large body of chalcopryite carrying gold and silver values was opened up, which caused the driving of the 1,500-foot double-track tunnel 400 feet below, and which is now connected by raises with the 100-foot and intermediate levels ; on the 100-foot level, 950 feet of tunnelling, crosscutting, etc., has been done.

The total work for the past year is 2,930 feet of drifting, tunnelling, etc., and 480 feet of raising. Improvements include the installation of a 200-horse-power water-power plant driving a dynamo and a 10-drill Canadian Rand compressor, and the erection of a 700-ton ore-bunker connected to the mine with a gravity-tram.

The company has between fifty and sixty men employed. (Report furnished by H. Neil Smith, superintendent.)

GLACIER CREEK.

The Stewart Mining & Development Co. continued work from January until the end of October, about 600 feet of tunnel having been driven by a crew of eight men. The main work consisted of driving on the No. 4 tunnel. A winze was sunk on the ore-shoot of the No. 4 vein, for a distance of 50 feet, at an angle of about 45 degrees.

The Glacier Creek Mining Co. resumed work about the middle of June and suspended operations at the end of August ; the work consisted of open-cuts and driving on the tunnel, which is now in about 200 feet. A force of six men were employed.

The Pacific Coast Exploration Co. made its final payment on the *Jumbo* and *Ben Bolt* claims in August. Development-work has been carried on continuously during the year, amounting to a total of 1,528 feet tunnelling and 39 feet shaft.

On the *Chicago* group, under bond to this company, 257 feet of tunnel has been driven.

On the *Rex* and *Ajax* claims, 350 feet of tunnel and 60 feet shaft. The bond on these claims was dropped by the company. Total amount expended on development-work by this company for the year, \$65,429.

On the *O.K. Fraction*, 110 feet of tunnel has been driven by the owner, J. Perrault, during the year.

The Portland Canal Mining Co. worked continuously until the latter part of October, when the mine was shut down. The capacity of the concentrator was increased from 50 to 75 tons a day, and it was started up the latter part of July ; 7,000 tons of ore were put through, which made in the neighbourhood of 2,000 tons of concentrates, of which about 1,500 tons were shipped. About sixty men were employed.

BITTER CREEK.

On the *Moonlight* group, owned by C. Delgrove and associates, the work done consists of a shaft 25 feet and a series of crosscuts and stripping. The Mineral Mountain Mining & Milling Co., of Seattle, has been formed to develop this group, and also the *Black Bear*, *Hoodoo*, and *Mayflower* groups, consisting altogether of nineteen claims.

The Bitter Creek Mining Co. has had a small gang working on the *Swede American* group; a considerable amount of surface work has been done and 62 feet of tunnel driven.

On the *L.L. & H.* group, there are three parallel veins outcropping on the *Union Jack* and *Famous* claims. All the development, to date, has been done on the No. 2 and No. 3 veins; the No. 2 vein has been stripped on the surface a distance of 500 feet, the width being from 4 feet up to 12 feet of vein-filling, mineralized chiefly with arsenical iron-pyrites carrying gold and silver values. A tunnel has been driven a distance of 200 feet, which has cut the foot-wall of vein No. 2 at a depth of 125 feet from the surface; at this point the owners came in contact with a large stream of water, when they decided to let it drain off before continuing on to the hanging-wall and also to vein No. 3. Vein No. 3 has an outcropping which measures 12 feet in width, showing galena on the foot-wall and arsenical iron-pyrites on the hanging-wall. A crosscut tunnel has been driven 30 feet, cutting the foot-wall of the vein at a depth of 25 feet from the surface.

AMERICAN CREEK.

The Big Casino Mining Co. has recorded the following work for the *Big Casino* group: 109 feet of tunnel and series of open-cuts.

The Northern Terminus Mines, Ltd., owns a group of nine claims situated on the east side of American creek; the work done consists of a shaft 45 feet, 45 feet of tunnel and open-cuts. A trial shipment of about 12 tons of high-grade ore has been rawhided to the valley and will be sent to the Tacoma smelter; the company expects this ore to average about \$200 to the ton.

OFFICE STATISTICS—PORTLAND CANAL MINING DIVISION.

| | |
|--|-----|
| Free miners' certificates (individual) | 517 |
| " " (company) | 7 |
| " " (special) | 9 |
| Mineral claims recorded | 435 |
| Certificates of work issued | 728 |
| Bills of sale, etc. | 265 |
| Filings | 53 |
| Certificates of improvements recorded | 21 |

Revenue.

| | |
|---------------------------------|-------------|
| Free miners' certificates | \$ 3,234 25 |
| Mining receipts, general | 5,962 95 |
| Other sources | 3,105 00 |
| Total | \$12,302 20 |

QUEEN CHARLOTTE MINING DIVISION.

REPORT OF E. M. SANDILANDS, GOLD COMMISSIONER.

I have the honour to submit the annual report on mining operations in the Queen Charlotte Mining Division for the year 1911.

Mining generally on the Queen Charlotte islands the past year has been very quiet, there being very few inquiries for copper properties. Very little new prospecting has been done the past year; quite a number of the prospectors, having tired of trying to get mining-men to interest themselves in their claims, have gone to work on their claims, and, in nearly every instance, with gratifying results, some of them opening up fine showings. A great many of the claim-holders have done from two to three assessments this year.

COLLISON BAY.

The owners of the *Leckie* group at Collison bay have done no work the past year on the claims, the *Meal Ticket*, *Cash Box*, and *Treasure Vault*.

On the *Wireless* and *Telephone* claims the Daykin Bros. have run a crosscut tunnel 40 feet long to tap the vein, and some good ore is now exposed in the face.

The *Thunder*, *Sadie*, and *Spade Flush*, owned by Thompson & McMillin *et al.*, have had considerable work done on them, with very favourable results.

IKEDA BAY.

The Ikeda Mines, Limited, owning the *Ikeda* group of claims, only worked a couple of men this past year, keeping up the assessments. The remaining un-Crown-granted claims, some twenty-odd, were surveyed by Morkill & Boulton, and Crown grants are now being applied for.

The Daykin Bros. have uncovered a showing of galena-ore on Ikeda bay, near the wireless station, and close to tide-water, carrying gold values; the ore also contains some zinc. At the time of writing very little work has been done to prove its extent and permanency. There are now three men at work.

COPPER ISLANDS.

During the past six months Mr. Heino, owner of the *Copper Island*, and one of the first locators on the islands, has had six men at work continuously. He has sunk two shafts, one 65 feet deep and the other 40 feet; some drifting has also been done. About 15 tons of ore has been mined and is ready for shipment. New buildings have also been erected and a steam-hoist installed.

The *Reid* claim, on one of the Copper islands, has been surveyed and Crown grant applied for.

Mr. Campbell, on George island, one of the Copper islands, has done considerable work on his claims, showing up some chalcopryite-ore.

HUSTON INLET.

The *Ivan* group, consisting of three claims, owned by Thompson, Mackinnon & Sivart, have had three men employed on them for the past few months. Some 50 feet of tunneling, besides stripping, has been done, exposing some yellow copper-ore. Buildings have been erected and the owners purpose prosecuting development extensively.

The *Iscoyd* group, situated on the divide between Huston inlet and Collison bay, and owned by Jas. George and J. W. Simpson, has had considerable work done on it the past year, with encouraging results. The owners have exposed showings of chalcopryite on the surface, carrying good values. They intend to exploit them at depth.

The *Hercules* group, owned by McEachern & McMillin, has had considerable work done on it, some 50 feet of tunnel having been driven. Some fine surface showings of copper are exposed.

HARRIET HARBOUR (JEDWAY).

The *Copper Queen* group has had no work done on it this summer; there has only been done the necessary assessments on the un-Crown-granted claims owned by J. S. McMillin. At present a watchman is in charge of the property.

Nils Pearson has done considerable prospecting-work on his claims between Jedway and Huston inlet. He expects to do further development this coming summer, a company having been formed for this purpose.

LOCKEPORT.

On the *Apex* group, situated on the divide between Lockeport and Tassoo harbour, and owned by Davies, Bell, Harris & Patterson, a crosscut tunnel has been driven to tap the ledge. This group of claims is now under bond to a Winnipeg firm.

On the *Swede* group some development-work has been done by the owners; the party who had this group under bond has done no work this year.

The Queen Charlotte Pioneer Development Co., who owns the *Bird* and *Bismarck* group, has done considerable work. A tunnel 50 feet has been driven on the *Bismarck* group, also other work done on the *Bird* group. This company also owns some claims on Werner bay which look promising.

On the *Nelson* and *Ottawa* groups, owned by E. M. Morgan and associates, considerable work has been done this summer. An average of ten men were employed all last season, and some 300 feet of tunnelling was done. Besides this, some prospecting-work has been done on the surface of the claims, cabins, etc., built, and trails made. There is a good showing of copper-ore on the *Ottawa*. Considerable more work is contemplated for the coming summer; all the claims are being Crown-granted.

CUMSHEWA INLET.

The Queen Charlotte Island Mining & Development Company, which owns the *Homestake* group in Cumshewa inlet, has operated continuously the past year, employing some ten men. This company has driven 1,200 feet of tunnel and sank 65 feet of shaft during the past year, besides erecting new buildings, including an assay office. Considerable ore has been mined and blocked out the past year, and it is the company's intention in the spring to build a wagon-road to tide-water, a distance of about half a mile. The ore assays high in gold values, often showing the native metal. The *Homestake* group consists of the *Homestake, No. 4*, and *Go East*, all Crown-granted; besides these, the company owns several other claims. In all probability this company will build a wharf in the spring. Chas. E. Pomeroy is superintendent and J. W. Austin assayer. The company's registered office is in Victoria and the head office in London, England.

On Louise island, on the south side of Cumshewa inlet, some large iron-deposits have been located. These were bonded through J. W. Sword last summer to the Western Steel Co., of Irondale. So far very little work has been done, but it is expected work will be carried on the coming summer.

SKIDEGATE.

The *South Easter* and *Beaconsfield*, situate near the Indian reserve at Skidegate, and owned by Bourne & McLellan, have had considerable work done on them. A shaft has been sunk 50 feet, and two drifts from the bottom run, one being 70 feet long and the other 40 feet, to test the vein. During the sinking of the shaft some high-grade ore was encountered; a few tons were sacked for shipment. Some of this ore will assay \$300 to the ton, the values being almost entirely in gold. The claims have been Crown-granted.

GOLD HARBOUR (WEST COAST).

The *Early Bird* group, situate in Gold or Mitchell Harbour, on the west coast, also owned by McLellan & Bourne, is a free-milling gold property, and several dollars of gold have been taken out. It is adjoining the property operated by the Hudson Bay Co. officials in the very early days, and where, I believe, the first gold was found north of California. There is now a small stamp-mill on the property with water-wheel and power, and this year the owners sent in a new hoist. There is a shaft down 75 feet and drifts each way from the bottom. Owing to a scarcity of water last summer very little work was done, but what work was done paid the owners well, and some gold bricks were the result.

HYDRAULIC-PLACER LEASES.

Some testing and sampling on the Sandhurst Gold Mines Co. property was performed this past year, and some testing-machinery, etc., installed. The company expects to do some more extensive work this summer. The properties are situate on the east coast of Graham island near Rose spit.

Some boring for oil on the west coast of Graham island, at a place called Otard bay, was carried on all summer by McPhail & Stewart.

OFFICE STATISTICS—QUEEN CHARLOTTE MINING DIVISION.

| | |
|--|-----|
| Claims recorded (quartz) | 134 |
| " (placer) | 3 |
| Certificates of work | 399 |
| Certificates of improvements | 7 |
| Bills of sale, etc. | 46 |
| Hydraulic leases | 2 |
| Free miners' certificates issued | 173 |

Revenue.

| | |
|---------------------------------|------------|
| Mining receipts | \$2,637.85 |
| Free miners' certificates | 902.25 |
| Other sources | 1,544.00 |
| Total | \$5,084.10 |

OMINECA MINING DIVISION.

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

I have the honour, as Gold Commissioner, to submit the annual report for the Omineca Mining Division for the year ending December 31st, 1911.

Hitherto, mining in this district has been retarded by the lack of transportation facilities, and operations have been confined principally to keeping up assessment-work on the more promising claims.

With the continued construction of the Grand Trunk Pacific Railway, which, on completion, will provide a means of transport to much of our mineralized areas, a remarkable change has taken place in the situation, and on some of the properties development-work has been carried on to a considerable extent, with very promising results.

During the past year there have been more prospectors in the field, and many new locations have been recorded.

The office statistics also show an increase in revenue of \$2,802.25 over that of the preceding year.

NINE-MILE MOUNTAIN.

Considerable interest is still manifested in Nine-mile mountain, and during the year 1911 some 113 new claims were recorded.

There is now a good trail leading up the mountain as far as the *Silver Cup* mines, which provides a means of access to many of the properties. It is the intention next year to convert this trail into a wagon-road, which will give facilities for shipping out ore.

Active development has been carried on, to a greater or less extent, and on the *American Boy* group, during the year 1911, surface trenching and stripping of the veins was continued on all four veins, and the total amount of this kind of work now amounts to about 1,800 feet. An ore-shoot 90 feet long was exposed in No. 1 vein, 120 feet long in No. 2 vein, and 250 feet long in No. 3 vein. Outside of these shoots the ore is of a concentrating grade. The ore is primarily galena, carrying good values in silver and a little gold.

A shaft has been sunk on No. 1 vein 37 feet, and a drift 28 feet long driven northward from the bottom. There is ore all the way down the shaft and along the drift, and 2 feet of very good ore in the face of the drift. Just north of this shaft there is a test-pit sunk on the vein about 10 feet, showing about 2 feet of good ore.

A tunnel is being driven to tap the ore-shoot of No. 2 vein at a vertical depth of 111 feet below the outcrop and an estimated depth of 129 feet on the dip, and is now in 180 feet, with a further estimated distance of 120 feet still to go. The best ore found on the property comes from the outcrop of this vein.

On No. 3 vein a shaft has been sunk 87 feet, with ore all the way down. Gold values are present in this vein to the extent of \$4 or \$5, with a total average of about \$70 a ton.

Additional buildings were erected in October, 1911, and there are now comfortable quarters for a crew of fifteen men.

General samples taken by the owners show values of 89.2 oz. silver and 28.7 per cent. lead in the ore. Picked samples have run up to \$385 a ton.

Silver Cup Group.—A considerable amount of development-work has been done on this group, and during the year a small force of men has been steadily maintained. As soon as transportation facilities are available, it is the intention of the management to proceed with operations on a more extensive scale.

Sunrise Group.—This property is owned by the Hazelton Sunrise Mines, Limited (N.P.L.), and comprises a group of five claims. A considerable amount of development-work was done during the past summer, and the following assessment-work was recorded for the year: One tunnel in solid rock, 60 x 7 x 5 feet; one open-cut (mostly rock), 50 x 6 x 5 feet; one open-cut (partly rock), 45 x 4 x 5 feet.

Lead King Group.—This is a property on which considerable work has been done during the past year. The group consists of seven claims, viz.: *Lead King, Lead Queen, King, Last Chance, Lucky Boy, Lucky Boy No. 1, and Homestake.* On the *Homestake* claim a tunnel was driven to the extent of 150 feet.

Assessment-work on all of the properties has been well kept up, and the owners of the claims appear satisfied as to the future outlook.

On the more important claims work has been done as follows, viz.:—

Silver Bell, Group of Three Claims.—Fifty feet of stripping (part rock), 3 feet deep by 3 feet wide; one open-cut in rock, 7 feet deep by 12 feet long; and one open-cut in dirt and rock, 5 x 7 feet.

Big Six, Group of Six Claims.—Trenching, 250 x 2½ feet wide by 5 feet deep (dirt and rock); one trench, 80 x 4 x 3 feet wide; open-cut, 80 feet wide, 25 feet long, by 6 feet deep (rock); open-cut, 25 feet long by 25 feet wide by 5 feet deep; drifting in solid rock, 20 x 4 x 5 feet; one trench, 50 feet long by 3 feet deep by 2 feet wide (loose rock); surface stripping, 25 x 20 x 2 feet (earth).

Silver Bow, Group of Two Claims.—Drifting, 17 x 4½ x 6 feet (rock).

Colter, Group of Two Claims.—Open-cutting, 28 x 8 feet deep by 6 feet wide; stripping, 40 feet long by 7 feet wide by 3 feet deep.

Prince Rupert, Group of Three Claims.—Open-cuts, 3 x 10 x 6 feet, 3 x 10 x 6 feet, and 200 feet of stripping 3 x 3 feet.

Little Florence, Group of Four Claims.—Open-cut, 20 x 4 x 10 feet face; open-cut, 37 x 3½ x 8 feet face; 100 feet of stripping and open-cut 7 x 3 x 5 feet; 70 feet of stripping and open-cut 10 x 4 x 6 feet.

Silver Cup Extension, Group of Three Claims.—Open-cut, 9 x 5 feet wide by 8 feet face; open-cut, 7 x 4 feet wide by 4 feet face; open-cut, 9 x 4 feet wide by 5 feet face; solid-rock open-cut, 7 x 4 feet wide by 6 feet face; open-cut, 13 x 4 feet wide by 8 feet face; open-cut, 15 x 6 feet wide by 7 feet face.

Knob Hill, Group of Four Claims.—One cut, 20 x 25 x 8 feet; one tunnel, 10 feet; 25 feet of trenching, 4 feet deep; one cut, 8 x 10 x 12 feet (rock-work).

ROCHERS DÉBOULÉS MOUNTAIN.

During the past year a considerable amount of prospecting has been done on this mountain, and some eighty-five new locations have been made. Development-work has been actively carried on during the season on the *Juniper* and *Ohio* groups, with very promising results.

Juniper Group (known as the *Rochers Déboulés Copper Company*).—This property is situate on the North fork of the *Kitsequecla* river, about nine miles and a half east of the railway at the *Skeena Crossing*. The group consists of the following six claims, viz.: *Jack Pine* mineral claim, *Juniper* mineral claim, *Balsam* mineral claim, *Log Cabin* mineral claim, *Iowa* mineral claim, and *Timberline* mineral claim.

There are three defined leads running through the property. The No. 1 vein has an ore-shoot exposed for a distance of 500 feet, carrying high-grade copper-ore; the No. 2 vein has 2½ feet galena silver-lead ore; the No. 3 vein shows a width of about 11 feet, the foot-wall side carrying values in copper, and the hanging-wall has about 18 inches of silver-lead ore.

The development of No. 1 vein consists of: One tunnel of 150 feet in length giving a depth on the vein to 110 feet; also one tunnel 40 feet in length; also one inclined shaft 20 feet deep, and several open-cuts on the ore.

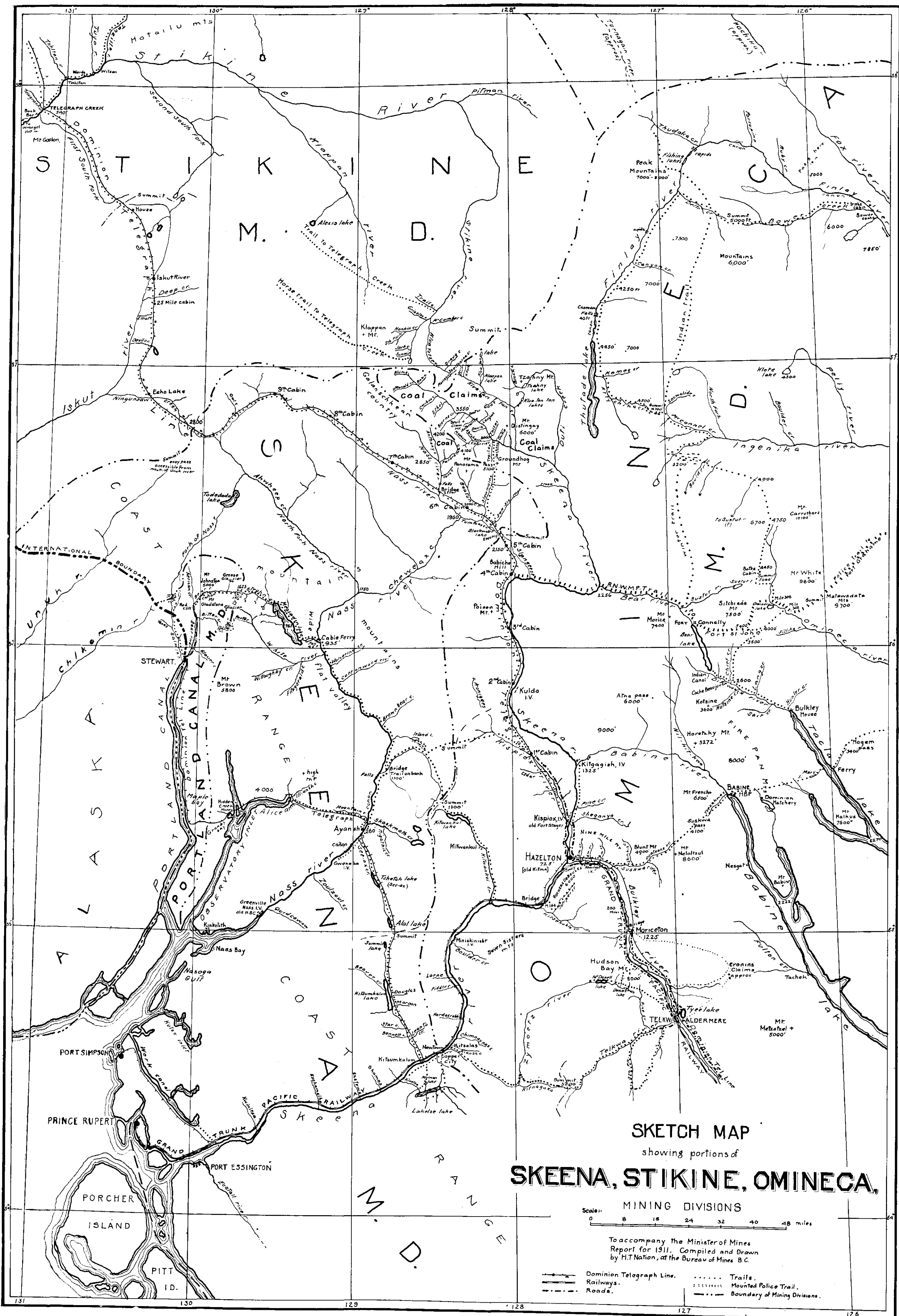
A considerable amount of work has been done on the other two veins, and the results have given much satisfaction.

The Ohio Group (adjoining the *Rochers Déboulés Copper Co.*'s claims to the east).—There are seven claims on the group—*Ohio*, *Maple Leaf*, *Kitsequecla*, *Princess*, *Pilot*, *Scotch Hill*, and the *Henrietta*. The main showing on the property is a fissure running in a general east-and-west direction through the full length of two claims, *Ohio* and *Maple Leaf*, which averages 5 feet in width.

The work done to date consists of open-cuts on the vein and surface stripping. A large part of the vein is covered with slide-rock and wash from the hillside. In places the vein-matter has been eroded, leaving the walls standing up to a height of 50 feet. The formation is the usual grano-diorite of the mountain.

An open-cut on the lead with a 10-foot face showed 3 feet of shipping ore, showing gold, silver, lead, and copper. From stripping done above this showing the ore-shoot is proved to be more than 100 feet long. Above here the vein is covered with slide for a distance of 500 feet to where the vein has been stripped for a distance of 200 feet, showing values in silver, lead, and copper.

On the *Kitsequecla* claim, which joins the *Ohio* to the east, are two veins running parallel with the main vein, both being from 1 to 4 feet wide; samples from both of which gave values in silver and lead.



GLEN MOUNTAIN.

This district, which came into prominence during the year 1910, is situate about five miles to the north of Hazelton, and on some of the claims showings of ore have been encountered. Assessment-work on all of the locations has been kept up, and on a few of the claims development-work has been proceeded with to a more or less extent.

Canadian King Group.—Consisting of six claims—*Canadian King, Canadian Queen, Black Prince, Speculation, Clearwater, and Swiftwater.* A number of men were employed during the past season on this property, and the management expresses much satisfaction as to the results obtained.

Silver Standard Group.—With the past year's work this property has exceeded expectations, and some rich ores have been exposed. On No. 1 vein, a tunnel was driven for 71 feet, showing up $2\frac{1}{2}$ feet of ore. On No. 2 vein, some open-cuts were made and strippings done, also a shaft sunk for 20 feet, exposing a vein from 4 to 6 feet in width. On No. 3 vein, a shaft was sunk for 45 feet, exposing 14 inches of ore, from which high assays were obtained. On No. 4 vein, a shaft 85 feet in depth was sunk, and at the bottom a vein of 30 inches of ore was encountered, from which high assays were obtained. The vein by open-cuts and strippings has been traced for a distance of 1,200 feet, and varies from $2\frac{1}{2}$ to 10 feet in width.

FOUR-MILE MOUNTAIN.

In the year 1910 there was considerable activity on Four-mile mountain, but during the past year little has been done in the way of development. The work that has been done for the most part was of the nature of assessment.

BABINE RANGE.

About forty-two new locations were made on the Babine range during the past season, some of which are reported to be promising prospects. At the present time there are no facilities for shipping ore, and apart from the usual assessment-work very little has been done in the way of development.

HUDSON BAY MOUNTAIN.

Beyond keeping up the yearly assessment on all promising claims, little has been done in this district during the year 1911 in the nature of development. The district, however, attracted a number of prospectors, and some sixty new locations were made.

KITSALAS CANYON AND ZYMOETZ RIVER.

Many new locations have been made in this district during the past season, but, with the exception of a few of the claims, little has been done in the way of development, and there are no mines in active operation.

PLACER-MINING.

Placer-mining in the Omineca gives indications of showing a marked improvement in the near future. During the past season tests were made by several companies to prove the value of the ground taken up under lease, and the results obtained have proved very encouraging. As a result of these tests, arrangements are now in progress for the conducting of operations on a much larger scale, and the season of 1912 should witness considerable activity in this direction.

COAL.

During the year a large number of coal-prospecting licences have been applied for, and our coal-measures are being prospected to a considerable extent, with most promising results.

The chief interest is now being centred towards the anthracite field near Groundhog mountain, which covers a much larger area than had previously been known.

This field lies on the height of land lying between the headwaters of the Skeena river, flowing south, and an unnamed tributary of the Stikine river, flowing north, at an elevation of 3,000 to 3,500 feet above the sea-level, the coal lands being about evenly divided on each slope.

The extent of this field, as far as at present indicated by the direct finding of coal in place, is at least seventy-five miles in a north-west and south-east direction, with a maximum width of about thirty miles.

The total area of coal lands at present located is at least 500 square miles, and the probabilities are that this area will be very largely increased.

The field is reached at present from Hazelton by a trail about 150 miles in length, which follows up the old telegraph-line to the 4th Cabin, from which point there is a self-made trail following up the Stikine river.

Pack-trains are only able to make a few trips during the season, as the trail is not open until the latter part of June or beginning of July, on account of passing over a divide on which the snow lies. This difficulty may possibly be avoided by the location of a new trail.

OFFICE STATISTICS—OMINECA MINING DIVISION.

| | |
|---|-------|
| Free miners' certificates (individual)..... | 1,017 |
| " " (special)..... | 6 |
| " " (companies)..... | 4 |
| Mineral claims recorded..... | 621 |
| Certificates of work..... | 618 |
| Placer claims recorded..... | 4 |
| Agreements and transfers..... | 201 |
| Placer-mining leases granted..... | 18 |

Revenue.

| | |
|--------------------------------|-------------|
| Free miners' certificates..... | \$ 4,807.25 |
| Mining receipts..... | 8,212.15 |
| Total..... | \$13,019.40 |

OMINECA MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

THE NEW COALFIELD AT THE HEADWATERS OF THE SKEENA RIVER, NORTH OF GROUNDHOG MOUNTAIN.

From present indications and developments it would seem as though this coalfield would prove to be one of the most important developments that the Province has seen for many years. The field is, as yet, only slightly developed, and, if but a fraction of its present promise is fulfilled, it is bound to have a wonderfully stimulative effect upon the future of the Province.

As yet, no official examination by this Bureau has been made of the field, as, until this past season, no important development-work has been done, nor did such development seem to be justified until the approaching completion of construction on the Grand Trunk Pacific Railway from the Coast to Hazelton brought the field within reasonable reach of transportation and afforded a market for its coal.

The probability of the existence of the coalfield in this district had been realized for some years, but its actual discovery was made in 1893 by James McEvoy, B.A.Sc., who had formerly been of the Geological Survey of Canada, and was then the geologist and mining engineer of the Crow's Nest Pass Coal Company in East Kootenay.

Mr. McEvoy was accompanied by W. W. Leach as an assistant, who was also formerly of the Geological Survey; they were there in the interest of a Toronto syndicate, known as the Western Development Company, of which G. G. S. Lindsey is the head.

In the year 1903, Mr. McEvoy staked and duly acquired for his company some twelve square miles of the coal lands, and the following year Mr. Leach staked four additional square miles for the company, whose holdings are at present sixteen square miles.

These claims were duly surveyed, the maps accepted by the Government, and the statutory assessment-work has been kept up each year since, some eight years. Of these early discoveries mention has been made several times in the reports of this Bureau.

Credit for the discovery of the field belongs as mentioned above, and the discovery cannot be now called "new," although it is only within the past two years that the existence has been proved of a field far greater than was at first even suspected.

GEOGRAPHIC POSITION OF THE FIELD.

The first stakings, those of the Western Development Company, are situated near the headwaters of the West fork of the Skeena river in latitude 57 degrees north and longitude 128 degrees west, and at an elevation above sea-level ranging from 3,000 to 4,000 feet.

Subsequent stakings and discoveries have shown the field to extend in a north-westerly direction for a distance of about seventy-five miles, and to have a width, in places, of about thirty miles.

This extension of the field will include portions of the headwaters of the Nass river and, also, of a stream flowing northerly into the Stikine river. The location of the field may therefore be given, briefly, as on the watershed forming the headwaters of the Skeena, Nass, and Stikine rivers.

The field has been referred to as the Groundhog Mountain basin, but is, in reality, not on Groundhog mountain, although immediately to the north of it.

PRESENT ACCESSIBILITY OF THE FIELD.

The shortest and most available route into the field is at present via Hazelton. Hazelton has been for years the head of river navigation on the Skeena, on which a fleet of river-steamers has been employed for the past few years, and up to the present this has been the way all freight has been brought in.

The Grand Trunk Pacific Railway is at present building its line from Prince Rupert, and this passes near to Hazelton. Rails were laid and the line was operated in 1911 as far as Newtown, on the Skeena river, a distance of 100 miles from Prince Rupert and within six miles of Kitsalas canyon.

The road-bed is constructed to, and past, Hazelton, and but for a tunnel and a couple of bridges the rails might be laid right to Hazelton; this will, undoubtedly, be done this coming summer, so that, for this Report, Hazelton may be considered as connected with Prince Rupert by rail.

From Hazelton into the coalfield is, by trail, a distance of about 140 miles. The route followed is up the valley of the Skeena, following the line of the Yukon telegraph-line to the 4th Cabin; thence, still following the Telegraph trail over Groundhog mountain into the

headwaters of the Nass, this trail is still followed to nearly the 6th Cabin, where the public Telegraph trail is left and a private trail striking north is taken, which leads up a tributary of the Nass to, and over, a summit on to a tributary of the West fork of the Skeena.

The present trail thus leads over two summits which could be avoided if a new trail should be continued from the 4th Cabin up the Skeena valley.

Pack-trains take about a month to make the round trip, and the trail near the summit is not open until late in spring and is closed early in the fall, so that only about three, or at best four, round trips can be made in the season.

Pack and saddle horses can always be had at Hazelton; the prices in spring for horses wintered in the vicinity are usually high, and remain so until pack-trains can arrive from the Fraser valley. Pack-horses and their equipment could be hired last summer at rates varying from \$1 to \$1.50 per day, and packers at from \$3 to \$3.50 a day and found.

All supplies requisite for camp and most of those needed for prospecting and preliminary development of mineral properties can be had at Hazelton, where there are several good stores, at prices not at all out of proportion to the prices charged in the Coast cities.

TRANSPORTATION POSSIBILITIES.

There seems to be no great difficulty in reaching the field by a railway, save the question of distance, and with coal in the quantity and of the quality as here indicated, distance is not of importance.

No actual survey has, as yet, been made for a railway location, but engineers competent to decide, who have been over the ground, are agreed that there are at least three practicable routes by which railways could be run to the seaboard, the routes and distances estimated being as follows:—

First Route.—While not the shortest route to tide-water, the line which will probably be first constructed will start from the Grand Trunk Pacific Railway near Hazelton, for the reason that it calls for the least expenditure on new railway-construction to connect with existing transportation, while requirements of the Grand Trunk Pacific Railway for fuel will demand that this line be built anyway, and that railway would also supply an immediate and steady market for the coal.

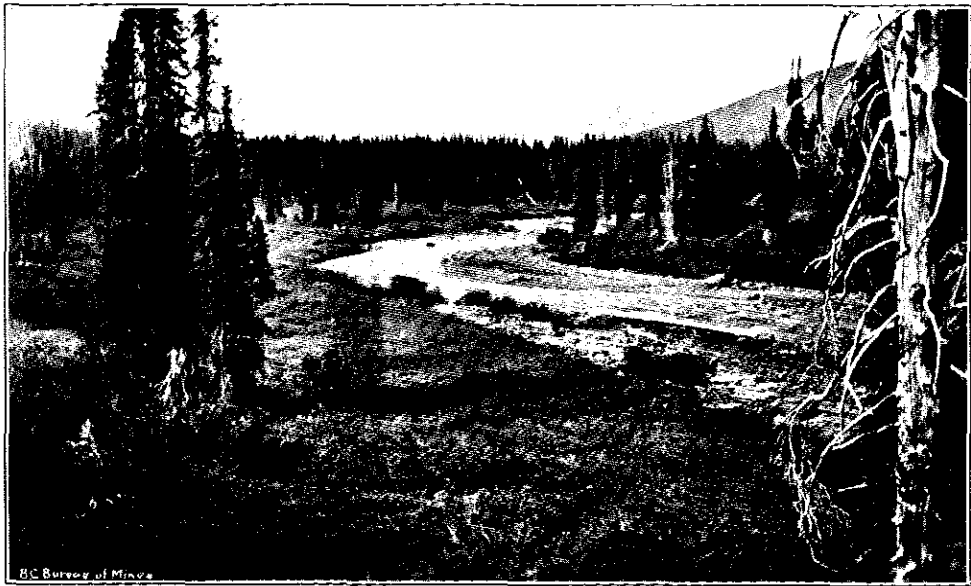
This line will probably start from the Grand Trunk Pacific line on the north-west side of the Skeena river, near the bridge over the river, and follow up that side of the Skeena all the way to the coalfields, a distance of about 160 miles.

The elevation of the rails at the bridge is 759 feet above sea-level, and that of the coalfields is about 3,000 to 3,500 feet. The Skeena river has a very uniform grade, and the route is said not to offer any great engineering difficulties to railroad location, and would be a piece of road that could be cheaply constructed.

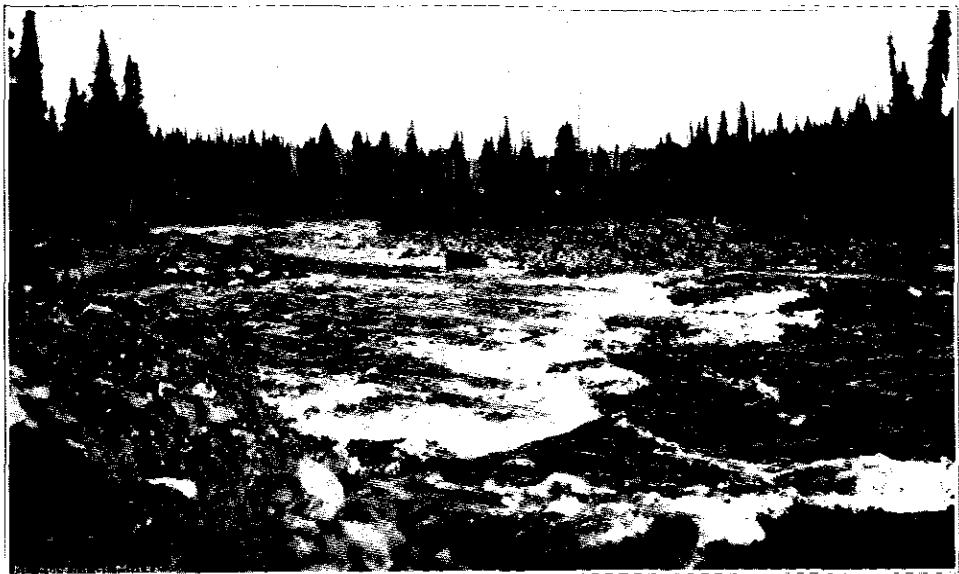
From the bridge to Prince Rupert by railway is exactly 164 miles, the mile-post being on the bridge. The total distance from the coalfield to tide-water by this route would be 324 miles, of which half is now built, and the remainder can be quickly constructed on a very easy gradient, the grade being with the load all the way. The harbour at Prince Rupert is already established.

Second Route.—A second feasible route from the coalfield would lead from the Skeena watershed over to the Nass watershed by following Courrier creek up to a pass, having an elevation of 4,100 feet, and then following the Nass river down to tide-water.

This route, it is estimated, would be from 200 to 225 miles in length, and, while not yet surveyed, is reported by prospectors as not presenting difficulties to railway-construction, and



Merry Creek—a tributary of Klau-tan-tan River.



Beltnes Creek—a tributary of West Fork of Skeena River.

as passing through a wide valley containing much agricultural land which will require railway facilities. There is said to be much valuable timber along this route.

Nass harbour offers a very good ocean terminal with good harbour facilities, while another bay, a few miles to the south and equally accessible, is reported to be one of the finest harbours on the northern coast, offering facilities even greater than Prince Rupert, so that this route has all that is required at this end.

Third Route.—A third route, and the shortest to tide-water, estimated at about 125 miles, would leave the coalfields by the same pass as the second route, through Courrier pass on to the Nass, which river would be followed down for about seventy-five miles, where a tributary flowing from the west would be followed up to its source, which is in a pass on the divide between this fork of the Nass and the headwaters of Bear river, the stream flowing into the upper end of the Portland canal at the town of Stewart.

This pass has an elevation of about 2,200 feet, but is occupied by a glacier, under which it would be necessary to tunnel for a distance of not over two miles.

At the Stewart end of this route, McKenzie & Mann have already constructed a line of railroad up the valley of the Bear river for a distance of about fifteen miles, and have constructed a pier capable of receiving ocean-vessels.

The harbour at Stewart presents some difficulties to the establishment of extensive dockage facilities, but these are not unsurmountable; Portland canal provides a good navigable waterway, but its inner end, at Stewart, is a long distance from the ocean, about seventy-five miles, and these facts somewhat offset the advantage of the shorter railroad route.

GEOLOGY.

The following is an extract from the report of James McEvoy to his company, the Western Development Company, after spending the summer of 1911 in this field:—

"The rocks in which the coal occurs have been classed as of Cretaceous age, but their age has not yet been absolutely proved. At the top of the series there is about 100 feet of hard conglomerate, similar to the conglomerate overlying the coal in the Fernie district of the Crowsnest.

"Below this there is a thickness of 2,000 to 3,000 feet of dark-grey and black shales with thin bedded sandstones, containing here and there small lenses of conglomerate. The greater part of the coal occurs in the top 800 feet of this series.

"No section could be uncovered on the property (that of the Western Development Co.) owing to the flat-lying attitude of the rocks and the almost universal surface covering of clay and gravel.

"On the mountains, almost a mile west of the northern part of these claims, Mr. Malloch, of the Dominion Geological Survey, measured a section of 2,700 feet, in 800 feet of which, near the top, were seven coal-seams, aggregating 23 feet of coal.

"A supplementary section measured to the south of the property, and believed to be a downward continuation of the first, gave three seams totalling 11 feet of coal in a thickness of 200 feet of rocks. Mr. Malloch's total section showed eleven seams amounting to 35.9 feet of coal in 2,800 feet of measure.

"Speaking in general terms, this property may be said to comprise the middle portion of the enlarged southern end of a coalfield which occupies the valley of the West fork of the Skeena river. Going westward, the ground rises gradually and fairly uniformly from the river to the western limits of the property, where the elevation is about 1,200 feet above the river. The dip of the rocks, in a general way, is parallel to the surface of the ground.

"The writer has previously stated that the development of this Cretaceous coal to an anthracite was caused by a source of heat in the rocks beneath the coal-measures, and further observations on the ground this past season only confirm this theory.

"In the south-eastern corner of the field, near the eastern edge of the field, on Lot 131, there is abundant proof of this heating action, as evidenced by the quartz veins or veinlets which permeate the coal-seams. Elsewhere in the main part of the field small veinlets of quartz, although rare, are still occasionally to be seen."

On the map of the property accompanying Mr. McEvoy's report he shows the seams to be, in many places, horizontal, and in others the dip runs from 5 to 15 degrees, with, in one place, towards the southern end of the property, a maximum of 35 degrees.

Mr. McEvoy's report only deals with the southern end of the field, where his company's properties are situated, but he states that he is satisfied that coal-outcrops are found for a distance of at least 70 miles in a north-west direction and over a width of some thirty miles.

G. S. Malloch, of the Geological Survey, spent the summer of 1911 investigating the southern end of the field; his report has not yet been published, but the Director of the Survey has issued a press bulletin which contains the following notes:—

"The coal-measures so far as known have a north-westward extent of at least seventy miles, and a width at the southern end of thirty miles. The sediments have a thickness of upwards of 3,000 feet, but contain coal in commercial quantities near the top and bottom only, though there are a few thin seams in the intermediate beds. The upper horizon contains seven seams, with thicknesses varying from 2 to 6 feet, and, so far as is known, is limited to an area of twenty square miles. The lower horizon contains at least three seams from 4 to 6 feet thick, and extends over most of the area occupied by the coal-measures. The coal is anthracitic in character. Some of the seams are high in ash, but from one of them some excellent analyses have been obtained. The basin is faulted considerably, and there are numerous local flexures associated with the faults. The development of a coalfield of this character near the Pacific coast would be of great importance to British Columbia. It lies about ninety [? nearer 125] miles from tide-water at Stewart, Portland canal, along a possible route for a railway, and about 150 miles from Hazelton, on the Grand Trunk Pacific Railway."

The coal-basin occurs on a high plateau chiefly occupied by beaver-meadows, which renders preliminary development and geological examination extremely difficult. This high plateau is the divide of the watershed of the Skeena, Nass, and Stikine rivers, tributaries of each heading here.

QUANTITY OF COAL.

It would be quite futile at the present time to attempt even an estimate of the available coal in this field, since but a small fraction of the field has been even prospected, the larger part, in fact, having only been staked this past year, when, for the first time, its great extent was realized.

The best that can be done is to give some idea of the results accomplished on the few claims developed, together with an estimate of what these may be expected to contain, leaving it to the reader to apply this to such portion of the remainder as his temperament may suggest.

Mr. McEvoy says, as the result of developments "in the upper horizon" of the geological section, that is, in the upper thickness of 800 feet, which, as before mentioned, contains the seven seams of coal:—

"The principal results of the work done on the ground are the opening-up of a 6-foot seam on Lots 126, 133, 135, and 128. Tunnels were driven into these seams at these places,

showing, on Lots 126 and 133, 6 feet and 6 feet 2 inches of coal, respectively, with a band of dark-grey shale varying from 1 to 4 inches in thickness. On Lot 135 the seam showed 6 feet of coal, with a similar parting of 1 to 3 inches of shale. On Lot 128, on the North fork of Davis creek, the seam was exposed at only one place and the roof rocks had been removed, leaving a covering of clay, so that the tunnels showed only a thickness of $4\frac{1}{2}$ feet of coal, the top part of the seam having been eroded away. On Lot 128—on Evans creek—a small seam $1\frac{1}{2}$ feet thick was uncovered; this probably overlies the 6-foot seam, but the evidence is not conclusive. On Lot 131, towards the middle of the east side, a seam 2 feet 2 inches thick outcrops, and in the south-east corner, near the mouth of Davis creek, a 4-foot seam is opened up. This last-mentioned seam contains a high percentage of ash and shows numerous quartz veinlets along the jointage planes; both these undoubtedly underlie the 6-foot seam. On Lot 136, on the side of Boulder creek, a seam of coal 6 feet 8 inches in thickness, exclusive of a 6-inch soft-shale parting, is opened by a tunnel 55 feet in length."

Mr. McEvoy is very guarded in giving an estimate of the quantity of coal proved, only attempting it for the one seam, that is, for the 6-foot seam, which he considers is well established under six and a half square miles, or 4,160 acres, and he assumes the average thickness at only $5\frac{1}{2}$ feet. From this very conservative basis he figures the tonnage of this portion of this one seam as: $4,160 \times 5\frac{1}{2} \times 1,500 = 34,320,000$ tons of 2,000 lb.; and this calculation is based on the specific gravity of bituminous coal, while this coal is from 10 to 15 per cent. heavier, so that no deduction is necessary for loss in extraction. This means 1,000 tons a working-day for 100 years.

"As the above-given estimate is only for a thickness of $5\frac{1}{2}$ feet, and for a limited area of six and a half square miles, instead of calculating for a total estimated quantity on the property, it may be left to the judgment of the reader to form his own opinion."

R. C. Campbell-Johnston, of Vancouver, has for the past two seasons been doing some preliminary development-work for the B.C. Anthracite Coal Syndicate. This company's holdings consist of upwards of fifty square miles of coal lands, and are located immediately to the north of the Western Development Company and in the vicinity of Biernes creek

Mr. Johnston's report says that he has opened up a coal-seam on Biernes creek, which he designates as the "Benoit" seam; the development-work had not proceeded sufficiently to determine its full width, although it is shown to be of workable size, although, near the surface, containing lenses of quartz in the seam.

On the same creek, Mr. Johnston says the "Scott" seam is shown 10 feet in thickness, with low dip. The "Garneau" seam is 36 inches thick, with lenses of coal in the roof. The "Choquette" seam has 15-inch clean coal. The "Ross" seam is apparently not completely developed, but indications are that it is over 10 feet in thickness. The "Pelletier" seam carries 6 feet of coal, at a high dip, due to a local disturbance.

The six seams are in what Mr. Malloch describes as the "lower horizon," which "extends over most of the area occupied by the coal-measures."

Mr. Johnston's development has not progressed sufficiently far to permit of an estimate being attempted as to quantities.

Mr. McEvoy says: "There is also the indisputable evidence of the geological section, which shows eight seams of marketable thickness, that is, of 3 feet and over in thickness, which aggregate 31.9 feet in thickness of coal."

For the purpose of giving some idea of what the possibilities of the present known field may be, the following calculation may be of interest:—

Over 600 miles of coal lands have been already staked: suppose, then, that *one-third* of this—that is, 200 square miles—should prove to be underlain by *half* the thickness of coal indicated in the geological section, or 16 feet, this would therefore give us: $200 \times 640 \times 1,500 \times 16 = 3,072,000,000$ tons of coal, equivalent to 10,000 tons a working-day—which is about our present Provincial output—for 1,000 years. And this calculation has already been subjected to division by six.

QUALITY OF THE COAL.

As yet the development of the field is entirely superficial, the longest tunnel being less than 100 feet, so that in no case can it be expected that the samples obtained are entirely free from the contamination of surface material washed into the cleavage-planes of the coal.

This contamination has been rendered greater owing to the land being low-lying beaver-meadows and easy-sloping hillside into which the coal-seams dip, thus affording every facility for the contamination of the seams near the outcrop. This accounts, to some extent, for the amount of ash shown in some of the appended analyses, which should improve as depth is gained.

In the southern part of the field there has been some movement of the rocks subsequent to the formation of the coal, which, Mr. McEvoy points out, "has no doubt caused, or at least facilitated, the formation of tiny quartz veinlets, which are more numerous here than in any other part of the field." It is expected that this condition, with the resulting high ash, will prove to be purely local.

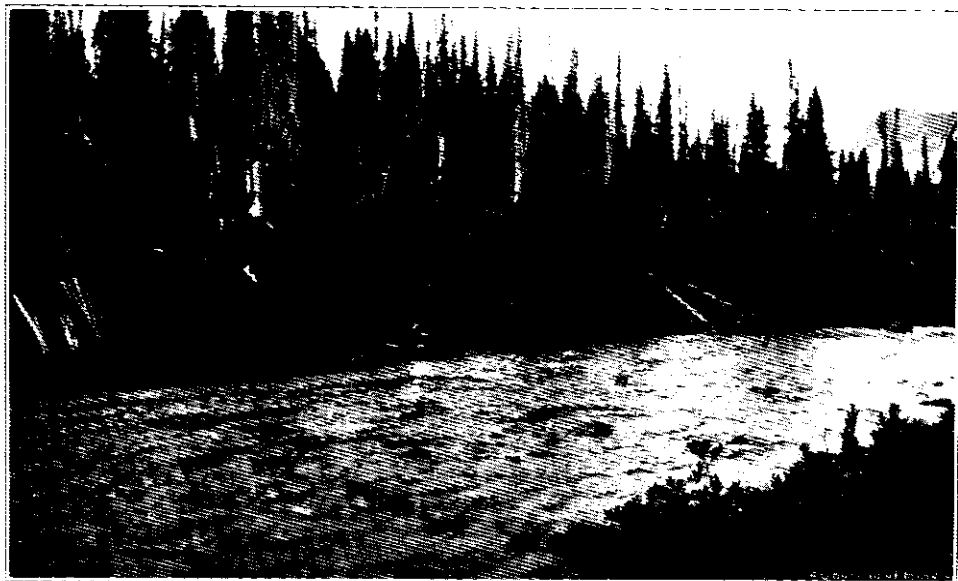
Several of the seams contain a shale, or clay, parting, and it is quite possible that a crushing, sizing, and washing of the coal may be found desirable, as is done in the anthracite regions of Pennsylvania.

The analyses given in the appended Schedule show what the coal is at the outcrops, or very near the outcrops, and it should be noted in samples Nos. 1 to 6—taken by Mr. McEvoy—that "the samples were taken in each case all across the face of the coal-seam, but not to include the shale parting; these may therefore be regarded as average samples. All of these coals are almost smokeless and have a pale-blue flame with a slight tinge of red. They are non-coking."

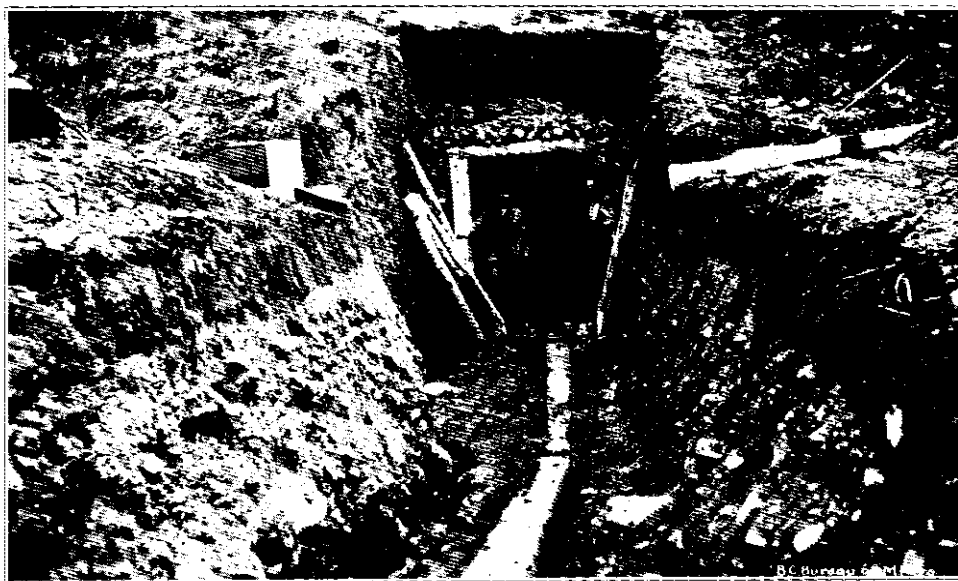
Physical Characteristics.—The physical character of the coal is not, as yet, shown at its best in the samples obtained, the coal still being affected by proximity to the surface, and, consequently, is much broken in most of the samples.

The greatest depths have been obtained on the Western Development Company's property, and, speaking of the exposures on Lots 126 and 133, Mr. McEvoy says: "According to Kent's and also to Fraser's classification, the coal is just within the anthracite class. In physical characteristics, it deserves, in a greater degree, to be placed in the anthracite class. The upper half of the seam does not show any bedding-planes; it is bright and clean, with the typical conchoidal fracture of anthracite. It is very hard, solid, and homogeneous throughout. The lower half of the seam is also a bright, very hard, clean coal. It shows signs of bedding-planes and has a rectangular jointage as well as a conchoidal fracture on a smaller scale."

Speaking of the coal on Lot 136, a seam 6 feet 8 inches thick, he says: "This is a bright, hard coal with a crystalline fracture, breaking into large lumps of firm, tough coal."



Choquette Coal-seam—Beltrac Creek—Groundhog.



Benolt Coal-seam—Groundhog.

Classification.—The classification of the coal, as classed by the system adopted by this Bureau, is indicated in the Schedule of Analyses attached. For purposes of classification, the "Expanded Analysis" is used—viz., the analysis of the clear coal, free from ash; the analyses have been made on air-dried samples by fast-coking method.

As the majority of the samples are from near the outcrops and in a wet basin, these samples probably contain an undue amount of included water, which, in the system of classification adopted, would lower the classification of the coal, and therefore a higher classification would be obtained from coal more under cover.

In Dowling's Classification by the Split Volatile Ratio—the one adopted by this Bureau and by the Geological Survey—coal having a Split Volatile Ratio "of between 10 and 13 are classified as anthracitic; those with a ratio between 13 and 15 as semi-anthracite; and those having a ratio of 15 and over as anthracites."

The details of this system of classification were given by Mr. Dowling in the Transactions of the Canadian Mining Institute for 1908, and were also noted in the report of this Bureau for 1909, on page 184.

The amount of moisture present in the sample has such an appreciable effect on the classification that much hesitancy is felt about giving the analyses and classifications that follow, more particularly so as there does not seem to be among assayers any standard method of "air-drying," either as to temperature or humidity of the air in which the sample is dried.

The classifications given are therefore to be considered as merely tentative and as indicating what is known at present of the coals in question.

To summarize the attempt herein made to classify the coals of the field, it would seem that the coal may be placed as on the dividing-line between a semi-anthracite and anthracite, some of the samples being in each class.

Coal of this class for ordinary uses, such as domestic or steam-raising purposes, is even superior to an anthracite, as it is slightly more free-burning and is equally smokeless.

As indicating independent classification of the samples here given, it might be said that a part of sample No. 13 in the Schedule was sent to the United States Geological Survey at Washington, through Dr. A. H. Brooks, of that Survey, who reports: "Doctor Martin has examined it (the sample of coal) and regards it as a very good, firm anthracite. The blocky appearance of the specimen is particularly favourable."

Mr. McEvoy classifies, using both Kent's and Fraser's classification, samples Nos. 1, 2, and 3 as anthracites; sample No. 4 as a semi-anthracite, but this was only an outcrop sample; sample No. 5 he also places as semi-anthracite; and sample No. 6 as "just outside of the anthracite class and at the top of the semi-anthracite."

In the accompanying Schedule of Analyses, the source of the analysis is designated by a reference letter, and these references are as follows:—

- A. Samples taken by James McEvoy "all across the face of the coal, but not to include the shale partings." The assays were made by Thomas Heys & Son, of Toronto.
- B. Samples taken by R. C. Campbell-Johnston, of Vancouver, and assayed in Vancouver.
- C. Samples received from respective owners and assayed in the British Columbia Government Laboratory.

SCHEDULE OF ANALYSES, GROUNDHOG MOUNTAIN COALS, WITH CLASSIFICATION ACCORDING TO DOWLING'S SPLIT VOLATILE RATIO.

| Designation Number. | Locality. | Seam. | Authority or Reference. | PROX. ANALYSES BY FAST COKING. | | | | Sulphur. | Coking Qualities. | British Thermal Units. | EXPANDED ANALYSES CALCULATED ON CLEAR COAL. | | | Dowling's Split Volatile Ratio. | Classification by Split Vol. Ratio. | Remarks. |
|---------------------|--------------------------------|---------------------------|-------------------------|--------------------------------|--------|-------|-------|----------|-------------------|------------------------|---|--------|-------|---------------------------------|-------------------------------------|---|
| | | | | Moist. | V.C.M. | F.C. | Ash. | | | | Moist. | V.C.M. | F.C. | | | |
| 1 | Lot 126, West. Devel. Co. | 6 feet thick | A | 1.17 | 6.54 | 83.37 | 8.92 | 0.74 | Non. | ..... | 1.29 | 7.18 | 91.53 | 19.5 | Anthracite. | |
| 2 | " 133, " " | 6 " " | " | 2.62 | 6.96 | 84.49 | 5.93 | 0.57 | " | ..... | 2.78 | 7.40 | 89.82 | 14.5 | Semi-anthracite. | |
| 3 | " 135, " " | 6 " " | " | 1.17 | 6.05 | 76.20 | 16.58 | 0.72 | " | ..... | 1.40 | 7.25 | 91.35 | 18.91 | Anthracite. | |
| 4 | " 128, " " | 6 " " | " | 4.72 | 10.65 | 72.02 | 12.61 | 0.65 | " | ..... | 5.41 | 12.18 | 82.41 | 7.70 | ..... | Outerop. |
| 5 | " 136, " " | 6 feet 8 inches [thick | " | 1.39 | 5.75 | 63.02 | 29.84 | 1.08 | " | ..... | 1.98 | 8.20 | 89.82 | 15.44 | Anthracite..... | Contain numerous veinlets of quartz. Ditto. |
| 6 | " 131, " " | 4 feet thick ... | " | 1.40 | 6.06 | 70.68 | 21.86 | 1.60 | " | ..... | 1.79 | 7.76 | 90.45 | 16.63 | " | |
| 7 | Benoit seam ..... | ..... | B | 4.55 | 4.55 | 84.84 | 6.06 | 1.00 | " | 12,852 | 4.84 | 4.84 | 90.32 | 12.77 | Anthracitic coal. | |
| 8 | " " ..... | ..... | " | 4.04 | 5.14 | 83.26 | 7.56 | 0.80 | " | ..... | 4.38 | 5.55 | 90.07 | 12.98 | " | |
| 9 | Scott " | 10 feet thick .. | " | 3.53 | 4.64 | 81.75 | 10.08 | 0.80 | " | ..... | 3.92 | 5.16 | 90.92 | 14.38 | Semi-anthracite. | |
| 10 | " " | 10 " " | " | 4.55 | 6.57 | 78.78 | 10.10 | 1.00 | " | 12,323 | 5.06 | 7.31 | 87.63 | 10.48 | Anthracitic coal. | |
| 11 | Garneau " | 3 feet thick ... | " | 4.04 | 4.04 | 83.33 | 8.59 | 1.00 | " | ..... | 4.42 | 4.42 | 91.16 | 14.08 | Semi-anthracite. | |
| 12 | Pelletier " | 6 " " | " | 4.04 | 4.04 | 71.72 | 20.20 | 1.00 | " | 11,340 | 5.07 | 5.06 | 89.87 | 12.2 | Anthracitic coal. | |
| 13 | McEvoy No. 1. .... | ..... | C | 2.80 | 3.70 | 85.6 | 7.90 | .... | " | ..... | 3.04 | 4.01 | 92.95 | 18.83 | Anthracite..... | Picked samples. |
| 14 | Scott seam, R. C. C. Johnston. | ..... | " | 3.40 | 3.10 | 75.9 | 17.6 | .... | " | ..... | 4.12 | 3.76 | 92.12 | 15.66 | " | |
| 15 | Garneau " " ..... | ..... | " | 4.3 | 2.9 | 82.3 | 10.5 | .... | " | ..... | 4.80 | 3.24 | 91.95 | 14.57 | Semi-anthracite. | |
| 16 | Benoit " " ..... | ..... | " | 3.9 | 2.9 | 80.3 | 12.9 | .... | " | ..... | 4.48 | 3.32 | 92.20 | 15.20 | Anthracite. | |
| 17 | Pelletier " " ..... | ..... | " | 3.1 | 3.5 | 77.7 | 15.7 | .... | " | ..... | 3.67 | 4.15 | 92.18 | 16.42 | " | |
| 18 | B.C. Anthracite Coal Co. .... | ..... | " | 4.0 | 3.1 | 85.2 | 7.7 | .... | " | ..... | 4.34 | 3.35 | 92.31 | 15.63 | " | |

COAL IN THE VICINITY OF HAZELTON.

In deciding as to the necessity of a railway to connect the Grand Trunk Pacific Railway at Hazelton with the coalfield near Groundhog mountain, the question as to the existence of sufficient and suitable coal near at hand is of great importance and requires some notice.

That there are on the Skeena river near Hazelton, and extending eastward along the valley of the Bulkley and its tributaries, a number of areas of coal-bearing formation is beyond question. Some of these areas are of considerable extent, and several have been proved to contain coal of good quality and in beds of workable thickness, although, of these, a number have been shown to be so flexed and faulted that their exploitation for coal on a commercial basis cannot be considered as feasible.

There still remain, however, a number of areas in which it is possible, and even probable, that coal may be developed of such character and under such conditions as to permit of its being worked.

The question has been investigated by the Geological Survey, and the reports of W. W. Leach record a number of areas of coal formation which are more than suspected of containing such coal.

The Provincial Mineralogist, in 1905, examined the coal-area of the valley of the Telkwa from its junction with the Bulkley river up to Goat creek, and described it in the report of this Bureau for that year. This same area was also described by Mr. Leach in the Summary Report of the Geological Survey for 1906 (p. 37).

The greater, and seemingly the most promising, part of this area later became controlled by the Grand Trunk Pacific Railway Company, which company has for the past two years been making serious attempts to prove up beds of coal of such character as would justify serious development. To this end a wagon-road has been built in from Telkwa, and one of the company's engineering staff has been engaged during this time in accurately surveying and geological mapping of the basin; core-drills have been employed and a number of holes put down in localities which the coal-outcropping would seem to designate as the most likely to prove favourable.

The field having been sufficiently examined and reported upon in the publications mentioned, the writer visited it this past summer to see what practical encouragement had been obtained from the development-work done by the Grand Trunk Pacific Railway.

The operations were found to have been greatly hampered by the inappropriateness and insufficiency of the plant sent in for the purpose, so the amount of boring done was not sufficient to permit of final conclusions being made as to the value of the field. Of the holes that had been put down, the results obtained are strictly negative, and, so far, at least, do not add to the hope that the field might have economic importance.

The work was still being continued in the hope that more favourable results might later be obtained, but at present no calculations can be based on a supply of coal from this point.

Subsequent reports of Mr. Leach indicate other areas that have come under investigation.

SHEGUNIA RIVER AREA.

One of these areas, noted in Mr. Leach's 1909 report, is in the Skeena valley above Hazelton, and a couple of miles above the mouth of the Shegunia (Salmon) river.

It would seem that here there are, at least, three seams of coal that have been more or less prospected for years; two of these seams are 2 feet thick and one is 5 feet thick.

The analyses given show the V.C.M. to run from 18 to 21 per cent., and the fixed carbon to be from 57 to 59 per cent., while the ash runs from 20 to 22 per cent.

Mr. Leach says: "The strata, however, where exposed along the banks of the Skeena, are so highly flexed and faulted that it seems improbable that mining can ever be successfully undertaken, unless further prospecting proves the seams to be in a less disturbed condition in other parts of the basins. In all three seams the coal is very severely crushed, and in the case of No. 1 and No. 2 seams at least is high in ash."

Until further prospecting proves otherwise, this area cannot be seriously considered as a point of coal-supply.

In the same report Mr. Leach mentions a coal-deposit discovered in 1909 on the Morice river, thirty miles above its junction with the Bulkley. The section he gives of the one seam he was able to find shows it to be 5.3 feet thick, and to contain three bands of good coal, from 0.4 to 1.4 feet thick, separated by bands of shale. This deposit is clearly not, as yet, proved to be commercial.

HOWSON COAL PROPERTY.

In his 1908 report Mr. Leach describes another coal-basin on the Morice, near the mouth of Gabriel creek, and one mile from the river.

"This area appears to be one of the largest in a district where the coal-beds occur, as a rule, in small basins."

Here several openings have been made in the outcrop of what is evidently a 10-foot seam, being quite regular and dipping at an angle of 30 degrees west. Below this seam is another, 3 feet thick. The analyses given of these seams average about 31 per cent. V.C.M., 49 per cent. fixed carbon, and 9 per cent. ash.

This field has been very little developed and has possibilities; it lies at an altitude of about 4,000 feet, and it is reported that there is a feasible and cheaply constructed route for a railway down the Morice river to the line of the Grand Trunk Pacific Railway, which would be about fifty miles long.

This property consists of some six claims and is held, at present, by the Telkwa Mining, Milling & Development Company.

As to the evidence of an available coal-supply at this point, the verdict must be, the Scotch one, "not proven."

GOLDSTREAM COAL.

On Goldstream, a tributary of the Morice river, F. M. Dockerill has staked a number of coal-areas, lying to the north-west of the Howson properties, which Mr. Leach describes as an important, but small, basin two by two and a half miles in area.

Mr. Leach gives the following analyses:—

| Sample. | Moisture. | V.C.M. | Fixed Carbon. | Ash. | |
|-----------------------------|-----------|--------|---------------|------|-------------|
| (1.) From 8-foot seam | 4.67 | 30.55 | 55.23 | 9.55 | Non-coking. |
| (2.) " 6½ " | 6.36 | 28.36 | 58.75 | 6.53 | " |
| (3.) " 3½ " | 6.86 | 27.24 | 59.47 | 6.43 | " |

All these samples are from outcrops, practically no development-work having been done.

The property is an extension of the Howson properties and the two may be classed together.

BABINE LAKE COAL.

Mr. Leach mentions a coal-basin on Babine Lake watershed, seventeen miles up the Tucheé river, a stream which flows into the south side of Babine lake, fifty miles from its outlet.

The only coal-seam he was able to find was 2 feet thick, and his sample showed 28 per cent. ash. It is later reported that a bigger, and better, seam has since been uncovered.

The lack of evidence of good coal at this point, and the fact that the Babine range of mountains intervenes between it and the line of the Grand Trunk Pacific Railway, with no suitable pass, renders this field of no value for the purpose under consideration.

Twenty-three Miles.—The Ashman Coal Mines, Limited, whose property consists of some coal locations, is on the Bulkley river, some twenty-three miles above Hazelton. There does not appear to be any commercial coal here; according to Mr. Leach, the staking was "due to the presence of an 11-foot bed of carbonaceous shale and its resemblance to coal. This can hardly be classed as a true coal, but rather as a carbonaceous shale."

Twenty Miles.—About twenty miles from Hazelton, in the Bulkley valley, the Grand Trunk British Columbia Coal Company, Limited, holds twelve sections of coal land.

The basin is small, being reported as four and a half miles long by a maximum of one and a half miles in width.

As many as twelve seams of coal, varying in thickness from 12 inches to 40 inches, included in a thickness of 500 feet of sandstones and shales, were uncovered in the north-western extremity of this basin. "The analyses from two of the best looking of these seams proved disappointing, the percentage of ash being very high" (20 and 23 per cent.). "Near the centre of the basin six seams were stripped varying in thickness from 12 to 38 inches" (the ash is about the same). This is not commercial coal and may be neglected.

DRIFTWOOD CREEK.

Coal locations have been made on Driftwood creek near its mouth, "occurring in a small patch of tertiary sediments" Mr. Leach found 1.8 feet of clean coal, carrying 8 per cent. moisture and 13.4 per cent. ash; he classes the coal as of "lignitic character."

The writer sampled this coal in 1905, classing it as a lignite, and did not consider the field of commercial importance.

ZYMOETZ RIVER AREA.

Mr. Leach mentions in his 1908 report the existence of a coal-area on the headwaters of the Zymoetz, or Copper, river.

Glacier Creek Coal.—The coal-bearing measures occur on Glacier creek at the southern base of Hudson Bay mountain. The measures here are very "severely folded and faulted."

"Some time was spent here in an endeavour to uncover a workable coal-seam, but without success, although a number of small seams, from 4 to 9 inches thick, were stripped. The samples taken showed such a high percentage of ash as to render the coal useless."

Copper River Coal Syndicate.—About eighteen miles down the Zymoetz river from Glacier creek, at what is locally called Coal creek, another area of coal-bearing beds is met with.

"The beds here appear in the general form of a shallow syncline"; the width of the basin is put at about two miles, with the length not determined.

In 1908 little or no work has been done, but two outcrops were seen by Mr. Leach.

"The lower of these showed 3 feet of clean coal, while the upper one was 1 foot 4 inches in thickness."

The analysis given of the 3-foot seam is: Moisture, 5.45 per cent.; V.C.M., 34.03 per cent.; F.C., 48.17 per cent.; ash, 12.35 per cent.

Since Mr. Leach visited this field there has been a considerable amount of development-work done, probably more than on any other in the district, and the field is looked upon as the most promising.

The property has passed into the hands of the Copper River Coal Syndicate, of which the National Finance Company, of Vancouver, are the fiscal agents, and who have kindly furnished this Bureau with the report, dated July, 1911, of the superintendent in charge, F. B. Chettleburgh, giving the amount of development-work already accomplished.

It appears that the property was examined for parties in September, 1910, by Edward Dinnan, a mining engineer of Seattle, who estimated an exceedingly large tonnage of coal as underlying the company's property. The property was again examined in September, 1911, by an English coal-mining engineer, who is credited with having made a favourable report. Neither of these reports has been obtainable, although they were asked for.

Mr. Chettleburgh gives the following details of work done :—

No. 1 seam : 22 inches of clean coal ; stripped for 30 feet ; drift, 5 x 5 feet, 14 feet long (four sets timber).

No. 2 seam : 3 feet 8 inches of coal and shale ; stripped for 70 feet ; drift, 5 x 5½ feet, 12 feet long, on north-east side of creek ; stripping on south-west side of creek 26 feet.

Original seam : Tunnel 108 feet long. Outcroppings of this seam are visible in the creek, and throughout the length of the tunnel no irregularities were seen.

No. 3 (?) or 6-foot seam : 5 feet 9 inches of clean coal, with 8 inches fireclay and 3 inches mining dirt underlying ; tunnel, 152 feet, with 30 feet airways. This tunnel is all in hard coal, with a clay roof that necessitates timbering.

No. 3 seam : 7 feet 2 inches of coal, clay, and dirt ; open-cut, 11 feet long. The top layer of seam consists of 23½ inches of solid, clean coal.

No. 4 seam : 2 feet 8 inches of solid, hard coal ; stripping, 38 feet, and a drift 12 feet long.

No. 5 seam : 4 feet 2 inches coal, shale, and clay. This resembles No. 2 seam very much, and may be the same, as here it has not been found in place.

On Twin creek an open-cut and two tunnels were started and open-cuts made all over the property to comply with the Coal Act.

It seems, from a hurried examination of the ground by the writer, quite feasible to run a railway from this property to the source of Zymoetz river, where it heads with Pine creek, a tributary of the Telkwa, in a flat, marshy summit, having an elevation of about 3,000 feet above the sea-level.

The distance from the coalfield to the summit would be about twenty miles ; the distance from the summit to the junction of the Telkwa and Bulkley and the Grand Trunk Pacific Railway would be about twenty-five miles, at which point the elevation is about 1,900 feet.

As far as is known to this Bureau, there is no other coal on, or near, the line of the Grand Trunk Pacific Railway eastward until the Rocky mountains are reached.

There is a deposit of coal on the south side of Fraser lake, almost on the line of the railway ; this was reported upon by the writer in the report of this Department for 1905, page 105, but the development at that time did not give much hope that commercial coal would be found.

MINERAL CLAIMS IN HAZELTON DISTRICT.

REPORT BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

On July 10th, 1911, the Provincial Mineralogist, with one assistant, left Victoria for Hazelton, to investigate the various mineral claims near the line of the Grand Trunk Pacific Railway in the vicinity of Hazelton, from which, judging from samples, it seemed probable that a tonnage of galena-ore, carrying silver, might be available as soon as transportation became an accomplished fact.

The trip was disappointing as regards the amount of actual development-work found to have been done, as in no case had it been sufficient to demonstrate conclusively any definite tonnage of ore at present or the certainty of any in the future; still, however, on a number of claims the work done had shown up ore of exceedingly good assay value, and the deposits indicated considerable probabilities of continuing to develop to a stage of actual production.

Leaving Vancouver at midnight on Monday, July 10th, Prince Rupert was reached before noon on Wednesday, where transfer was made to the train of the Grand Trunk Pacific Railway which left at 1 p.m., arriving at Newtown, 100 miles from Rupert, at 10 p.m.; here the steamer "Islander" was waiting to transfer passengers and baggage to Kitsalas, on the opposite side of the river, about four miles higher up.

After a night spent in the hotel at Kitsalas, the Hudson Bay Company's steamer "Port Simpson" was taken to Hazelton, leaving at 9 a.m. Thursday, and arriving at Hazelton at 7.30 a.m. on Friday. The journey from Vancouver to Hazelton, including stops, thus occupied 150 hours elapsed time, one of the fastest trips that had then been accomplished.

A requisition for a pack-train had been sent in advance, but no horses were found ready, as the white packers had already engaged all their horses earlier in the season, so, after a few days' delay, horses were obtained from an Awilgate Indian and a start was finally made on Tuesday, the 18th.

ROCHERS DÉBOULÉS.

The first place visited was the Rochers Déboules camp, so called since it is situated on the southern side of Rochers Déboules mountain in a small amphitheatre or basin at the head of Juniper creek, a creek flowing southerly into the North fork of Kitsequecla river, which, in turn, empties into the Skeena, about fifteen miles below Hazelton, or near the point where the Grand Trunk Pacific Railway crosses the Skeena River.

Rochers Déboules mountain is an isolated mass of grano-diorite, locally called granite, which, according to the Geological Survey, is probably of Lower Tertiary age, and belongs to a group of rocks of that age which have been designated as the "Bulkley eruptives." "These rocks, consisting chiefly of grano-diorites and diorite porphyrites, have evidently played an important part in the disposition of the various mineral deposits of the district, since it is in the immediate neighbourhood of these intrusive masses that all the principal ore-bodies have been discovered."

The basin at the head of Juniper creek is known as Juniper basin, and the trail leading to it starts from the Skeena river near the mouth of the Kitsequecla, from an elevation of 700 feet, rising to the basin at an elevation of 4,200 feet in a distance of fifteen miles, following up the courses of the streams, which are flanked on either side by high hills.

The basin is small in area; the mountains rise steeply on all sides, their slopes being covered with rough granite slide-rocks for about 1,000 feet up before the formation in place is freely exposed.

As far as could be observed, all around the basin, and certainly in the vicinity of the mineral discoveries, the country-rock is entirely of granite, with occasional younger dykes, quite acid in character, cutting through the mass and following a system of fissuring which seems to have a strike of about south-west.

The slope of the mountain lying to the north, and towards Hazelton, is very abrupt, so much so as to force the approach from the south, and apparently does not contain the fissuring system with which the mineralization is associated on the southern slope of the mountain. The discoveries around Juniper basin were made, for the most part, in 1910, so that, in July, 1911, when the writer visited the camp, there was very little work done, and, consequently, little more than outcrops to be seen.

On the south side of the basin, above the slide-rock, at an elevation
Great Ohio of about 5,000 feet, a well-defined fissure is to be seen cutting through
Group. the granite country-rock in a S. 45° W. direction, and this fissure is accompanied by a later, light-coloured, acid dyke, which has in itself influenced, or the action which created the dyke has influenced, if not actually caused, the formation of the mineral deposit in the fissured zone, for the mineralization seems to be confined to those fissures that have associated with them these later dykes.

The fissure seems to be quite persistent, with a dip to the north of about 80 degrees, and can be traced to the summit at an elevation of 5,600 feet, having a width, in places, of 8 feet, but frequently becoming much less and occasionally sending off spurs or splits.

The mineralization consists of galena in a quartzose gangue, the ore also carrying appreciable values in gold and silver; this mineralization is by no means general in the fissure, but at one or two spots galena is abundant, although not as yet discovered in any defined ore-shoot.

The property is only a prospect, showing a little ore of exceedingly good grade, which gives encouragement to further prospecting. The property was located, and is still held, by Munroe & Sargent, of Hazelton.

The *Juniper* group, consisting of six claims, is located on the hillside
Juniper Group. on the north slope of the basin and extends from the basin almost to the summit. This property was also located by Munroe & Sargent, but had been bonded to Trimble & Pemberton, who, in the early part of the season, established a camp in the basin and had six or eight men at work developing the property.

There are at least two important ore-showings on the property, known as the "upper" and "lower" showings, and these appear to be quite independent of each other.

The lower showing is at an elevation of 4,900 feet, about 600 feet higher than the camp; the upper showing is at an elevation of 5,700 feet.

There seems to be on this slope of the hill also a system of parallel fissures, having a general strike of about S. 45° W. and a dip to the north-east from 40 to 50 degrees. These fissures run nearly parallel with the hillside, dipping into it, and disappear to the eastward under very heavy slide, where they are lost to sight, but where it is possible to trace them they seem to be fairly continuous.

Upper Showing.—When the property was visited on July 21st, the development had not advanced sufficiently to prove anything more than could be seen in the outcrop.

This outcrop occurred in a brook which, flowing down the steep mountain-side, had washed its course clear down to the solid formation, thus exposing a quartz vein from 4 to 6 feet in width; at this point heavily mineralized with chalcopyrite, to an extent, to judge



Juniper Creek Tunnel.



Hazelton—Pack-train loading.

by the eye, as to average across the vein 6 to 8 per cent. copper, with which was associated values in gold and silver of about \$2 to the ton. This exposure in the creek was so situated that, on account of the flow of water, no work could be done at that point, while to either side the surface was covered with slide, composed of very heavy rocks, that prevented prospecting for the probable extension of the vein without a heavy expenditure.

The ore-exposure in the creek was certainly very encouraging, as was the general continuity of the fissures in the locality, but further than this had not, at the time, been demonstrated, and no statement can be made as to the length of the ore-shoot which would do justice to the probabilities. Some 150 feet east of the "showing" four or five men were engaged in an attempt to get down through the slide-matter to the solid formation, and so prove up the continuance of the fissure and the ore-shoot, but at that time the work had not progressed far enough to do so.

Lower Showing.—When the property was visited, the management clearly laid more stress on the upper showing than on the lower, and, consequently, the latter had not received very much attention; later, however, the management reports that the prospecting here turned out so unexpectedly well that, later in the season, it was on this showing the work was concentrated, and from the samples seen, taken from subsequent development-work, the ore-showing must have materially bettered, so that the following description must only be taken as of the date of 22nd July, 1911.

In the same granite formation, almost 700 feet above the basin on its northern slope, three open-cuts had proved the continuity of a fissure for a distance of 1,000 feet.

This fissure represented a zone of crushing some 10 or 12 feet wide, having a strike of S. 45° W. and dipping to north-east at an angle of 40 degrees. As exposed in the open-cut, the first 4½ feet on the foot-wall consisted of crushed granite silicified by the subsequent infiltration of quartz, the whole somewhat mineralized by chalcopryite scattered through it, rather than in any defined layer. The amount of chalcopryite there exposed was encouraging, though not sufficient to constitute ore. Above this lay a band of granite, some 3 feet thick, of a darker colour than the surrounding country-rock, and having the appearance of being a dyke of more recent injection.

Above this granite intrusion is another zone of crushed granite 1 or 2 feet thick, apparently not as much silicified as the lower layer, and in this was plentifully distributed small layers and lenses of galena and sulphide of antimony, which, in selected samples, carried high silver values.

From the bonders, Trimble & Pemberton, it is learned that the later development on this showing was very satisfactory, the continuity of the fissure was proved, and an ore-shoot of sufficient size, containing considerable ore, was developed.

In the fall the property was bonded to a syndicate, or company, organized in the United States, under which development has been pushed in an energetic manner.

July 22nd. The Provincial Mineralogist left Juniper basin at 8.15 a.m., travelling thirteen miles in a rain-storm, and camped that night on the bank of the Skeena, near Foley, Welch & Stewart's Camp No. 21, which was the only place where horse-feed was available between that point and Hazelton.

July 23rd. Camp was moved to Two-mile flat, on the outskirts of Hazelton, a further distance of fourteen miles. Here there had been good feed, but it had been eaten off by the numerous horses brought into Hazelton by the railway-construction, so the horses would not stay and had to be picketed for the night.

July 24th. Camp was broken early and the pack-train in motion by 8.15 a.m., headed for Cariboo Mountain camp. The route lay through Hazelton, which was reached at 9.15; here extra camp supplies were purchased and directions as to trails obtained from Mr. Brindle, a prospector.

CARIBOO MOUNTAIN.

Cariboo mountain lies on the east side of the Skeena river, just north of the Shegunia, a stream that flows in from the east, about eight miles north of Hazelton. The trail follows the wagon-road up the east side of the Skeena to Loring's Glen Meadow ranch, some five miles, where the road ends; here a trail was taken which, in a further distance of two miles and a half, leads to the Shegunia river, at a point about two miles from its mouth, where the river was crossed on a pack-trail bridge recently built by the Government. Shegunia river is at this season of the year rather a formidable stream, rising in the glaciers and snowfields between Nine-mile and Cariboo mountain, both forming part of the Babine range of mountains that flanks the east side of the Skeena for many miles northward.

From the bridge to its mouth the Shegunia is in a canyon, with perpendicular banks from 100 to 150 feet deep, composed of porphyritic igneous rocks, probably belonging to what has been called by the Geological Survey the Bulkley eruptives, of Tertiary age.

The contact of these igneous rocks with the sedimentaries occurs somewhere near here, since the next rock-exposure seen, a couple of miles to the eastward, consisted of altered argillites and sandstones, the intervening space being covered by surface drift and wash from the mountains, constituting a gravelly plain, heavily timbered with black pine, spruce, etc., of small size, and having but few open spots and no grass.

Camp was made immediately after crossing the Shegunia after ten miles' travel, as no further horse-feed was to be found short of the top of Cariboo mountain, at an elevation of 1,200 feet.

July 25th. Camp at Shegunia river was broken and the pack-train in motion by 8.30, by which time Mr. McBain, one of the owners of the claims on Cariboo mountain, came into camp, having ridden out from Hazelton that morning.

After travelling northward for about a mile and a half along the old Kiskagash trail, a side trail was taken which branched off to the right up the mountain. In a short distance this trail crossed Pine creek, which flows into the Skeena, and the stream-depression was followed most of the way, up the shoulder of the mountain to timber-line.

After a hard climb up the mountain, Long and McBain's camping-ground was reached at 1.15 p.m.; the camp is at an elevation of 5,025 feet, and well above the general timber-line, but on the edge of a bunch of stunted balsam and spruce which occupies a sheltered sag in the hillside.

Here a most uncomfortable night was passed in a camp where it was difficult to find level ground, and, as the snow had only just melted, everything was water-soaked, while the wind blew so hard and shifted so often that it was impossible to keep any camp-fire and difficult to do cooking.

The *Silverton* group, consisting of six claims, located by Long & Silverton Group. McBain, is situated on the south slope of Cariboo mountain at an elevation of about 5,100 feet. This slope of Cariboo mountain faces the north slope of Nine-mile mountain, where the Nine-mile Mountain camp is located, the deep valley of the Shegunia river separating the two.

There is no doubt but that the success which had attended the prospecting of Nine-mile mountain suggested the idea of investigating Cariboo mountain.

These two camps are on the opposite side of the valley at about the same elevation, and distant apart, as the crow flies, only about five miles, although as a pack-train travels, they are distant fifty miles.

The rock formation of this part of Cariboo mountain consists of altered argillites, sandstones, etc., cut by numerous light-coloured acid dykes.

On the bare hillside above the camp the solid formation is frequently and well exposed, exhibiting a large number of small fissures, filled with quartz and cutting the formation in a north-and-south direction; as far as could be observed, these fissures were not continuous, each disappearing in a short distance, to be replaced by another a little higher, or lower, on the hillside.

The width of the fissures seen would not exceed 6 to 10 inches, and these frequently contained bunches of iron and arsenical pyrites which, in concentrated samples, carried \$10 in gold to the ton. A sample of clean ore taken by the writer for assay gave 0.70 oz. of gold and 5.7 oz. of silver to the ton. Some occasional specimens of galena were seen, but the quantity was unimportant.

As far as prospecting had been carried on this part of the mountain, it had not demonstrated anything that gave promise of developing into property of commercial value, but, at the same time, it did show an extensive, if scattered, mineralization of the mountain; as this same mineralization continues northward along the Babine range at least as far as the mouth of the Babine river, where there have been a number of mineral claims located, it would seem as though it indicated a section that was well worth prospecting.

The general geological conditions here are favourable to the deposition of mineral; it is the opinion of the writer, however, that the part of the mountain lower down, and nearer the contact of these sedimentaries with the igneous rocks, will be found more likely to contain ore-deposits of workable size.

July 26th. The slight prospecting-work that has been done on Cariboo mountain having been seen the previous afternoon, camp was broken, and the descent from the mountain started at 8.30—the pack-train moving to Loring's Glen Meadow ranch, where camp was made; the writer going with Mr. McBain to his properties on Glen mountain, and returning at night to the camp at Loring's ranch.

GLEN MOUNTAIN.

Glen mountain is a small detached hill, or knoll, about a mile long and half as wide, rising 1,000 feet above the valley of the Skeena, on the east side of the river, about four miles above Hazelton. This hill is detached from the main Babine range and seems to be a mass of volcanic rocks, probably of the Bulkley eruptive series, sticking up through the sedimentaries of the Skeena valley.

The *Silver Standard* group, consisting of six claims, was located, and Silver Standard is held, by Long & McBain, of Hazelton, being now bonded to Stewart, Group. McHugh & McLeod, who are developing the property with a force of from fifteen to twenty men under Mr. McCrimmen, as foreman. There are a number of tunnels, shafts, open-cuts, and strippings at various points on the property, and these reveal a system of several veins all having a general north-and-south strike; these vary in width from quite small stringers up to 6 feet of vein-matter, chiefly quartz, dipping to the north-east at angles about 50 degrees.

The work done has shown the veins to be very continuous and permanent, and to carry in places shoots of ore, consisting principally of galena. This galena carries silver in considerable quantity, as is evidenced by the assay of a piece of the ore, taken by the writer for that purpose, which gave: Lead, 58 per cent.; silver, 303 oz.; and gold, 0.24 (\$4.80) to the ton.

The development of the property had not proceeded far enough to block out any measurable quantity of ore, but there were two or three shoots of ore exposed that gave promise of containing ore in workable quantities and of a grade, as indicated by the assay given, to permit of its being profitably exploited.

On the *Alamo* claim there was exposed by surface trenching a vein-fissure from 2 to 3 feet wide, in which were visible two or three stringers, or bands, of galena from 4 to 7 inches thick, which were reported by the owner as having assayed \$90 in gold, silver, and lead. This vein here contained little quartz, the vein-filling appearing to be crushed country-rock.

A crosscut tunnel had been started in some 30 feet vertically lower down, in an attempt to find at that depth a continuation of the surface showing; this tunnel had been run in for 60 feet in a N. 80° E. direction, but, so far, had not reached the lead.

On the *Standard* claim, at an elevation of about 1,700 feet, a 10-foot open-cut showed a fissure running N. 10° W., in which the vein-filling was some 6 feet wide, containing a vein of quartz from 8 to 12 inches wide, carrying some galena.

Another open-cut, 20 feet long, exposed a second vein from 2 to 4 feet wide, having a strike N. 20° W. and a dip of about 80 degrees, and carrying a fair percentage of galena and grey copper.

At an elevation of 1,850 feet another stripping showed a vein, or, rather, two veins, or layers, of quartz each from 10 to 14 inches wide, striking N. 30° E.; the upper of these layers, as seen, was barren quartz, while the lower carried some galena.

On the *Silver Standard*, at an elevation of about 2,000 feet, a crosscut tunnel had been driven in for 85 feet, cutting a quartz vein about 2 feet wide, quite heavily mineralized with iron-pyrites, but little galena; drifting had been done on this to the right for 55 feet with a crosscut of 65 feet, while to the left a drift had been made of 15 feet. The result of this work had not been very satisfactory, as no commercial ore had been encountered.

About 500 feet away from this tunnel in a N. 20° E. direction, and apparently on the same vein, a shaft was being sunk, and was then down about 25 feet. The vein here was from 4 to 5 feet wide, and a large proportion of the vein-filling was galena, which still showed in the bottom, and, to judge by the dump, the percentage of galena found all down the shaft must have been considerable.

This appeared to be a very promising shoot of ore, but it had not been proved to any great distance on either side of the shaft, only a few feet, so that its lateral length was still undetermined.

There were numerous other small cuts, strippings, etc., over the property that it does not seem necessary to enumerate, but which, in the aggregate, went to confirm the facts already given.

The workings described are all on the west and north-west slope of Glen mountain, and here, as giving the most promise, the attention of the owners is now centred.

On the other side of the hill a lot of work had been done previously, showing very similar fissuring, but apparently not as much mineral.

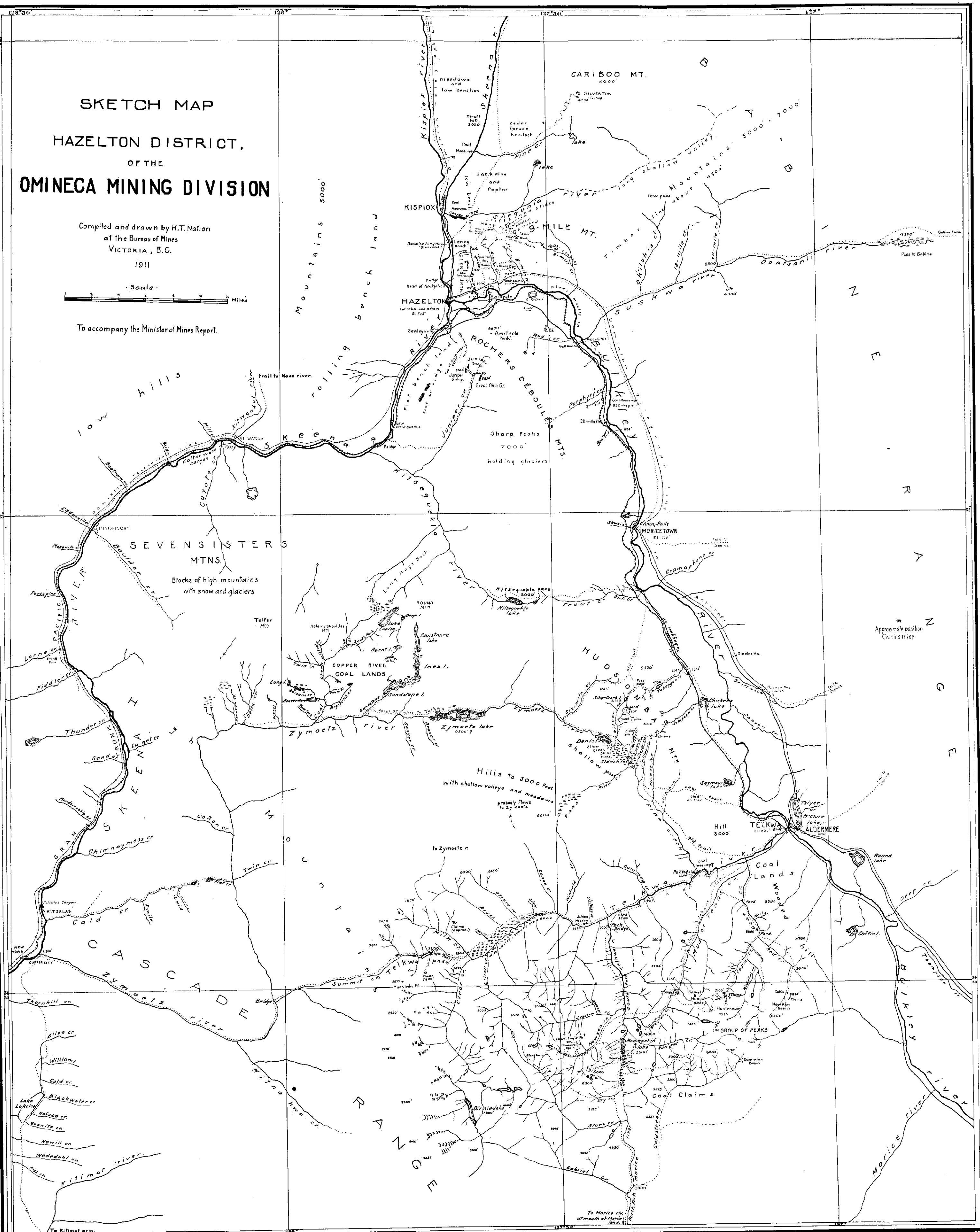
The location of the property for cheap mining is all that could be desired—a plentiful timber-supply, water, a low elevation, nearness to transportation, etc., all of which, coupled with the high grade of the ore, renders it probable that within a short time shipments of ore will be made.

SKETCH MAP
HAZELTON DISTRICT,
OF THE
OMINECA MINING DIVISION

Compiled and drawn by H.T. Nation
at the Bureau of Mines
VICTORIA, B.C.
1911

Scale
0 1 2 3 4 5 Miles

To accompany the Minister of Mines Report.



This group, consisting of six claims, situated on the eastern slope of Canadian King Glen mountain, was located and is owned by Long & McBain, and has been bonded to the same people as has the *Silver Standard*. No work was at that time going on, but the work done there showed the same class of fissuring and ore as on the *Silver Standard* group. A shaft has been sunk for a depth of 50 feet, but was then partly filled with water; two tunnels, each about 90 feet long, had been driven and a number of open-cuts made.

July 28th. Camp was moved from Glen Meadow ranch, by way of Hazelton, to a camp on the Nine-mile Mountain trail at the crossing of Six-mile creek.

SIX-MILE CAMP.

The *Wild Rose* group, consisting of three claims, the *Wild Rose*, *Mary Jane*, and *Isabel*, is situated at an elevation of 2,250 feet, on the hill between Four-mile and Six-mile creeks, about where it is crossed by the Nine-mile Mountain trail. The property is held by a syndicate represented by D. A. Ferguson, of Rossland, B.C.

Considerable work has been done, scattered over the claims, and very superficial in character, giving no proof as to what may eventually be found on the property, although the indications so far do not give much promise.

On the Six-mile side of the low hill a pit has been sunk for about 4 feet in a diorite country-rock, showing an iron-stained zone and fissure striking N. 15° W., carrying a small quantity of finely crystalline iron-pyrites, which did not on assay give material values.

A short distance farther up the hill a trench had been opened which showed a 6-inch quartz vein, striking N. 10° E., with a little iron-pyrites, and this was also barren.

On the *Isabel* a shaft had been sunk for 10 feet and timbered for 4 feet, in similar country-rock, showing a quartz vein from 8 to 10 inches wide, striking N. 30° E. and dipping at an angle of 80 degrees, with but sparse mineralization.

On the *Mary Jane* a timbered shaft about 37 feet deep was seen, which had been sunk on a crushed zone in which was a vein of about 20 inches in width, striking N. 25° E. and dipping at 75 degrees. The foot-wall of the vein seemed to be a quartzite and the hanging-wall a broken and highly silicified rock.

The fissure, by slicken-siding, indicated considerable movement, while the vein-filling was crushed rock into which the quartz had filtered.

The fissure contained some iron-sulphides, together with a small quantity of sulphides of zinc and lead, but not in commercial quantities.

On the *Wild Rose*, on the west bank of Four-mile creek, at an elevation of 1,900 feet, an open-cut 15 feet long and 10 feet deep showed a fracture zone about 3 feet wide, filled with crushed country-rock, with, on the foot-wall, a quartz vein 6 to 8 inches wide, striking N. 55° W., but not carrying appreciable values.

On the east side of this creek, at an elevation of 1,750 feet, an open-cut 12 feet long and 12 feet deep at the face, terminating in a tunnel 6 feet long, showed a fault-plane along which quartz had been deposited for a thickness of from 4 to 6 inches; this was heavily charged with iron-pyrites, but, as far as could be seen, there was no arsenical pyrites or zinc-blende present.

A sample of this vein taken by the writer gave, upon assay, 5.4 oz. of silver and 0.02 oz. of gold to the ton.

The Babine Mining Co. has several claims, including the *Central Star* Babine Mining Co. and *Last Chance*, immediately adjoining, but slightly to the south of the preceding property, on a knoll between Four-mile and Six-mile creeks. The company has done a good deal of work on the property and has erected a substantial cook and bunk house; the property was in charge of Mr. Corrigan, as foreman.

The main workings consist of a tunnel 134 feet long, the first 33 feet following in on a fissure which was traceable on the surface for some distance, in a S. 25° W. direction. At this distance in, the fissure became obscure, and a crosscut was made to the right for 14 feet, at the end of which the tunnel was continued in about its original direction for some 87 feet.

In line with the first part of the tunnel, and seemingly on the fissure, two pits have been sunk some distance up the hill, in each of which is to be seen a quartz vein 24 inches wide.

The mineralization consists of galena, with some grey copper and also iron and copper sulphides. A sample of the ore taken for assay gave: Lead, 11.5 per cent.; silver, 14.5 oz.; and gold, 0.01 oz. to the ton.

It is reported that selected samples of the ore gave very high assays in silver, with very little gold.

The amount of ore developed in the workings was small and the vein quite irregular, not showing up in the tunnel as well as would be expected from the surface showings.

The *Last Chance* tunnel had been driven in for 130 feet, with a crosscut of 28 feet to the right near the face. This tunnel had been driven to prove up certain showings seen in two open-cuts about 30 feet higher on the hillside, but had not been successful in developing ore, while the vein was not as clearly defined as might be desired; the fissure remained fairly constant, but the vein was very irregular and erratic.

In addition to these tunnels, a shaft had been sunk 30 feet, but was then full of water and could not be seen. There were also open-cuts at various points on the claims, but none appear to have uncovered commercial ore.

Still farther to the south on the same hill between Four-mile and Six
Omineca Mining mile creeks, at a point where the hill terminates in a sheer bluff, the
Company. Babine Mining Company, of which Mr. Kinman is manager, has been doing
considerable development-work.

The old *Era* shaft had been sunk for about 35 feet, at an angle of 45 degrees, on a fissure having a strike N. 35° E. The fissure was clearly defined, but there did not appear to be a vein of any important size developed, and, to judge by the dump, comparatively little quartz and very little ore had been taken out in the sinking.

At the "new shaft" a very large open-cut had exposed a quartz vein for a distance of 250 feet to the north of the shaft, but, about 30 feet south of the shaft, the vein seems to be cut off by a fault.

The general fissure is from 4 to 6 feet wide, in which is a quartz vein averaging about 18 inches wide, and carrying stringers of ore from 1 to 6 inches wide.

The ore consists of galena, zinc-blende, and iron-pyrites, with some grey copper.

A sample of the clean ore taken for assay gave 42 per cent. of lead and 190 oz. of silver to the ton, with only a trace of gold. The values are variable with different samples.

The general strike of the fissure is N. 10° E., with a dip of about 70 degrees to the south-east; it occurs in a granite country-rock, but seems to be very near the contact of granite and sedimentaries.

Considerable ore was visible in the out, but it was disseminated through the quartz, rather than in a defined ore-shoot.

On this vein the new shaft has been sunk for about 50 feet, and a drift made to the south to the fault, where an attempt is being made to pick up the continuation of the vein.

There are, on the property, numerous open-cuts, in several of which mineral had been found.

There are a number of veins on the property following small fault-planes and in the crushed zones which accompany them, but, for the most part, these are irregular and not of great size.

Should commercial ore be found in the present development workings, near the edge of the bluff at an elevation of 2,200 feet, the configuration of the ground would admit of a lower tunnel of short length being driven, and a considerable depth attained, at low cost; as the property is only five miles from Hazelton and facing the Bulkley valley, its location is greatly in its favour.

NINE-MILE CAMP.

On Sunday, July 30th, the party left Six-mile Creek camp at 8.25, the trail following up the course of Six-mile creek until the open mountain-top was reached; then, crossing over the rolling summit, it drops over into Nine-mile Mountain basin, the source of the west branch of Nine-mile creek.

This basin is a mile in diameter and is surrounded by a round-topped, crescent-shaped ridge some six miles in length, along which the various claims are located, the more important being on the north side of the ridge where it slopes down to the Shegunia river.

The first claim visited was the *10 Million*, a claim recently located by 10 Million M.C. Dan Olsen *et al.*, of Hazelton. This claim is located on the west side of the basin, where it breaks off with a 30-foot fall into the canyon forming the upper part of Nine-mile creek.

There is a very clearly defined fissure, or fault-plane, cutting in a north-and-south direction into the hill, which exhibits much evidence of movement, leaving much slicken-siding, graphitic shale, etc., on the walls and a large amount of gouge-matter in the fissure, but beyond this the main fissure does not show any mineralization, nor does it contain any quartz vein. There are several small side-fissures which seem to join the main fissure from the west, and these contain small veins of white calcite from 4 to 6 inches wide, with a small quantity of galena, iron-pyrites, and zinc-blende.

A sample was taken of the mineral showing, which assayed 7.4 per cent. of lead and 42.5 oz. of silver to the ton, and a trace of gold.

At another point a main fissure was accompanied by a brecciated zone, in which was a light-coloured dyke running with the fissure; this also contained small calcite veinlets and a little mineral. The property makes no pretence of being more than a prospect, and has not opened up any vein that seems to promise any great future.

On the summit of the ridge on the east of the basin—well above the Hazelton Mineral timber-line—at an elevation of about 5,200 feet, is the *Hazelton* claim, Claim. owned by Mr. Railson, of Hazelton. The work done consists of a number of open-cuts and pits on the bald surface of the ridge.

In the first open-cut seen, about 10 feet long, there is a fissure striking N. 70° E., carrying a small quartz vein heavily mineralized, with iron-pyrites and some galena.

Another open-cut, 30 x 10 feet, exposed a 6-inch vein, striking N. 70° W. and dipping at an angle of 45 degrees to the east; this is, apparently, a separate vein from the one mentioned, and it is very heavily mineralized with galena, iron-pyrites, and antimony sulphide.

A sample taken of this ore assayed: Lead, 18 per cent.; silver, 36 oz.; and gold, 0.4 oz. to the ton.

The country-rock is an altered argillite and the veins are irregular, ending abruptly in each direction, although there are continuous fissures, which, however, do not seem to carry much mineral.

On the north, or outside, slope of the basin and on the Shegunia River side of the mountain, the ground breaks off precipitously at first, and, lower down, slopes at an angle of about 30 degrees to the river; on this precipitous slope are located the *Silver Cup*, *Sunrise*, and *Lead King*, the most important claims in the camp.

The most easterly of these claims is the *Lead King*, which in July, 1912, was not being operated and had been untouched for some time; therefore nothing definite could be seen. The following is taken from Mr. Leach's report in the Geological Survey Summary for 1909:—

"*Lead King*.—The *Lead King* mineral claim lies about one-quarter of a mile to the west of the *Sunrise*, and is situated in the granite near its contact with the sedimentaries. The granite here is much shattered, numerous small slicken-sided fault-planes at all angles being in evidence; the ore apparently occurring along a line of weakness. The vein has been stripped at a point where it has been much disturbed, and it is doubtful whether the dip seen here can be considered as normal. In the cut the strike is east and west, and the dip S. 22°. The width of the vein is 3.1 feet, the whole being heavily mineralized; the ore being an association of finely crystalline galena with some zinc-blende, together with a small amount of weathered siliceous gangue. As before stated, a shipment of about 5 tons has been made from this property for a smelter test, but as yet no returns are visible."

The *Sunrise* group consists of four claims on the same slope as the *Sunrise* Group. *Lead King* and about half a mile to the west. On the last of July, when the claim was visited, the snow of the previous winter still covered the greater part of the ground, and two tunnels which had been driven were still buried so deep that the men working on the property had been unable to find them; consequently, very little of the property was visible.

A stripping, being made by sluicing with water from the melting snow, had exposed a quartz vein from 4 to 8 inches wide, striking N. 35° E. and carrying about 2 inches of very clean galena.

The main showing, and the one on which the buried tunnels were supposed to have been driven, was being stripped by a stream of water, the work then having exposed the vein for a length of from 125 to 150 feet.

The vein, as exposed, was from 2 to 5 feet in width, with a strike of N. 37° E. and a dip to the east of 45 degrees; throughout the quartz there were lenses and stringers of clean galena with smaller quantities of iron-pyrites, zinc-blende, and antimony sulphide.

In the upper portion of the open-cut there was a stringer of bright clean galena about 4 inches wide, while in another part of the vein-exposure, where some 15 tons of ore had been picked out, it was much wider; as nearly as could be estimated, the average width of clean ore in the cut was from 5 to 7 inches. A sample of this clean galena, taken for assay, gave: Lead, 72.5 per cent.; silver, 140 oz.; and gold, 0.02 oz. to the ton.



Nine-mile Mountain—near Hazelton.



Howson Basin—South Fork Telkwa River.

The vein was, in this surface exposure, somewhat irregular and variable in its width and mineral contents, while, as has already been said, nothing could be seen of the underground workings.

Owing to the imperfect inspection that could be made of the property, the following is extracted from the Summary Report of the Geological Survey, 1910:—

"The main vein occurs in a granitic (grano-diorite) intrusion, the ore consisting of galena with a little stibnite and zinc-blende, being deposited in a sheared zone. The vein has been stripped for about 150 feet on a very steep hillside, and shows about 3 feet of quartz, with disseminated galena and from 6 to 15 inches of solid galena. The sheared zone containing the ore is from 10 to 25 feet in width, and is generally more or less mineralized; it is possible that part of it at least will prove of shipping quality. A short tunnel was being driven to cut the vein below the lower end of the stripping, but, at the time of the writer's visit had not reached the ore in a distance of 30 feet."

The following reference is from the 1909 Summary:—

"About 300 feet to the west of this opening (the main vein) another vein has been stripped on this claim; this vein is 12 inches wide and strikes east and west, dipping south 15 degrees. The ore is an association of white quartz with a little white dolomite, carrying very small amounts of galena and zinc-blende."

The *Silver Cup* group, consisting of four claims, the *Silver Cup*, *Silver Cup*, *Silver Cup*, *Dollar*, *Duke*, and *Duchess*, is held by the Silver Cup Mines, Ltd., a Prince Rupert company, and was under the management of Joseph Falls. The property is situated on the northern rim of the ridge surrounding Nine-mile basin, extending down its outer slope towards the Shegunia river.

At present the property is reached by trail from Nine-mile basin, to which there are two trails from Hazelton, the old trail following up Six-mile creek, already described, and a new one, recently built by the Government with the idea that it might eventually be made into a wagon-road; this trail starts up Two-mile creek and circles round the northern side of the basin.

These trails fully satisfy all present requirements, for it is evident that should this property, or either of the last two described, develop into producing mines, their product would be lowered into the valley of the Shegunia river, along which, only, would a wagon-road be of any practical utility.

While this property has not as yet nearly reached the position of a producing property, it is nevertheless the nearest approach to such and is the most important in the camp.

The workings on this property are in a sedimentary formation, apparently a much altered sandstone, or a quartzite, occurring near the contact with a large area of granitic rock.

On the *Duke* claim a tunnel was found to have been driven in for about 100 feet, but no work has been done there for some time; in this tunnel a vein was exposed, carrying galena, blende, and arseno-pyrite, about 12 inches in width. The vein, however, seemed to be cut off by a fault-plane and its further extension had not been found.

On the *Silver Cup* claim there are three tunnels, all on a very well-defined vein. The outcrop of the vein occurs at an elevation of 5,100 feet at the top of the almost precipitous slope of the mountain to the north, at a point so nearly inaccessible as to be reached only by aid of ropes; the vein is somewhat broken here, as are all the veins on the summit, but contains an appreciable amount of mineral.

The No. 1, or Upper, tunnel is at an elevation of 5,000 feet, and is reached by the miners by the use of ropes, while in winter snowslides are liable, at any moment, to sweep over the tunnels, as they did in 1910, when a snowslide carried off and killed the mine foreman.

The strike of the vein is N. 55° E., with a dip of 70 degrees to the east, cutting the country-rock bedding at an acute angle.

This tunnel had been driven in for about 200 feet on the vein and carries some ore all the way; the width of the ore varies from 6 up to about 20 inches, and will average from 10 to 12 inches.

No. 2 tunnel is at an elevation of 4,900 feet, and has been driven in for about 90 feet upon the strongest portion of the vein seen on the property.

The vein here outcropped in a spot undesirable for starting a tunnel, on account of snowslides, so the tunnel was begun a short distance to the west, and is at first a crosscut, striking the vein a short distance in, which it follows to the face, carrying a stringer of good ore all the way.

The width of ore showing in the tunnel averages about 20 to 24 inches, and contains a considerable proportion of clean galena, antimony, arsenical pyrites, and zinc-blende.

A sample of the ore taken by the writer, as indicating its character, gave, upon assay, 47 per cent. of lead and 71 oz. of silver to the ton, with a trace of gold.

Selected samples of the clear galena and antimony sulphides will assay from 50 to 70 per cent. lead and from 150 to 250 oz. silver.

The No. 3 tunnel was started in at an elevation of about 4,825 feet, on what was probably thought to have been the vein, as it was about in line with the upper workings; this proved not to be the vein, but a calcite stringer which was valueless.

The tunnel was in about 100 feet, the first part straight and in line with the upper tunnels, but in the inner part, where no ore was found, crosscuts had been made in search of the vein, which was, however, never found by these workings.

Subsequent surface prospecting seemed to show that between No. 2 and 3 tunnels the vein had been faulted some feet to the east, as what is supposed to be the same vein has there been found on the surface, so that it is possible, with this knowledge, the No. 3 tunnel may be continued and eventually find the original vein at depth.

At the time the property was visited, the management was engaged in prospecting a showing much lower down the hill, at an elevation of about 3,500 feet, where some ore had been found; as the country here seems to be much faulted and possibly has slid down from a higher altitude, it does not seem probable that a connection will be established between this lower ore-showing and the upper ones.

The camp, consisting of a couple of log-houses, has been built on a timbered ridge, at an elevation of 4,200 feet, in a place where it will be free from snowslides, though exceedingly inconvenient to the trail over Nine-mile basin, a disadvantage which would be removed by a low-level trail on a road up the Shegunia river.

August 1st. The party broke camp at Nine-mile basin at 8.45 a.m., glad to get out of the water-soaked camp and away from the flies, which seem to rise from the ground with the disappearance of the snow.

The route taken out of the basin was over the rim in a north-west direction, through an open draw, in which there was no trail; by following the draw nearly half a mile and descending about 1,000 feet, the new, or low-level, trail, built by the Government from Two-mile creek up, was reached, and this was followed downwards for seven miles to the *American Boy* camp, which was reached by 10.30 a.m.

TWO-MILE CAMP.

The *American Boy* group, consisting of eight claims, owned by Harris American Boy. Bros. and Mullen, of Hazelton, is situated on the eastern slope of Two-mile creek at an elevation of about 3,200 feet, and distant from Hazelton, by the trail, some seven miles.

The camp and the various workings are on an easily sloping bench on the eastern side of, and several hundred feet higher than, the valley of Two-mile creek, in a dense growth of large hemlock, spruce, and balsam timber.

The camp buildings consist of a very good log-cabin with tents; the development of the property has been done by the owners, with little outside assistance, and is made up chiefly of stripping trenches in surface soil, uncovering the veins, and two small shafts.

There are at least three distinct parallel veins shown up by the work done, and these are all of about the same general character, having a general north-and-south strike and a steep dip.

No. 3 vein is probably the most promising and has received the most development; it occurs on a very easily-sloping hillside at an elevation of 3,200 feet, having been developed by an inclined shaft sunk 25 feet in an argillite country-rock, and shows a very well-defined quartz vein, averaging about 24 inches wide, carrying a heavy percentage of galena, with some zinc-blende, iron-pyrites, and arseno-pyrite. The vein has a strike approximately north and south and dips about 75 degrees; it is very regular and continuous, as has been proved, for some distance.

An open-cut about 20 feet to the north of the shaft exposes the vein for a length of 10 feet, in which the vein shows up clearly about 27 inches of white quartz, with, disseminated through it, bunches and stringers of galena, etc.

In the shaft, a few feet underground, there appears on the hanging-wall a light-coloured dyke which did not show in the surface workings.

The vein, as exposed in the shaft, continues quite as strong to the bottom, varying in its width somewhat, but maintaining an average of 24 inches; the mineralization in the vein also remains strong to the depth shown.

As indicating the proportion of ore in the vein, it was noted that there was a pile of ore on the dump, amounting to about 30 tons, taken from the shaft in sinking the 25 feet; a sample taken by the writer, as roughly representing this ore-pile, assayed: Lead, 11.5 per cent.; silver, 138 oz.; and gold, 0.2 oz. to the ton. A second sample taken of the ore in another vein on the property assayed: Lead, 48 per cent.; silver, 125 oz.; and gold, 0.02 oz. to the ton.

No. 2 vein is a couple of hundred yards down the hill from No. 3, and has been exposed by stripping and open-cuts for several hundred feet, which shows it to be unusually regular and persistent, having a strike of N. 40° W. and a dip of about 80 degrees to north-east, with a width of from 2 to 3 feet; the vein-filling is white quartz carrying galena and a little zinc-blende, pretty generally disseminated through the vein, but in variable amounts at different places. The ore does not occur in a sufficiently concentrated form to be shipped direct, but would make a good concentrating ore.

No. 1 vein lies still farther to the south, having about the same strike and dip as has No. 2 vein; it is some 3 feet wide and has been traced by stripping for from 300 to 400 feet; the vein-matter and mineralization being similar to No. 2 vein.

A shaft has been sunk on this vein for a depth of 35 feet, and it is reported that a drift 20 feet long has been made at the bottom, but, as the shaft was partly filled with water, this could not be seen.

The property is one of much promise as a concentrating proposition, and is ideally situated for cheap mining; when the development in the present location at the outcrops justifies it, an adit tunnel can be driven in from the valley of Two-mile creek, where the plant would be located and all the ore brought out.

August 2nd. Camp having been made the night before at Two-mile creek, the day was spent there, while supplies for a trip up the Bulkley valley were being purchased at Hazelton and an extra horse obtained.

August 3rd. Camp was broken at 8 a.m. and a start made at 9.20 a.m. for Aldermere; the route taken was by the wagon-road which crosses the Bulkley river on a suspension bridge, about three miles from Hazelton, and then climbs the bench land lying to the south of the river. After travelling some twenty-two miles from Hazelton, camp was made on the road-side at an old road-camp.

August 4th. The wagon-road was still followed, recrossing the Bulkley at Moricetown, camp being made that night in the woods near the 38-mile post.

August 5th. By 2.30 p.m. the town of Telkwa was reached; here the Bulkley river was again crossed and camp was made on the flat between the Bulkley and mouth of the Telkwa river.

BABINE MOUNTAIN.

Several groups of claims have been located on the Babine Lake slope of the Babine mountains, a range which lies between that lake and the Bulkley valley; a trail to these properties starts in from Telkwa, although there are two other trails leading to this camp from the Bulkley valley, one starting in from Moricetown and the other from the Hudson Bay ranch, following up Driftwood creek.

A large amount of work has been done on these properties, and, particularly on the Cronin property, a considerable amount of galena has been developed, and it looks as if the camp contained possibilities.

As these properties are over the summit and on the Babine Lake slope, it would seem as though the natural outlet for ore, in any large quantity, would be down to Babine lake, which lake must sooner or later be connected by rail to the main line of the Grand Trunk Pacific Railway; in the immediate future there is no probability of such transportation facilities as would permit of ore of the grade found being taken out, as the expense of pack-train transportation is prohibitive.

The properties were not being developed in 1911, at the time of the writer's visit to the district, so that little could have been seen; consequently the properties were not visited.

This camp was reported upon by W. Leach in the Summary Report of the Geological Survey for 1910, page 96 *et seq.*, who reports as follows:—

"Description of Prospects.

"The Babine-Bonanza Mining and Milling Co.—This property (better known as Cronin's mine) is situated in the Babine mountains near the headwaters of a branch of Tuchi river, a tributary of Babine lake, and not far from the sources of Driftwood creek. The locality is somewhat difficult of access by the present trail up Driftwood creek, as the summit at the head of that stream is high and rugged and passable with loaded pack-animals only for a short season. It is expected, however, that a more favourable route, with no adverse grades, can be found by way of the Tuchi river and Babine lake.



Marletown and Hudson Bay Mt.—Bulkley River.



Town of Telkwa—Bulkley Valley—looking west.

"The ore occurs at or near the contact of an area of pinkish granite porphyry, with a series of altered black argillites and tuffs of the Hazelton group. Along the contact the porphyry is much decomposed, and nearly everywhere more or less mineralized. It would appear that there are two classes of ore-deposits on this property; the first, on which most of the work has been done, occurring in a sheared zone in the porphyry, and the second along the contact where the porphyry has in part been replaced by secondary minerals.

"The ore consists essentially of crystalline galena and zinc-blende in a gangue of quartz and brecciated porphyry; it also contains small quantities of iron, copper, and arsenical pyrites. No information is available as to the values contained in the ore.

"The principal work done is a tunnel, driven along a sheared zone in the granite porphyry, with the intention of cutting an ore-shoot exposed on the surface at the top of the hill, about 250 feet above the level of the tunnel. What is probably the continuation of this ore-shoot was cut about 350 feet from the entry, and showed 3.4 feet of good ore, consisting of galena and zinc-blende in a quartz gangue, striking N. 65° E. and dipping about 70 degrees north-west. A short way beyond this point the ore is cut off by faulting, the tunnel having been driven in barren ground a further distance of about 125 feet, and a crosscut driven to the south-east for about 115 feet, without finding the ore. An upraise was driven on the ore for about 30 feet, where the vein was again found to be faulted.

"On the surface a considerable amount of prospecting-work has been done, consisting of open-cuts and several small shafts. An incline shaft sunk on the dip of the vein, in what is probably the same shoot as that found in the tunnel, shows about 3 feet of ore, but the vein is somewhat irregular. The whole width of the vein is fairly heavily mineralized with galena and zinc-blende in a gangue of quartz and altered country-rock, both walls consisting of granite-porphry, and the foot-wall being heavily slicken-sided. The shaft is about 40 feet deep on the dip of the vein, which here is about 60 degrees north.

"About 450 feet to the south-west a vertical shaft has been sunk to a depth of about 20 feet. Although within a few feet of the contact, this shaft is entirely in the porphyry, and shows about 2 feet of ore, consisting of galena, pyrites, arseno-pyrites, and much zinc-blende, in a gangue of brecciated porphyry and quartz. Alongside of this shaft and adjoining it a slope has been sunk on the contact between the granite-porphry and the black argillites, the foot-wall being porphyry and the hanging-wall argillite. The dip is here 70 degrees, and the ore about $4\frac{1}{2}$ feet wide and similar to that in the shaft. This slope is about 28 feet deep on the dip of the ore.

"It does not seem probable that the ore-body here has any connection with that found in the tunnel, but is rather a separate contact deposit. Continuing in a south-westerly direction along the contact, a number of open-cuts and shallow shafts show ore more or less continuously for a distance of about 1,500 feet.

"*St. Anne and St. Eugene Mineral Claims.*—These claims, the property of John McKendrick and partners, are situated in the Babine mountains near the headwaters of Canyon creek, but on the Babine Lake side of the divide, and at an elevation of about 5,000 feet above sea-level.

"The ore occurs in a well-defined vein in an intrusive area of what is probably a grano-diorite, but which has not yet been microscopically examined. These granitic rocks cut the volcanics of the Hazelton group, and consist chiefly of green and red andesites and breccias. The vein occurs near the contact of the two formations.

"The ore consists of white and rusty quartz, with tetrahedrite and galena, which occur, as a rule, more or less concentrated in bands parallel to the walls of the vein. The writer was unable to obtain any definite information in regard to the assay value of the ore.

"With the exception of a few open-cuts, the only development-work done on this property consists of a tunnel 50 feet in length, driven on the vein, which, in the face of the tunnel, has a width of 4.4 feet."

August 6th. Sunday was spent in camp at Telkwa. The Telkwa river was rising very rapidly, owing to a cloud-burst in the vicinity of Hankin basin, for which place the party was headed, so that the ford at Goat creek was reported impassable.

August 7th. The "old story" of pack-train travel came out for the first time on this trip—the horses were not to be found—Indians were sent to hunt for them, and they were finally brought in at 1 p.m. and a start made at 1.40 p.m.

Goat creek was forded about 4.30 p.m., and at 6.30 p.m. camp was made where the trail to Hankin basin branches off the Hunter Basin trail.

The writer had gone on in advance of the pack-train to examine the progress made by the G.T.P. Development Co. to prove, by drilling, the coalfield of the Telkwa valley.

This company holds twenty-six claims, and has been engaged for the Bulkley and Telkwa past year or so in drilling for coal with a Keystone drill and a chilled-shot Valley Coal Co. drill, employing six men, working double shift, in charge of C. E. Betts, one of the G.T.P. engineers, under the direction of Mr. Beaudette, of Montreal, as consulting engineer.

It was found that several holes had been put down, but that the work had been much hampered by breakages and the delay necessary to get extra parts in so remote a location.

The results that had been obtained up to that time were rather negative, and had not proved up coal of quality or quantity to justify the establishment of a colliery.

HANKIN BASIN.

August 8th. The camp remained on Goat creek, while the Provincial Mineralogist, with Mr. Nation and an Indian, took saddle-horses and proceeded to Hankin basin, where two men were supposed to be at work on the Hankin claims.

The prospectors were not at the cabin nor on the claims, and could not be found by a heavy smoke started at the cabin nor by repeated rifle-shots, so that the search for new developments had to be carried on unaided by the owners.

Although most of the afternoon was spent in the search, nothing could be found of new work or more than was described in the report for 1905.

The camp was being occupied at the time, but, as the drills, tools, and forge were covered with rust, it was evident that no serious work was being done, so a return was made to the camp on Goat creek.

August 9th. At 9 a.m. a start was made for Hunter basin, along a new trail which had been built up the left side of the creek valley; this trail was found to be a great improvement on the old one, followed on a previous visit, and, with slight repairs, where the creek had washed it out, would be very good mountain-trail.

HUNTER BASIN.

Hunter basin is at the head of Cabin creek, a tributary of Goat creek, at an elevation of 5,100 feet; it is an amphitheatre, surrounded by a circle of mountains rising to between 7,000 and 8,000 feet, on the slopes of which a number of claims have long been located by Wm. Hunter, the pioneer prospector of the camp, and others.

On the various properties around the basin only such work has been done as a prospector could do single-handed, and this has not amounted to more than the annual assessment-work, so that much remains to be proved about the various prospects.

The greatest amount of work has been done by William Hunter, who is credited with making the first locations in the basin, and who for the past seven or eight years has been at work each summer on his locations; he has built a cabin in the basin, at an elevation of about 5,100 feet, while his claims lie about 1,000 feet higher on the mountain-side.

The country-rock here consists of bedded volcanic rocks, reddish and greenish andesites, agglomerates, etc., tilted at comparatively low angles, but occasionally showing, locally, more severe crumpling, often accompanied by faulting.

Across the ridge to the south, an intrusive area of coarsely crystalline granitic rocks is found, which seems to have had an important bearing on the mineralization of the district, as it is along the borders of this area that many claims have been staked, notably in Hunter basin.

In Hunter basin the veins are, as a rule, small, and appear either in narrow irregular fissures, or as replacements along lines of crushing.

Owned by William Hunter; situated on the south side of the basin King and Jackpot at an elevation of 6,200 feet. The most important work done is a shaft, Mineral Claims. sunk some years ago to a depth of 25 feet, but which was found full of water. The shaft was sunk on a vein which, near the shaft, is 2 feet 6 inches wide, striking N. 55° E. and dipping at an angle of 80 degrees. This vein is in a line of crushing which seems to be accompanied by a dyke intrusion.

Near the shaft the quartz-filling of the vein is 2 feet 6 inches wide, but, at 30 feet to the west, in an open-cut the vein is found to have pinched out, although the fissure is traceable for a long distance.

The vein is, in places, heavily mineralized with bornite, chalcopryite, specular-iron, pyrites, etc., occurring in pockets or irregular lenses.

The quality of ore developed is not great, but it is of exceedingly good value; one sample of clean ore, taken by the writer, assayed: Copper, 38 per cent.; silver, 42 oz.; and gold, 0.10 oz. to the ton.

Another sample from the same showing gave: Copper, 26.7 per cent.; silver, 39.4 oz.; and gold, 0.04 oz. to the ton; while a sample taken of a sack of the ore at Hunter's cabin assayed: Copper, 5.17 per cent.; silver, 106 oz.; and gold, 0.02 oz. to the ton.

On the eastern end of the claim a tunnel had been started and was then in 10 feet, to cut a showing on the surface higher up, but had not yet done so.

About 1,000 feet to the west of the shaft, on the same or a parallel fissure, an open-cut shows a quartz vein, in a porphyritic lava, from 6 to 12 inches wide, but sparsely mineralized. This same fissure has been traced for another 1,000 feet, through rather broken country, exhibiting, in places, copper-carbonates, arsenical pyrites, etc., with occasional bunches of micaceous specular-iron.

The *Rainbow* adjoins the *King* and is also owned by William Hunter. Rainbow Mineral Claim. On the west side of a small pinnacle of rock, at an elevation of 5,950 feet, an open-cut had been made, but it had caved in; on the dump there was about half a ton of ore carrying a fair percentage of copper as bornite, and also some specular-iron.

On the *Lucky Jim*, adjoining the *Rainbow*, another of Hunter's claims, at an elevation of 6,100 feet, there is exposed a crushed fracture zone carrying some chalcopryite and a good deal of micaceous iron. A sample taken of this iron assayed: Copper, 3 per cent.; silver, 7.8 oz.; and gold, 0.06 oz. to the ton.

The *Idaho* claim, also owned by Wm. Hunter, lies some distance to the east of the *King* and across a draw caused by a heavy fault. At an elevation of 5,500 feet there was seen a strong and persistent dyke occurring in a crushed zone, striking N. 35° E. The dyke was slightly mineralized, but the crushed zone in places contained considerable mineralization consisting of bornite and chalcopyrite. A sample taken of this ore assayed: Copper, 60 per cent.; silver, 112 oz. to the ton, and only a trace of gold.

At an elevation of 5,500 feet another clearly defined dyke, also striking N. 35° E., with a vertical dip, shows beside it, a crushed zone carrying quartz, about 18 inches wide, with a streak of a few inches on one side carrying considerable bornite, in some places showing pieces of nearly solid bornite a foot square. A sample taken of this, with the associated copper-carbonates, gave the following assay: Copper, 5.6 per cent.; silver, 3.7 oz.; and gold, 0.02 oz. to the ton. A small shaft had been put down on the showing to a depth of about 14 feet.

On the north-west side of the basin, at an elevation of 5,600 feet, Wm. Hunter had staked another claim, but had not done much development; only some stripping and open-cuts, scarcely sufficient to admit of an opinion being formed as to its value. Here is what appears to be a bedded vein, striking about east and west and dipping at 25 degrees to the north, seemingly conforming with the bedding-planes of the volcanic-ash rock.

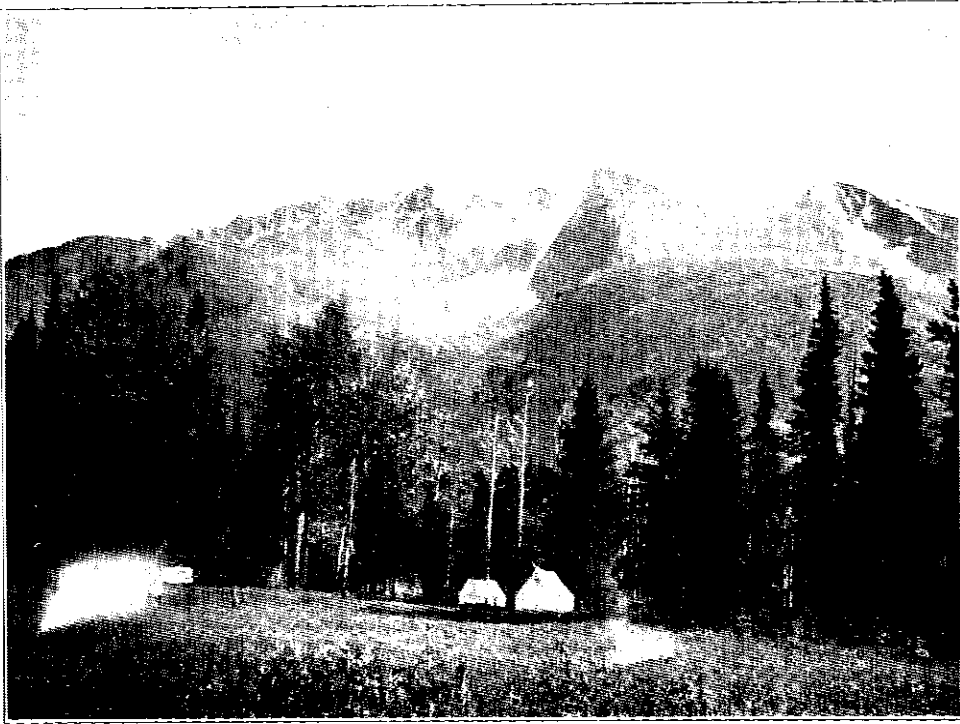
The outcrop can be traced for a hundred yards following the contour of the hill, showing a thickness of vein from 8 to 12 inches, quite heavily mineralized with bornite, copper-carbonates, copper-oxides, and specular-iron; a good deal of secondary mineral was visible in the outcrop ore. A sample, approximately an average of the ore exposed, gave: Copper, 25 per cent.; silver, 40 oz.; and gold, 0.04 oz. to the ton.

On the north-west side of the basin near its upper end is the *Tribune* mineral claim, located near the summit of the hill, at an elevation of 5,900 feet. Here a clearly defined vein occurs in a very broken rock formation; the vein will average from 8 to 16 inches in width, and has been traced for 300 feet, striking in a general N. 70° W. direction, with a nearly vertical dip; the vein contains considerable copper-carbonates, etc., and assayed, in the sample taken: Copper, 2.1 per cent.; silver, 24.7 oz.; and gold, 0.02 oz. to the ton.

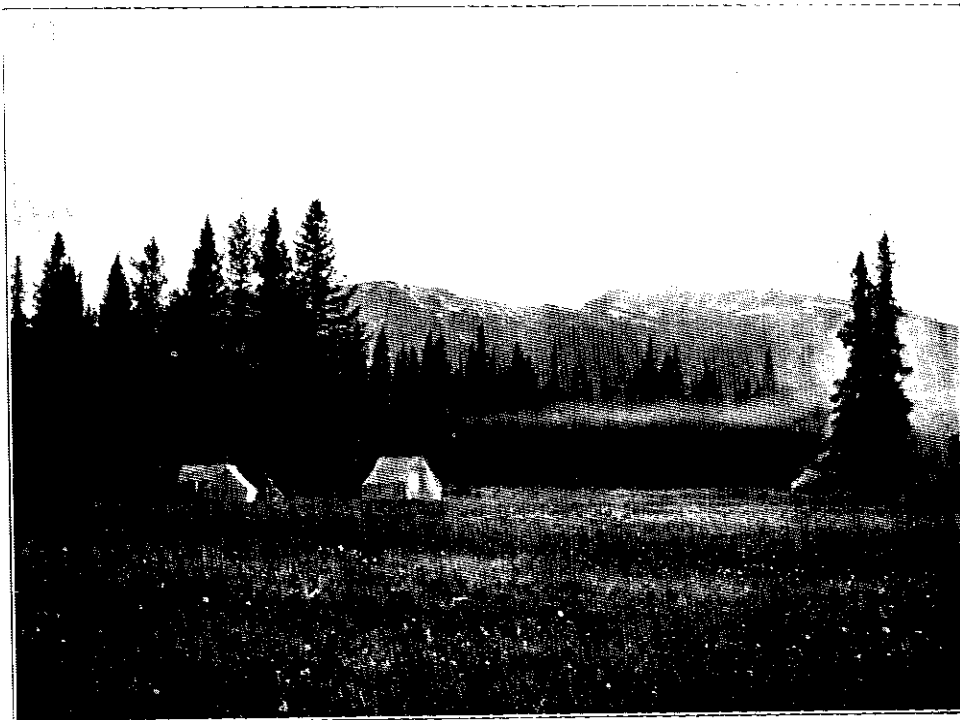
The property is a new location and has, as yet, been little developed, as seemingly in the past little attention has been given to this side of the basin. The property was staked and is held by Chester Thomasson, of Telkwa.

The *Colorado* claim is on the same side of the basin and somewhat to the west of the previously mentioned claim; it is also held by Chester Thomasson. Here, at an elevation of 5,900 feet, is a quartz-fissure from 12 to 24 inches wide, with good walls and considerable gouge-matter. The vein was mineralized throughout with copper minerals, the mineralization being heavier on the lower half of the vein, from which a sample taken assayed: Copper, 18 per cent.; silver, 400 oz.; and gold, 0.12 oz. to the ton. Another sample, of the copper-carbonates only, ran: Copper, 34 per cent.; silver, 52 oz.; and gold, 0.08 oz. to the ton. A tunnel has been run in on the vein for nearly 90 feet.

August 10th was spent in Hunter basin examining the claims there. On returning to camp in the afternoon, it was found that a horse had managed to get "mixed up" with the tent-ropes, and had torn out half the side of the tent, necessitating three hours' work with thread and needle giving it "first aid," enabling it to be used for the remainder of the season.



Silver Creek Flats—Hudson Bay Mt.



Joe Nuss' Ranch—Telkwa River.

August 11th. The camp in Hunter basin was broken early, and by 9 a.m. the pack-train started for Howson Lake camp. The route taken was over the rim of the basin to the west, when, after passing over a glacier half a mile wide, a descent was made on to a high grass-covered tableland, on the drainage-area of Glacier creek, from which rises abruptly the "Camel Humps"—two rounded hills—which serve as landmarks in that district for many miles around. Passing to the west of the Camel Humps, a gradual descent was made over easily sloping ground to some meadows on the divide between the headwaters of Glacier and Tenas creeks, where, after some search, an old Indian trail, now very obscure and obstructed, was found—this is known as Mooseskin Johnnie's trail—and led to Howson lake, the north shore of which was reached by about 4 p.m. after very hard travelling; circling around the lake—with no trail—Howson's trail to the coal properties on Glacier creek was found. This was followed to the Howson cabins (also staked as a townsite—Howson city), which were reached at 5.45 p.m. after about as hard a day's travel as the horses could stand.

The cabins were, however, some reward, as they were found to be most substantially and well constructed and fitted with stoves and spring mattresses—the latter a luxury not to be despised after a hard day's journey, and a great improvement to a bed on the bare ground.

August 12th was spent in camp, as both man and beast needed the rest. Howson lake is about one mile and a half long by half a mile wide and not over 3 or 4 feet deep; it is full of trout from $\frac{1}{2}$ lb. to $1\frac{1}{2}$ lb. in weight, three rods managing to land fifty for one and a half hours' fishing, and excellent eating some of these proved to be, although most of them were "borrowed" next day by a party of surveyors passing during the absence of the writer.

August 13th, Sunday. The camp remained at Howson lake, while the writer, with Mr. Nation and an Indian, took horses and rode to the summit of the range lying to the southwest of the lake, where a number of mineral claims had been staked.

On the summit, at an elevation of about 6,000 feet, the stakes of the *Strathcona* mineral claim were seen; also those of the *Granville*, *War Eagle*, *Anna*, *Eva*, *Iron Colt*, etc., but the only work that could be found was a few open-cuts on the bare hill-top.

The volcanic country-rock has here been cut by numerous dykes, the main eruptive mass being some distance away, on Howson creek.

No veins could be seen in the vicinity, such mineralization as there was occurring in conjunction with the dykes, in seams or streaks along their walls, sometimes associated with a little quartz, serpentine, etc., the mineralization often extending into the decomposed country-rock and consisting of iron-pyrites and pyrrhotite, with a little chalcopyrite.

The dykes and country-rock in the vicinity are much iron-stained, often presenting an "iron-cap" of some extent.

Samples taken of the heaviest mineralization found on the *Strathcona* and *War Eagle* assayed: Copper, 12 per cent.; silver, 5.4 oz.; and gold, 0.02 oz. to the ton. Similar samples from the *Anna-Eva* assayed: Copper, 4.5 per cent.; silver, 3.5 oz. to the ton, with a trace of gold.

In none of the openings seen was there mineral exposed of any important amount.

On the *Eva* a considerable amount of trenching, etc., had been done, and several dyke-contacts exposed for a long distance, each showing a great deal of "iron-cap" and iron-stained rock, all of which carried a little copper and silver.

Crossing over the ridge at an elevation of 6,000 feet, the writer worked his way down a very steep hillside into the valley of Howson creek and to the trail leading up the creek to several mining prospects.

This trail was followed up for some miles to the *Duchess* claim, owned by the Telkwa Mines, Ltd., and situated on the north side of the creek, near its head.

The country-rock in the vicinity is the same volcanic series as previously noted, but is somewhat nearer the large area of intrusive rocks, which has sent off the numerous dykes found cutting through the volcanics.

On the *Duchess* claim there are a number of very large and continuous, iron-stained dykes cutting at right angles into the hill; on one of these considerable work has been done, a large open-cut made, with, a few feet below this, a tunnel driven along the edge of the dyke for about 108 feet. The main dyke is at an elevation of 5,300 feet, nearly 20 feet wide over all, and carries in it a smaller, very black dyke, some 2 feet wide, adjacent to which the original dyke is heavily mineralized with specular-iron, iron-pyrites, and a small proportion of copper-pyrites, the whole forming an "iron-cap," most imposing to the eye, but carrying only a small amount of valuable mineral.

A small stringer of quartz a few inches wide follows the wall of the dyke, but appears to be secondary and does not seem to be seriously mineralized.

A sample of nearly clean ore assayed: Copper, 10 per cent.; silver, 4.4 oz. to the ton, with a trace of gold.

On the same hillside, a short distance down the creek, is the *Evening* group, owned by the Telkwa Mining, Milling, and Development Company.

The conditions here are about the same as on the *Duchess*, very large dykes, cutting the volcanics, along the walls of which mineralization has taken place, consisting of specular-iron, iron-pyrites, and chalcopyrite. These dykes have been traced and opened up along the hillside by cuts, etc., for over 1,500 feet. The ore does not appear to carry gold anywhere, while the copper-ore is rather irregularly distributed along the contact.

August 14th. The party left Howson lake at 9.30, travelling northerly by the "Howson trail," which leads for nine miles down the west side of the South fork of Telkwa river to its junction with the main stream, keeping on the bench land high above the river. The trail crosses the fork near its mouth on a pack-bridge, and follows down the right bank of the Telkwa to its mouth.

It had been intended to cross the Telkwa river at the mouth of the fork and to continue up the left bank of the river, but on arriving at this point it was found that the old bridge had been washed out and the river was too high to permit of its being forded with packs; consequently, there was nothing to do but follow the right bank to the new bridge about eight miles lower down; this could not be done that day, so the party was obliged to make camp on the south bank opposite the mouth of Cummings creek.

August 15th. The south bank of the Telkwa was followed down to the bridge, which was crossed, and the north bank followed up over a very good trail (the main "Copper River trail") for about ten miles, camp being made at Joe Nass's ranch, a fine open flat on the bank of the river, owned by the packer, and used by him as headquarters for fall and winter hunting.

August 16th. The Joe Nass camp was left and the main Copper River trail followed up to the mouth of Milk creek, a distance of about fifteen miles farther, where the last horse-feed is found before the trail gets well over the summit; here camp was made on the bank of Milk creek.

This main "Copper River trail" connects Telkwa with Kitsalas, on the Skeena—a distance of about eighty miles by trail. The trail has been put in good order for this entire length, with the exception of about four miles between Milk creek and the summit, which is

in a disgraceful condition and practically impassable for loaded horses, whereas a small expenditure in putting in corduroy over a few bog-holes would render the whole trail of service. The elevation of the pass is 3,200 feet.

There is little feed on the Zymoetz River portion of the trail, and pack-trains using it are obliged to carry grain for the horses for one or two nights.

August 17th. The camp remained at Milk Creek crossing, and the writer went out on foot to try to find the various claims in the vicinity from which quite rich samples had been sent out.

The rock formation here is evidently just about on the contact of the main grano-diorite area with the volcanic series of the interior, which should prove a favourable formation for the deposition of mineral, as it probably will when more thoroughly prospected.

The camp is new, having only been discovered about a year before, so that little more than prospecting has been done and few attempts made to develop the prospects found.

Amongst other claims, those held by Andy Goodwell had been mentioned to the writer as very promising and as having had some work done on them, so an attempt was made to find them.

The main trail was followed to the summit, where a branch trail led off to the left, to Goodwell's cabin, which was found without difficulty, at an elevation of 3,250 feet. From this cabin a well-cut trail, leading up the hill, was followed for one and a half hours to an elevation of 4,600 feet, when the open and bare hill-top was reached. Here the trail subdivided into several small and very indistinct paths which often led over fields of snow, where they were lost. After wandering over the hill-top all the afternoon without finding either workings or workers, the search was given up.

It was learned later that the search had led to within 100 feet of the workings, which were concealed from view in a narrow gully. While no workings were seen, the formation was found to be as described, and seemed a promising field for prospecting.

August 18th. Again proceeding on foot, the writer started out with Mr. Nation to find the other claims.

The *Big Four* and *Lost Treasure* are claims recently staked by P. Big Four. Powers, G. Charleton, R. Hamilton, and James Beaman, working as partners. The property is situated on the same mountain as Goodwell's property, lying between the headwaters of the Telkwa and Clear creek, at an elevation of 3,700 feet.

The trail to the property branches off the main trail about a mile after the crossing of Milk creek, the property being about 1,000 feet higher up the hillside. There was no trail, only a blazed line to follow, but it led to where the men were at work.

The formation in the immediate vicinity of the workings, where it could be seen, was a granite (grano-diorite), fine-grained and of a very light colour.

A surface excavation had stripped, for from 40 to 50 feet, a quartz vein, striking in a general south-east direction, which carried a considerable amount of ore consisting of galena, copper-pyrites, etc.; a clean sample of which assayed: Lead, 65 per cent.; silver, 9 oz.; and gold, 0.02 oz. to the ton.

The work done was only a preliminary uncovering of the vein, with, as yet, no depth; the vein was irregular in its strike, proceeding by a series of steps-faults of a few feet each. The extension of this vein-showing was being prospected for; its presence was indicated by much float, but it had not then been found in place.

A number of claims had been staked recently on the mountain to the north of Milk creek, claims being held by Dunlevy, Hatch, Hoopes, and others; on these, only preliminary prospecting had been done, and, as it would have taken three days longer to examine them, that part of the camp was not visited.

As indicating the mineral from this section, a sample from Hatch's claim was assayed, which gave: Copper, 2.8 per cent.; silver, 372 oz.; and gold, 0.6 oz. to the ton.

August 19th. Leaving Milk Creek camp at 9 a.m., the party started down the Telkwa, retracing its steps, travelling that day some fifteen miles, as far as Joe Nass's, where camp was made for the night.

August 20th. The party moved from Joe Nass's ranch to Telkwa, reaching there at 3.30 p.m., when additional camp supplies were obtained in the town.

August 21st. An early start was made for Hudson Bay mountain to inspect a number of claims lying on its southern slope, at the headwaters of Pine creek.

The old trail to this camp followed up Pine creek from the valley of the Telkwa, but a couple of years ago a new trail was laid out, and this is the one now exclusively used from Telkwa.

This new trail leaves the right-of-way of the Grand Trunk Pacific Railway in the Bulkley valley, about five miles below Telkwa, striking in a north-west direction up the eastern flank of Hudson Bay mountain and crossing by a pass, at an elevation of about 2,900 feet, on to Pine creek, where it joins the old trail about ten miles from the mouth of Pine creek.

From this junction of the trails, Pine creek was followed to its source, and camp was made on some meadows, called Silver Creek flats, on Silver creek, a tributary of the Zymoetz river, at an elevation of 3,000 feet.

The distance from Telkwa to Silver Creek flats is about twenty-two miles, the trip occupying, with the pack-train, about eight hours.

Most of the claims are on this southern slope of Hudson Bay mountain, directly north of the divide between the watersheds of Pine creek and the fork of the Zymoetz river, the branch trails leading to the claims leaving the main trail in the vicinity of Aldrich's cabin.

August 22nd. Camp remained at Silver Creek flats, while the writer and Mr. Nation proceeded on foot up the mountain.

The first properties visited were those held by D. C. Simpson, who, Simpson's Claims, single-handed, has done an unusual amount of development-work on his various claims. His *Victory* group, consisting of the *Victory*, *Triumph*, *Standard*, and *Dandy Fraction*, is situated a mile from Silver Creek flats, and at an elevation of about 3,900 feet.

The rock formation of Hudson Bay mountain consists primarily of a volcanic formation—andesites, tuffs, etc.—with, towards the southern end of the mountain, a large area of intrusive granite.

The mineralization in this locality appears to be altogether along the courses of large dykes—offshoots of the granitic mass—where these dykes have cut through the volcanic rocks.

On this group a dyke, 12 to 20 feet or more in width, is found cutting into the hill, in N. 45° E. direction; on either side of this dyke is a crushed zone, from 2 to 3 feet wide, carrying, in places, galena-ore, with zinc-blende, etc., in bunches, through the crushed material.



B.C. Bureau of Mines.

Telkwa River—Zymoetz River Pass.

On one of these dykes, known as the "Big Ledge," openings have been made from an elevation of 3,900 feet up to 4,520 feet, the hillside sloping regularly at an angle of about 20 degrees.

The lowest of these workings is No. 1 tunnel, driven in 60 feet. The dyke here is 40 feet wide, with a crushed zone on its eastern side, about $2\frac{1}{2}$ feet wide; at the outcrop there was a streak of galena and zinc-blende about 20 inches wide, which the tunnel followed along in the crushed zone; the ore pinches out near the face, but the fissure continues into the hill.

An average sample of the 20 inches of ore was taken, and assayed: Lead, 17.8 per cent.; silver, 29.4 oz.; and gold, 0.07 oz. to the ton.

No. 2 open-cut, 75 feet higher up than the tunnel, shows the fissure running regularly; there are here two dykes, one acid and the other basic, with no crushed zone and very little mineral. Between this cut and the No. 1 tunnel the vein has been stripped for 75 feet.

No. 2 tunnel is at an elevation of 4,125 feet, or 225 feet above No. 1. This tunnel had been started in to cut under an ore-outcrop which shows 15 feet higher up the hill, where ore is exposed 24 inches wide, made up of galena, zinc-blende, and arsenical pyrites, scattered through a zone of broken dyke-matter.

No. 3 open-cut, 20 feet long, shows the same dyke, here 12 feet wide, with a strongly defined hanging-wall.

There are several stringers of galena from 1 to 2 inches wide cutting into the dyke at a sharp angle, occupying a series of cross-fissures; this ore is of the usual grade, although not in sufficient quantity to mine.

No. 5 open-cut has been "faced up" ready for starting a tunnel; the ledge here shows the following section, beginning from the left side of the cut: White dyke, crushed zone, 2 feet wide; white dyke, 4 feet wide; crushed zone, 2 feet wide; black dyke, 2 feet wide; and white dyke, 4 feet wide; very little mineral could be seen.

No. 6 open-cut shows, on the hanging-wall side of the main white dyke, a black dyke 4 feet wide, between which and an indefinite hanging-wall there was a crushed zone about 2 feet thick, carrying considerable ore, consisting of galena, arsenical pyrites, and some copper-pyrites.

No. 7 open-cut, 10 feet deep at the face and at an elevation of 4,380 feet, shows the dyke split in the middle, or else two dykes, with a crushed zone of about 3 feet between, quite soft and containing galena, with carbonates, etc. A sample taken across the 3 feet exposed assayed: Lead, 33.6 per cent.; silver, 39.6 oz.; and gold, 0.46 oz. to the ton.

No. 8 showing, on the edge of a basin at an elevation of 4,520 feet—at timber-line—shows the ledge to be very regular and continuous; here a black dyke appears between two white dykes, but with very little mineralization showing.

A short distance above this the "Big Ledge" passes into ground held by Aldridge, on which very little work has been done.

Some 800 feet to the east of the "Big Ledge" there is another, and very similar, white dyke, but having a strike of N. 10° E., which may bring these two dykes together; this is a strong, well-defined fissure, although very little mineralization was visible. This is called the "No. 2 vein."

Still farther to the east on the property are four other dykes, one of them quite large; upon these some stripping has been done, and from one fair values in gold have been reported.

No. 3 vein is also a similar dyke, striking N. 10° E., with a crushed zone 12 inches wide carrying carbonates of lead, with some sulphides of copper and iron.

To the east of a small creek there is another dyke about 20 feet wide and a fissure carrying galena and iron-oxides.

To the south of the *Victory* group there is a claim, said to be owned Aldridge's Claims. by Aldridge, on which a 20-foot open-cut has been made in gravel and clay wash; as far as it has gone, this work is meaningless, and there was no apparent reason why it had been done. Aldridge also held claims to the north of, or up the hill from, the *Victory* group, and into which the extension of the *Victory* "Big Ledge" extends, on which a few open-cuts had been made at an elevation of 6,000 feet.

The *Coronado* group is probably the best-known and one of the oldest *Coronado* Group. locations on the hill; it was from here, in 1905, that 4 or 5 tons of galena-ore were packed out by horses to Hazelton, and sent down the river to one of the Coast smelters. The property is owned by McDonald, Simpson, and Fleming, and lies below, and to the east of, the *Victory* group. No work has been done on the property for the past two years, so that the various showings were obscure.

This ledge is also a dyke, striking N. 25° E. (magnetic) and dipping to the west at an angle of 80 degrees. The fissure appears to be 5 feet wide with good walls, having a crushed zone next to the foot-wall, 20 inches wide, and carrying galena, lead-carbonates, and iron-oxide disseminated through the crushed material; no solid galena being visible.

No. 1 tunnel is at an elevation of 3,675 feet, on the site of the old original shaft. The work done here consists of an open-cut 40 feet long and 15 feet deep at the face, from which a tunnel has been driven in for 25 feet.

Along the side of the usual white dyke there is here a black dyke, similar to that on the *Victory*; there is also a second white dyke, coarsely crystalline, which has the appearance of being a more recent injection. At the portal of the tunnel the ore was 12 inches wide, but it is cut off in the tunnel by a cross-dyke; it, however, comes in again 1 inch wide. A clean sample of the galena will carry 36 oz. silver and 0.2 oz. gold to the ton.

No. 2 tunnel is at an elevation of 3,700 feet, and is an open-cut 15 feet long, with a 20-foot tunnel. The work was started on a stringer of ore, 6 inches wide at the outcrop, which cuts off to the left; there is no ore visible in the tunnel. The formation here seems to have moved, and the tunnel was not, as yet, in to solid formation.

No. 3 tunnel, or open-cut, is at an elevation of 3,775 feet. The dyke here is very continuous, but with a very tight fissure, showing, in the face of the cut, a little galena, zinc-blende, etc. In the pavement of the cut the ore was about 6 inches wide, continuing to the face, where it had narrowed to about 1 or 2 inches wide.

At an elevation of 4,075 feet a small open-cut had been made last spring showing a quartzose dyke, traceable for 400 feet in a S. 30° W. direction, carrying galena in small quantities.

These claims are owned by Chas. Hastings, and lie somewhat to the Dominion and east and at an elevation of 4,700 feet. The work done consists of a series Newcastle M.C. of open-cuts and strippings and a shaft sunk for about 25 feet, which was full of water. The conditions here are similar to those on the *Victory* group, a dyke, 6 to 8 feet wide, with good walls, striking N. 25° E., and carrying in a crushed zone, on its edge, some ore consisting of carbonates of lead, iron-oxide, and some sulphides of copper and iron. The writer took no samples here, but Mr. Leach, in the 1908 Geological Survey Report, gives assays of this ore: (a.) Gold, \$5.80; silver, 12.4 oz. to the ton. (b.) Gold, \$3.60; silver, 0.55 oz. to the ton.

These claims, owned by Miller Bros., are situated on the south-east shoulder of Hudson Bay mountain, on the left side of Pine creek, at an elevation of 5,500 feet, and are recent stakings. On the Cariboo there is a white dyke about 6 feet wide, striking N. 50° W., and accompanied by a crushed zone which, in places, carries mineral. At an elevation of 5,650 feet, on the side of a small basin, there is a fissure, striking N. 15° W., with a crushed zone, from 6 to 12 inches wide as exposed in an open-cut, carrying iron-oxides, with some sulphides. A sample of this ore assayed: Lead, 2.1 per cent.; silver, 8.1 oz.; and gold, 0.08 oz. to the ton.

Another sample taken, supposedly, from the same ledge, a little higher up on the bluff, assayed: Lead, 3.2 per cent.; copper, 0.75 per cent.; silver, 5.2 oz.; and gold, 0.08 oz. to the ton. The country-rock in this vicinity is much disturbed, and the line of the fissure is somewhat faulted by smaller cross-fissures.

The Moonshine group, also owned by Miller Bros., consists of four or five claims, the *Blue Bell* and others, and is located some distance to the west of the last-mentioned claims, at an elevation of 5,700 feet. The conditions here are about the same as on the other properties—a main dyke 10 to 15 feet wide, with a crushed zone 4 feet wide, carrying arseno-pyrites, iron-pyrites, and chalcopyrite in a quartz gangue.

The *Little Heather*, owned by R. L. Gale and Stanley Miller, lies to the west of the Moonshine and at elevation of 5,550 feet. An open-cut, 25 feet long and 10 feet deep at the face, shows a white dyke 5 feet wide, in the centre of which, in the face of the cut, there is a fissure from 8 to 10 inches wide, which appears to widen out in the lower part of the cut. This fissure carries some lead, copper, and iron-sulphides, a sample of which assayed: Lead, 6.3 per cent.; copper, 0.4 per cent.; silver, 15 oz.; and gold, 0.02 oz. to the ton.

This claim is owned by Mark Hanna, and is situated on Miller creek facing the lake. This is also similar to the other claims—a big dyke with a crushed zone carrying some galena. The work done consists of a tunnel driven in for 20 feet and an open-cut 20 feet long.

August 24th. The camp at Silver Creek flats was left at 9 o'clock for Silver Creek basin, lying at the head of Silver creek, a small tributary of the Zymoetz river, arriving there at 12.30.

The Hankin Bros. *et al.* for many years have had a number of claims located here; the writer tried to reach them from Moricetown in September, 1905, but was obliged to turn back on account of a heavy fall of snow.

There was no trail leading from Silver Creek flats to this basin, so the Indians had been sent out the previous day to find a possible route over the mountains, which they succeeded in doing. This route lay in a north-west direction through the woods until Silver creek was reached; then its stream-bed was followed up to the East fork, when the trail struck up a very steep slope, to the west of the fork, until the foot-hills bench was reached, and this was followed around, at an elevation of 5,100 feet, to a large basin about half a mile east of Silver lake—the head of the Main fork of Silver creek.

In this basin the Hankin cabin was found, and the claims are supposed to be located on the hills surrounding the basin. The basin is surrounded on three sides by high serrated ridges composed of decomposed volcanics (andesites, tuffs, etc.) beautifully bedded and tilted at high angles.

From the cabin a well-worn foot-trail zigzagged up the hill to the east; this and a couple of other trails were followed up for miles, in the expectation that they would lead to some workings, but neither workings nor stakes could be seen, and as all the prospectors had left the district, nothing could be found.

August 25th. Leaving the basin at 9 a.m., a small creek draining the basin was followed down for about half a mile to a small lake—Silver lake—at the head of Silver creek.

This lake lies at an elevation of 4,910 feet in a large saucer-shaped basin, with grassy slopes, from which Silver creek flows to the south in a deep channel or canyon; to the north-west is a pass flanked by high mountains, through which a trail leads to connect with the main trail from Moricetown to the Zymoetz river; to the north-east another pass opens through the main range at an elevation of 5,300 feet.

The trail taken leads by this latter pass to the headwaters of Toboggan creek, which was followed down to the Bulkley valley, in the vicinity of Kathlyn lake, and camp was made at 2.30 p.m. near Toboggan lake, a small lake three miles to the north-west of Kathlyn lake and into which Toboggan creek empties.

August 26th. Camp was moved to a small creek about one-quarter of a mile above Moricetown.

August 27th. Camp was moved to a small open marsh about a quarter of a mile off the wagon-road at the 9-mile post from Hazelton.

August 28th. The pack-train moved into Hazelton, arriving there at 11.30, only to learn that a steamer had left a couple of hours before, bound down the river.

August 29th. The steamer "Omineca" was taken down the river at 4 p.m., tying up for the night at a wood-pile a short distance down-stream.

August 30th. After a perilous run through Kitsalas canyon, in which the steamer turned broadside, breaking two rudders, nearly upsetting, and finally going down-stream backwards, Newtown was reached about noon. Here, by good fortune, a special train which had brought up a party of the directors of the Grand Trunk Pacific Railway was returning to Prince Rupert that night; this was boarded and Prince Rupert reached by midnight. Prince Rupert was left on September 1st and Victoria reached on September 3rd.

PEACE RIVER MINING DIVISION.

REPORT BY THOS. JAMIESON, GOLD COMMISSIONER.

I have the honour to submit herewith a brief report on mining conditions in the Peace River Mining Division for the year ending December 31st, 1911.

The mining situation remains practically unchanged since reporting last year, with the exception that a large number of coal claims were surveyed during the summer. These claims are situated on both sides of the Peace River canyon, near to Hudson Hope, and about sixty miles west from Fort St. John. A number of coal-prospecting licences were applied for during the year, covering claims situated above the middle forks of the South Pine river.

It would appear that this coal is suitable for cooking purposes. With the advent of railway transportation facilities, we may expect great activity when the development of these coal claims begin.

Quite a few prospectors are still at work in the Division, but, although they claim to be having fairly good success, no recording has yet been done.



60 Bureau of Mines

Silver Lake Pass—Hudson Bay Mt.

SOUTH-EAST KOOTENAY DISTRICT.

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FORT STEELE MINING DIVISION.

REPORT BY A. C. NELSON, GOLD COMMISSIONER.

I have the honour to submit a report on the progress of mining in the Fort Steele Mining Division for the year 1911.

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

| Year. | Held under Crown Grant or Certi- ficate of Improve- ment. | Certificate of Work. | New Locations. |
|-----------|--|-------------------------|-------------------|
| 1899..... | 37 | 718 | 729 |
| 1900..... | 71 | 704 | 470 |
| 1901..... | 104 | 642 | 455 |
| 1902..... | 117 | 451 | 253 |
| 1903..... | 142 | 335 | 200 |
| 1904..... | 167 | 260 | 169 |
| 1905..... | 189 | 193 | 181 |
| 1906..... | 241 | 235 | 160 |
| 1907..... | 254 | 160 | 115 |
| 1908..... | 264 | 150 | 100 |
| 1909..... | 280 | 154 | 116 |
| 1910..... | 294 | 161 | 179 |
| 1911..... | 307 | 167 | 96 |

MINERAL CLAIMS.

The *North Star* group, on Mark creek, has remained shut down since 1910, and it is probable that it will not be opened up again until some economic method of reducing low-grade ores has been successfully demonstrated; this also applies to the *Stemwinder* group, an adjoining property.

The *Sullivan* group, on the east side of Mark creek, has been worked steadily during the past year and has shipped about 25,000 tons, besides initiating new development-work and the installation of a water-power from Mark creek.

The *St. Eugene* group, on Moyie lake, has reduced its force to a minimum and has shipped but few tons; across the lake the *Aurora* group has done but little development during the year, but, as the finances have now been reorganized, it is hoped that 1912 will see this property put on a paying basis.

The *Society Girl* group, on the east side of Moyie lake, has been steadily going ahead, shipping a small quantity of ore, but not yet in the list of regular shippers.

General interest in mining seems to be accentuated, and it is confidently expected that this year will see a demand for the large deposits of hæmatite that are known, and the founding of the associated industries.

OFFICE STATISTICS—FORT STEELE MINING DIVISION.

| | |
|---|-----|
| Mineral claims recorded..... | 96 |
| Placer claims recorded or re-recorded..... | 4 |
| Certificates of work..... | 167 |
| Certificates of improvements issued..... | 13 |
| Conveyances and other documents of title..... | 33 |
| Partnership agreements..... | 5 |
| Gold Commissioner's permits..... | 4 |
| Documents filed..... | .. |
| Affidavits filed..... | 212 |
| Records of water grants and permits..... | .. |
| Mining leases issued..... | .. |
| " in force..... | 36 |
| Free miners' certificates (ordinary)..... | 304 |
| " (company)..... | 5 |
| " (special)..... | .. |
| Crown grants issued..... | 13 |

Revenue.

| | |
|--------------------------------|------------|
| Free miners' certificates..... | \$1,455 00 |
| Mining receipts..... | 1,694 40 |

FORT STEELE MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

The Fort Steele Mining Division appears to have had the largest total decrease in mineral production of all the districts of the Province. Not only did the strike of the Crowsnest coal-mine employees cause a decrease in output of coal and coke of nearly \$3,000,000 as compared with 1910, but the district had, as well, a decrease in production of silver to the extent of about 171,000 oz., and of lead of nearly 7,000,000 lb. The cause of the smaller production of coal and coke was the shutting-down of the collieries for a period of eight months, due to a labour dispute over the "agreement" as to wages; that of the lessened output of silver and lead was the direct result of the approaching exhaustion of the known ore-bodies of the *St. Eugene* mine; the decrease was, however, in part offset by an increase in output of these metals by the *Sullivan* mine, owned by the same company. There were only two other mines in Fort Steele Division that shipped ore; these were the *Aurora*, which made a shipment of about 100 tons to a concentrating plant near Creston, for a trial as to concentration, and the *Society Girl*, which shipped 537 tons of galena-ore. The total yield of placer gold is placed at a similar small value as that of 1910—\$3,000. The construction of the Kootenay Central Railway, from Golden, on the Canadian Pacific main line railway, south to the Crowsnest Railway east of Cranbrook, now in active progress, may be expected to lead to a resumption of mining in parts tributary to the upper Kootenay and upper Columbia valleys.

St. Eugene Mine.—This property has been for many years the largest producer of lead in the Province, but it has been an open secret for two or three years, and has been noted in these reports, that the known ore-bodies are about exhausted; the property continues to be worked, but with a diminished force, this past year employing 108 men and shipping some 5,186 tons of concentrates containing 138,242 lb. of lead. The owners of the property—the Consolidated Mining & Smelting Company of Canada—have acquired the *Sullivan* mine, which they are now operating.

Sullivan Mine.—Much development-work was done in 1911, this adding considerably to the available reserve of ore. To facilitate getting ore out of the mine, a tunnel was driven from the shaft, on the 100-foot level, out to the surface on the hillside, and a large ore-sorting house was erected near the outlet of this tunnel. The upper terminal of the aerial tramway from the mine down to the railway was removed to a storage-bin built immediately below the sorting-house. A hydro-electric power plant is nearing completion, power to be developed by three 6-foot Pelton wheels—two connected to a 40-drill compressor and one to a 120-kw. generator. Compressed air will be conveyed to the mine through an 8-inch pipe 5,100 feet long. Beside the body of lead-ore being mined here, there is in the mine an immense quantity of lead-zinc ore awaiting development of a suitable reduction process before it can be turned to profitable account. The *Sullivan* property, like the *St. Eugene*, is controlled by the Consolidated Mining & Smelting Company of Canada, Limited.

CROWN COAL & COKE COMPANY.

The following notes on the holdings of the Crown Coal & Coke Company, situated on the North fork of Michel Creek, have been extracted from a report on the property by Chas. L. Hower, mining engineer, of Johnstown, Pa., which were kindly supplied the Bureau:—

LOCATION OF THE PROPERTY.

The property of the Crown Coal & Coke Company consists of certain coal lands situated in southern British Columbia near the Alberta line (long. 114° 25' W., 49° 45' N.). It is about forty-eight miles north of the International boundary, and its southern extremity is six miles north of the Canadian Pacific Railway, where it crosses the Continental Divide via the Crowsnest Pass at an elevation of 4,425 feet above sea-level. This pass is one of the lowest in the Rocky mountains.

DESCRIPTION OF PROPERTY.

The entire property is on the watershed of the North fork of Michel creek, a tributary of the Elk river. For a distance this creek is the approximate western boundary, and the property lies on the western slope of the Sentinel range of the Rocky mountains.

EXTENT OF HOLDINGS.

The property consists of the following tracts:—

Crown-granted—

| | |
|--------------------|--------------------|
| Lot No. 6440 | 640 acres. |
| " 6441 | 640 " |
| " 6442 | 449 " |
| " 6443 | 640 " |
| | <hr/> 2,369 acres. |

Leased—

| | |
|--------------------|--------------------|
| Lot No. 6444 | 640 acres. |
| " 7932 | 640 " |
| " 7933 | 130 " |
| " 7934 | 187 " |
| " 7935 | 640 " |
| " 7936 | 573 " |
| | <hr/> 2,810 acres. |

Licensed—

| | |
|------------------------|--------------------|
| Not yet surveyed | 640 " |
| Total holdings | <hr/> 5,819 acres. |

In most places nature has stripped the softer measures away to the hard rocks and limestone which now comprise the crests and headlands of the great Rocky Mountain ranges, and only in extremely favoured locations, in narrow belts nestling against the great ranges and parallel to them, have the coal-bearing Cretaceous rocks been preserved from destruction.

GEOLOGY OF PROPERTY.

Crown mountain is one of the survivors, the cap of hard conglomerate overlying the coal-measures indicating one of the reasons they were not destroyed. In the vicinity of the Crown Coal & Coke Company's property is Crown mountain, an upturned block of strata, exposing the raw edges of the Kootanie series (the coal-bearing Cretaceous rocks) on its eastern escarpment and disappearing under the limestone range to the west.

PROSPECTING.

The prospecting-work on the property has been almost entirely confined to the four Crown-granted sections on Crown mountain. During the past four years this part of the property has been most exhaustively examined, fixing the value of the property as a coal-depository and disclosing the natural mining features.

On this portion of the property two camps have been built and the prospecting-work carried on in thorough and systematic manner. A complete section of the measures have been uncovered, disclosing eight workable seams, and the continuity of the measures has been established by tracing seam "C" around the mountain for a distance of over three miles.

No coal has yet been developed on the southern claims. The lay of the coal, if present there, is such that it is not as easily uncovered as in the northern part of the property. Should further prospecting-work disclose that this part of the property is barren, the various claims, now held on leases, should be relinquished, unless the timber is of sufficient value to justify the expense of Crown-granting them.

COAL-MEASURES ON PROPERTY.

The Kootanie coal-measures outcrop on the western side of the creek, opposite the southern end of the property. They follow up nearly parallel with the stream and cross the west branch at a point about 2,000 feet above the forks. From this point the outcrops swing around the southern end of Crown mountain and outcrop in its eastern escarpment. The measures gradually rise to the north, and on the Crown property they are about 2,000 feet above the eastern branch of the creek.

The coal-bearing rocks are about 500 feet thick and contain at least eight workable seams of coal with a combined thickness of 65 feet. As before stated, one of the seams has been traced through the entire property and the continuity of the measures thus established.

The only evidence of disturbance in the field is along the eastern escarpment of the mountain, where there are indications of a break in the strata near the outcrop of the same; also, near the point where Crown mountain joins the main range to the north, a "wrinkle" has broken the measures, almost at the northern boundary of the property. The general dip is 28 degrees and to the west.



Hankin's Camp—Hudson Bay Mt.



Toboggan Glacier—Hudson Bay Mt.

AMOUNT AND QUALITY OF CROWN COAL.

The following tabulations indicate the quantity and quality of the coal in the Crown-granted part of the property :—

COAL-CONTENTS, CROWN MOUNTAIN (OWNED) SECTIONS.

| Workable Seams. | Thickness. | Acreage. | Amount (Net Tons). |
|------------------------------------|------------|----------|--------------------|
| | Ft. in. | | |
| A | 6 0 | 800 + | 7,200,000 |
| B | 5 0 | 900 + | 6,750,000 |
| C | 16 5 | 1100 + | 26,400,000 |
| D | 6 5 | 1200 + | 11,500,000 |
| F | 5 5 | 1300 + | 11,200,000 |
| H | 12 0 | 1400 + | 25,200,000 |
| K | 8 0 | 1500 + | 18,000,000 |
| New seam | 6 0 | 1600 + | 14,400,000 |
| Total thickness | 63 3 | | |
| Total of workable coal known | | | 120,650,000 |

ANALYSES OF COAL-SEAMS, CROWN MOUNTAIN.

| Elements. | Seam C. | Seam D. | Seam G. | Seam H. | Seam I. | Seam J. | Seam K. |
|--------------------|---------|---------|---------|---------|---------|---------|---------|
| Moisture | 7.9 | 5.2 | 6.7 | 8.3 | 7.5 | 5.6 | 4.4 |
| Volatile | 23.00 | 22.00 | 21.60 | 22.20 | 23.55 | 19.60 | 18.80 |
| Fixed carbon | 71.55 | 74.50 | 69.00 | 69.30 | 70.90 | 74.65 | 73.40 |
| Ash | 5.45 | 3.50 | 9.40 | 8.50 | 5.55 | 5.75 | 7.80 |
| Sulphur | 0.10 | 0.59 | 0.22 | 0.30 | 0.55 | 0.59 | 0.51 |

The above analyses were made by Wm. H. Stowell, of Spokane. The samples were taken from the various prospects on the property. Most of these were merely shallow holes on the crop, and as a result the coal contained an excess of moisture and some surface impurities. Under mining cover the coal will not contain above 2 per cent. moisture.

Correcting for excessive moisture, the following is an average of twenty analyses of all the seams on the property :—

AVERAGE ANALYSES OF ALL SEAMS, CROWN MOUNTAIN.

| | |
|-----------------------------|----------------|
| Moisture | 2.00 per cent. |
| Volatile combustible | 21.08 " |
| Fixed carbon | 72.12 " |
| Ash | 6.80 " |
| British thermal units | 14,212 |

NORTH-EAST KOOTENAY DISTRICT.

GOLDEN MINING DIVISION.

REPORT OF E. J. SCOVIL, GOLD COMMISSIONER.

I beg to submit the annual report for the Golden Mining Division of North-East Kootenay for the year 1911.

During the past season mining has been more or less at a standstill, with the exception of the *Monarch* mine at Field; elsewhere in the district little has been accomplished, other than the usual statutory assessment-work and a certain amount of prospecting and restaking. Mining will not "come into its own" till the completion of the Kootenay Central Railway, which, however, is now under active construction, between Golden and Spillimachene, at the north end, and from the Crowsnest Railway at the south end. Several properties are in a position to ship as soon as transportation is provided. I am indebted to John A. Thompson, managing director, and H. H. Lavery, M.E., for the following information *re* the *Monarch* mine at Field:—

The mill is 140 x 40 feet, and is situated on the main line of the *Monarch Mine*. Canadian Pacific Railway. We have built a siding 350 feet long with capacity for five cars. The engine-room is 20 x 20 feet and the boiler-room 20 x 30 feet. These two buildings are additions to the mill proper.

Power.—A Pelton special 4-foot wheel complete with Pelton governor supplies 140 horse-power during the summer months. This wheel works under a 280-foot head, with a wooden pipe-line 1,700 feet in length and of 12-inch pipe. The dam on Thomson creek is 30 feet in width and has a depth of 12 feet. In winter the pipe-line furnishes the mill with the necessary water for pump-distribution, boiler and domestic uses. During the winter the power is supplied by a 100-horse-power 13- x 18-inch slide-valve engine, working under a 135-lb. boiler-pressure. The boiler is manufactured by the Jencke Boiler Co., Ltd., of St. Catharines, Ont., and has 100 horse-power capacity. The boiler feed-water is preheated by a Wainright closed heater, and forced into the boiler by a Canada Foundry duplex pump.

Mill Equipment.—The mill equipment consists of the following: One 8- x 12-inch jaw-crusher (Blake type); one set 24- x 12-inch roughing-rolls; one set 12- x 12-inch finishing-rolls; three sets three-compartment Harz jigs; one set two-compartment Harz bull-jigs; three Deister No. 2 sand-tables and one Deister No. 3 sling-table; one Baltic dewatering and settling box; two Yeatman hydraulic classifiers and three sets of elevators; also two sets of trommels. A 10-kw. double-cylinder generator supplies the light for mill, mine, and bunk-houses, offices, etc.

Aerial Tram.—The aerial tram is 1,100 feet in length, and is of the Leschen two-bucket type, having a capacity of 100 tons per day. The upper terminal is at the bottom of the inclined raise and the lower terminal at the mill. There is a difference in elevation of 186 feet in the 1,100 feet of tram-line.

Bunk-houses, Cook-house, and Office.—The company has built the above-named buildings on the opposite side of the Canadian Pacific Railway tracks, but just below the mill. Each building is double boarded and lined, and have Pareoid roofs. Each building is supplied with electric lights and running water.

Mine.—In addition to the regular development-work of blocking out ore, a tunnel and raise is well under way to make an underground connection with the mine and the old raise. The tunnel, which will be 187 feet long, is now in a little less than 100 feet; an inclined raise will then be started on an angle of 55 degrees, 190 feet in length, which will tap the mine at its most central point.

I might add that the mill is supplying air for the mine by a single-stage compressor, compressing the air to 85 lb. at the mine. A large $3\frac{1}{4}$ -inch Canadian Rand machine is being used to push the tunnel-work.

OFFICE STATISTICS—GOLDEN MINING DIVISION.

| | |
|--|------------|
| Free miners' certificates (102) | \$ 751 00 |
| Mineral claims recorded (17) | 42 50 |
| Placer mineral claims re-recorded (1) | 2 50 |
| Assessments recorded (19) | 447 50 |
| Special free miners' certificates issued (2) | 30 00 |
| Bills of sale recorded (2) | 5 00 |
| " placer (<i>nil</i>) ..... | ..... |
| Placer-lease rents (2) | 150 00 |
| Notices to group (2) | 50 |
| Affidavits and permits filed | 1 75 |
| Three copies of "Mineral Act" sold (3) | 75 |
| Acreage-tax collected | 433 75 |
| Total receipts | \$1,865 25 |

WINDERMERE MINING DIVISION.

REPORT OF GEO. F. STALKER, MINING RECORDER.

I have the honour to submit the annual report on mining operations in the Windermere Mining Division for the year ending December 31st, 1911.

The mining operations in this district show no improvement over last year; there were more locations recorded than in 1910, but the development-work done during the year was limited, as in last year, to a few properties, and, with few exceptions, amounted only to the usual assessment-work.

OFFICE STATISTICS—WINDERMERE MINING DIVISION.

| | |
|--|------------|
| Free miners' certificates issued | 54 |
| Location recorded | 26 |
| Certificates of work recorded | 31 |
| Certificates of improvement | 5 |
| Bills of sale recorded | 10 |
| Revenue | \$3,017.10 |

NORTH-WEST KOOTENAY DISTRICT.

REPORT OF ROBERT GORDON, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on the progress of mining within the Revelstoke and Lardeau Mining Divisions for the year ending December 31st, 1911.

There has been no visible improvement during the twelve months just ended, which means that there is practically no mining going on in this district.

There have been a few placer claims and leases taken up on French creek, in the Big Bend, and a small amount of gold was taken out of the placer diggings, but, I believe, not more than wages for the few men employed.

A movement is now on foot to have a prospecting drill brought in to ascertain the actual quality and depth of the ground on French, McCulloch, and Smith creeks, and I have been assured that the machine has been already purchased, and negotiations are now under way to obtain experts to operate it.

The ground held under lease has remained almost untouched during the year, and the several plants are not being kept in a workable condition.

The mica-deposits in the Big Bend were not further developed during the season, owing, to some extent, to the difficulties of transportation, and the metalliferous deposits were not developed at all for the same reason.

In the Lardeau Division things have not been very much better, although a small amount of development-work was done and several hundred tons of ore taken out.

To summarize the whole situation, I might say that mining is at a standstill throughout the whole district, and it will no doubt have to await its turn to have the attention of the necessary capital diverted in this direction.

REVELSTOKE MINING DIVISION.

REPORT OF W. E. McLAUCHLIN, MINING RECORDER.

I have the honour to submit herewith a brief report of mining operations in the Revelstoke Mining Division for the year 1911.

During the past year but little development-work has been done, except the necessary annual assessment-work, owing to the want of transportation facilities.

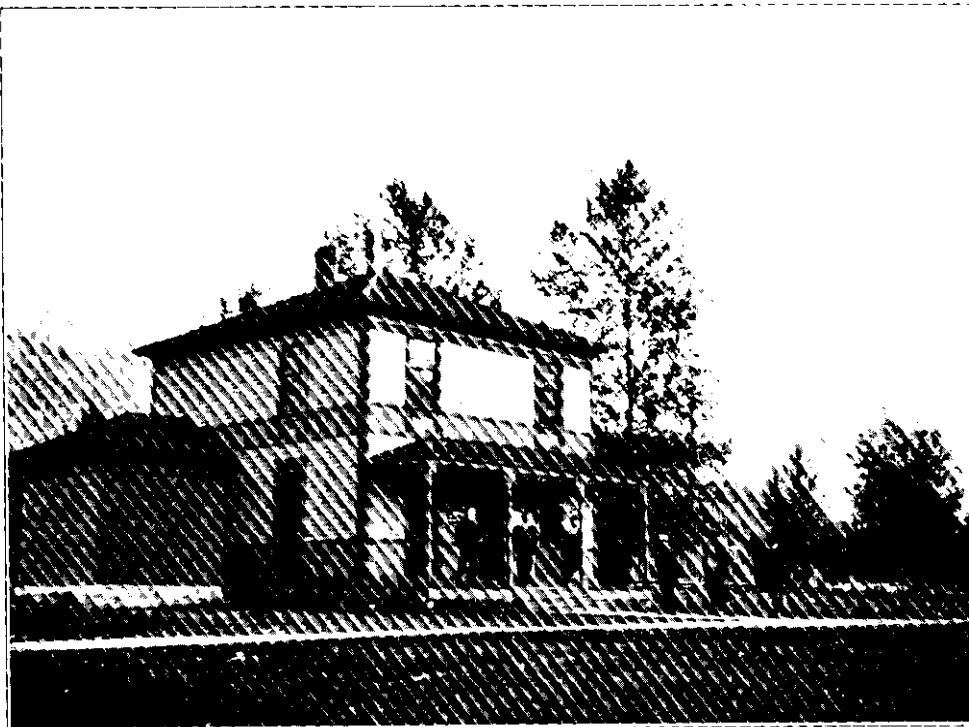
There was considerable development-work done on the *McEachern* group, ten miles south of Revelstoke, last year, and the intention is to do much more this season.

OFFICE STATISTICS—REVELSTOKE MINING DIVISION.

| | |
|---------------------------------------|-----|
| Free miners' certificates issued..... | 156 |
| " " " (company)..... | 3 |
| Locations recorded..... | 30 |
| Certificates of work recorded..... | 12 |
| Money paid in lieu of work..... | 9 |
| Conveyances..... | 6 |
| Powers of attorney..... | 4 |



Stocon Lake—looking north from New Denver.



Mining Recorder's Office—New Denver.

 LARDEAU MINING DIVISION.

REPORT OF B. E. DREW, MINING RECORDER.

I have the honour to submit herewith a brief report of mining operations in the Lardeau Mining Division during the year 1911.

The mining situation in this division remains practically unchanged since my report of last year.

Development-work on several properties has, however, demonstrated beyond a doubt that the ore-shoots encountered on the surface extend downwards at an angle corresponding with the dip of the fissures and dykes in which the ore-bodies are embedded; this statement applies more particularly to the silver-lead properties, seeing that the same conditions have been known for years to exist in our quartz veins carrying free gold. It is the opinion of the writer that the merits of some of the properties deserve investigation; for instance, the recently discovered shoots of ore in the *Burniere*, *Spider*, *Excise*, and *Duty* groups of claims, which vary from 2 to 8 feet in width, and carry uniformly good values.

OFFICE STATISTICS—LARDEAU MINING DIVISION.

| | |
|---|----|
| Free miners' certificates issued..... | 35 |
| Certificates of work issued | 79 |
| Payments in lieu of work | 2 |
| Claims recorded | 26 |
| Agreements and transfers recorded | 8 |

SLOCAN DISTRICT.

AINSWORTH, SLOCAN, AND SLOCAN CITY MINING DIVISIONS.

REPORT BY E. E. CHIPMAN, GOLD COMMISSIONER.

I beg to submit the annual report for the Ainsworth, Slocan, Slocan City, and Trout Lake Mining Divisions for the year 1911.

Those parts of the Ainsworth and Slocan Mining Divisions which are dependent for the transportation of their ores on the line of the old Kaslo & Slocan Railway were handicapped in being unable to ship their product, except at almost prohibitive rates, and there was, as a consequence, a greatly decreased product during the year, only 20,571 tons having paid the 2-per-cent. tax. With the completion, early in the spring, of the Canadian Pacific Railway line from Three Forks to Bear lake, and the hoped-for continuation of the line to Kaslo during the coming summer, it is confidently expected that the old-time shipments will be resumed, and exceeded, in 1912.

The development during the year 1911 has demonstrated in the older mines of the Slocan that the ore-bodies hold their size and values as depth is attained, and a feeling of confidence pervades that has not obtained for many years.

AINSWORTH MINING DIVISION.

There has been a decided and increased activity in the Ainsworth camp during the year. The advent of the Mabry people has resulted encouragingly, the important result being a thorough examination of the camp by the Consolidated Mining and Smelting Company, of Trail; this company has taken over under bond the *No. 1* and *Tiger* mines, and has options on a number of other properties.

Bluebell Mine.—This property has been closed down during the year, pending the reorganization of the owning company, which has now been effected. It is the intention of the New Canadian Metal Company to proceed at once—probably by the 1st of February—with development of the mine and the extension of milling-capacity to 300 tons daily. It is hoped, on account of the above, that by the end of the year a very different account may be afforded than has been the case for the past two years. It is anticipated that milling will begin about the 1st of May.

No. 1.—At this mine seventeen men are employed, and the company is instituting an extensive programme for development. There is a satisfactory showing of ore and regular shipments are being made.

Tiger.—On this mine the company has driven 100 feet of tunnel under contract, and the whole face of the tunnel is in good ore.

Hobson Mining Company.—The company has driven 600 feet of tunnel and drifted 200 feet, but is still some distance from its ore-shoot.

Dellie Mine.—Silver Hoard Company, under the management of W. S. Hawley, has done 400 feet of tunnelling and drifting, repaired cabins, cook and bunk houses; built 2,000 feet of trail; put in a new assay office, and is working seven men continuously. It proposes to develop water-power during the coming year, to install a compressor, build a small sawmill for the use of the mine, build ore-bins and such other structures as may be required for the economical working of the property, and expects to be shipping ore in sixty days, and hopes to continue during the year. The company intends also to drive a lower tunnel and do considerable work that will be necessary for deeper mining.

Hope.—The Florence Mining Company is driving a tunnel to a depth of 500 feet on this property, and is confident that it will be well repaid for the labour.

Gallagher.—Work during the year has been purely in the line of development. A 500-foot tunnel is being driven to reach the ore-zone from which all past shipments have been made, and a drift is also being made to connect the two main shafts on the property, which will greatly facilitate the handling of the ore.

Maestro.—Work was carried on continuously under lease and several car-loads of ore were shipped.

Star Mine.—One hundred and fifty feet of tunnel were run by contract and it is now in 760 feet; it is intended to run 100 feet more early in the year.

Highlander.—The Highlander Mill and Mining Company worked about two months and increased the length of its tunnel 100 feet, which now has a depth of 2,900 feet. The mine is now closed down.

WOODBURY CREEK.

The *Jessie-Blue Bird* worked for a short time in development, but did not ship any ore.

Sun.—This mine worked about three men from June to December, and has two cars of a good grade silver-lead ore sacked and ready for shipment.

KASLO CREEK.

Utica.—This mine, which was opened up late in the year 1910, is now employing twenty-three men at the mine and is daily taking out 3 tons of ore, running 150 oz. silver, 12 per cent. lead, and 20 per cent. zinc to the ton. During the year the drift on the lower tunnel has been extended 237 feet, 200 feet of which is in ore. The company has built 300 feet of sheds, ore-house, boarding-house at the mine, and stables, store, and ore-houses at the railway, where the ore is stored pending shipment when the railway is clear of snow in the spring. The shipments for the season amounted to 220 tons, which netted the owners about \$14,000. The shipments being rawhided to the railway now come from a small vein which produces clean ore. The larger vein needs a concentrator to treat the ore, and is to be extended next year 2,000 feet. Another parallel tunnel, which is now in 1,300 feet, is to be driven another 1,000 feet. It is also intended to run a tunnel one mile lower down, 1,600 feet deeper than the present workings, where the proposed concentrator and compressor are to be erected.

Whitewater Deep.—Work was resumed in the main raise on the 20th January, 1911, the period between the fire and that date having been consumed in necessary repairs and rebuilding. The raise was completed the 18th of July. The following is the work done since the 1st of January, 1911: Completing main raise, 437 feet; four stations cut, 12x8x7 feet; drifting on the vein from different stations, 1,191 feet; from stations and drifts, 576 feet of cross-cutting. Work was carried on with from twelve to thirty men.

Whitewater Mine.—Operated by J. L. Retallack & Co. This mine was purchased in October by a partnership, consisting of J. W. Stewart, of Foley, Welch & Stewart; Clive Pringle, of Ottawa; and J. L. Retallack, of Kaslo. Eighteen men are now employed. One hundred tons of high-grade ore have been shipped to Trail. This mine will continue to work all through the winter, but no shipments can be made on account of lack of transportation.

Washington Mine.—This mine is practically owned by the same partnership as above. During 1911 about eight men have been working on development until August, when the mine shut down pending the arrangement of transportation and milling facilities. The total amount of development carried out in the past three years was 3,000 feet, of which about 1,000 feet were during 1911. About 40,000 tons of concentrating ore were developed.

Panama.—This mine worked, on an average for the year, four men; ran two tunnels, respectively 95 and 55 feet; 400 feet of drifting were accomplished; two shafts, one 63 feet and the other 40 feet, were sunk; and 90 tons of ore were shipped, averaging 200 oz. silver to the ton. Late in the year Spokane and Vancouver parties took over the property under a substantial bond, and intend running a tunnel 750 feet in length and 350 feet below the present workings.

SOUTH FORK OF KASLO CREEK.

Cork Mines.—These mines are under the management of the West Kootenay Corporation. No work was done at the mine during 1911, but arrangements are now completed to resume operation on an extended scale by driving a long crosscut tunnel on the *Superior* vein, and the installation of an increased water-power for the concentrator.

Flint.—This mine worked two men part of the year on development-work, and shipped about a car-load of ore.

The *B.N.A.* worked two men for three months the last part of the year, but no shipments were made.

The *Martin*, *Nome*, and *Metropolitan* were developed to a considerable extent, and the annual assessment-work on the creek was fully represented.

DUNCAN RIVER.

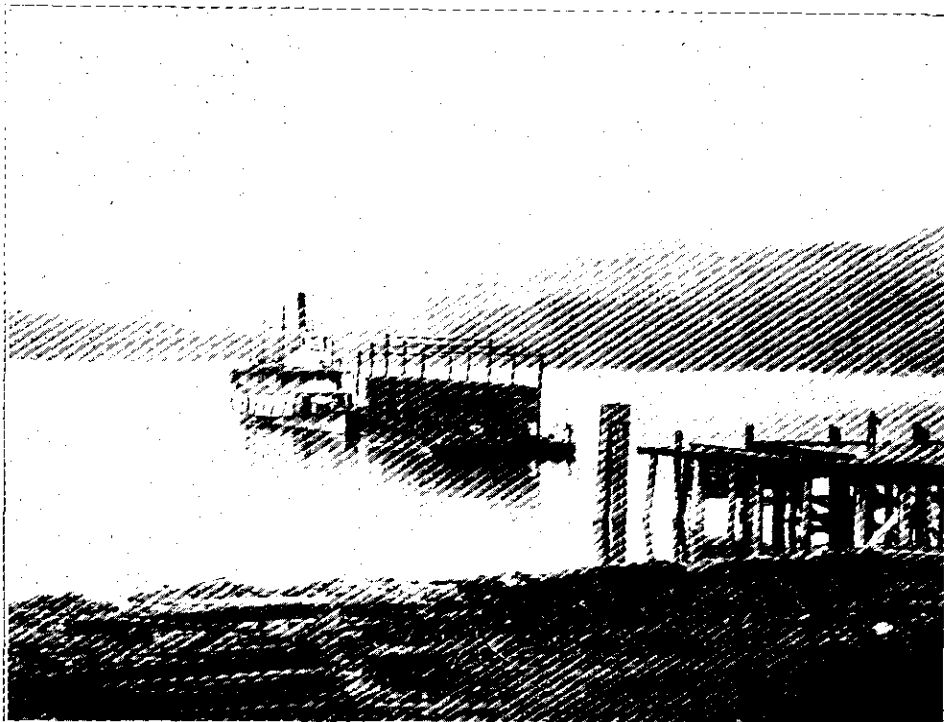
Very little work, except annual assessment, was performed in this district during the year. The *Red Elephant* group was worked by two men for three months, and they are entirely satisfied with the result.

OFFICE STATISTICS—AINSWORTH MINING DIVISION.

| | |
|--|-----|
| Free miners' certificates (personal) | 199 |
| " " (company) | 1 |
| New claims recorded | 113 |
| Transfers recorded | 42 |
| Certificates of work issued | 236 |
| Water records issued | 1 |
| Pre-emptions issued | 12 |
| Certificates of improvement (land, 4; mines, 33) | 37 |
| Certificates of purchase | 86 |



Silverton—Slocan Lake, B.C.



New Denver—Str. Slocan.

SLOCAN MINING DIVISION.

REPORT BY ANGUS McINNES, MINING RECORDER.

I have the honour to submit herewith the annual report on the mining operations in the Slocan Mining Division for the year ending December 31st, 1911.

During the year just closed a large amount of development-work has been done, which has proved beyond doubt that the ore-bodies "go down," and that the ores retain the same high values as in the upper workings of the different camps of the Slocan; if no unforeseen disasters occur, the year on which we have just entered will be a record-breaker in both ore-shipments and development-work.

Silverton Mines, Ltd.—This property is situated near Silverton. The development of No. 7 tunnel on this group is being continued and is now in about 1,000 feet, and three ore-shoots have been encountered. Raises are being made between Nos. 6, 5, and 4, the distance between these levels being, approximately, 220 feet vertical. The management has been experimenting at the mill with the Elmore vacuum process, and, I understand, is highly pleased with the results.

Van-Roi Mine.—This mine is also on Four-mile creek, about five miles from Silverton. The fine new concentrator was finished in the early part of the year, and has since then been treating about 125 tons of ore a day, producing silver-lead and zinc concentrates. The tonnage of ore milled amounts to about 30,000 tons. Ore-bodies are being developed on three levels at the mine, on two separate veins; it is expected that ore production will be well maintained from both veins. Altogether, the year's work has been most satisfactory.

Standard Silver Lead Mines.—This property is situated on Silver mountain, about four miles from Silverton. This company continues to make good progress with the development and equipment of the *Standard* group of claims. The new concentrator, which was started in the spring, is now complete and running. The water-supply system, the compressor, and tram-line are also running, and about 100 tons of milling ore is being run through every day; the mill is giving good satisfaction.

In the mine the chief work being done of late has been the further development of No. 6 tunnel, which is about 200 feet vertical depth below No. 5. In this adit zinc-ore was encountered at 1,800 feet from the portal; this ore continued for nearly 100 feet, when lead-ore was met with; the tunnel was then driven another 200 feet ahead, when it cut 8 feet of zinc-ore, which was drifted on both ways for a short distance.

From the 1,800-foot point in the tunnel a turn was made to the left, following the lead-ore. At about 100 feet from the main tunnel the vein is about 12 feet wide, the first-class ore varying from 5 to 8 feet wide, the remainder being good milling ore.

Rambler-Cariboo.—Development in the *Rambler-Cariboo* mine in recent years has done much to restore confidence in the mining industry of the Slocan District, and to encourage mine-owners to undertake deep-level exploration; since the big adit—which is about seven-eighths of a mile long—was driven about five years ago and the old workings thereby drained, much development-work has been done below the 800-foot level, the lowest in the mine prior to the driving of the 1,400-foot level. The downward continuation of the ore-shoot has been demonstrated, and now it has been proven that the highest-grade ore yet found in quantity in the mine occurs on the 1,200-foot level; three ore-shoots have been opened up in the vein on this level. I understand it is the intention of the management to commence the erection of a concentrator somewhere near the new spur of the Canadian Pacific Railway above Three Forks.

Apex Mineral Claim.—On the *Apex* claim, situated near New Denver and adjoining the *Mountain Chief*, active development was started about the 15th of November last with a small force of men; already two cars of very high-grade ore have been extracted. This is the first attempt made to develop this property; the character of the ore is "dry," very rich in silver, with very small percentage of lead.

Lucky Thought.—This is another property that has not been worked to any extent till this last summer, when a small force of men opened up a showing of 4 feet of solid galena-ore, and the owner, T. Lloyd, expects to make regular shipments from now on.

SANDON CAMP.

About Sandon the important deep-level development-work being undertaken on the *Slocan Star* and the *Payne* properties, respectively, is having a beneficial effect on the business of the camp and district. There are also the *Noble Five*, *Reco*, and *Surprise* mines; all of which have opened new ore-shoots of good grade. On the *Sunset* there is a deep tunnel being now driven.

NORTH FORK OF CARPENTER CREEK.

There are at present three properties doing considerable development and taking out quite a quantity of very high-grade ore. The properties now working are the *Jo Jo*, *Evening Star*, and *McAllister* groups. The *Hope*, *Ruth*, and *Richmond Eureka* are operating and making progress.

Altogether, the year just closed has been one of the best the Slocan has had in the way of sound mining and developing, and all indications point to even greater prosperity for the new year.

OFFICE STATISTICS—SLOCAN MINING DIVISION.

| | |
|---------------------------------------|------------|
| Free miners' certificates issued..... | 153 |
| " " (company)..... | 4 |
| New claims recorded.. | 84 |
| Certificates of work recorded | 144 |
| Bills of sale and agreements..... | 12 |
| Revenue collected | \$2,917.05 |

SLOCAN MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

Productive mining in the Slocan District has been subject to great fluctuations as regards the output made. The highest point in production was reached in 1897, when the output of the Slocan District, including the Ainsworth Mining Division, reached a value of \$3,721,231.

From this highest point the production fell away each year with great regularity until, in 1906, the lowest ebb was reached, when the production of the district had a recorded value of only \$783,318, about 20 per cent. of what it had been some ten years previous.

This was the lowest point reached; here the tide changed, and the output has been steadily increasing ever since, reaching in 1909 as high as \$1,572,077. The tide appears to have rested here for the time being, but the indications are, as will be shown later, that the flow has only halted and has not reached its flood; whether it will ever reach the high-water mark of 1896 is, as yet, a matter of opinion, and can be proved only by time.

These great fluctuations must have had a cause, and, while the variations of the metal market, with a general downward tendency of late years, has caused some fluctuation, this would in no way account for the great differences shown in the period indicated.

The true explanation seems to be in the general history of mining in the Slocan and its development.

The Slocan camp in its earlier days was phenomenal, inasmuch that bodies of lead-ore, exceptionally high in silver, were found "at grass-roots," and so situated, owing to the broken character of the country, that the first development and exploitation of these bodies could be cheaply and quickly made.

Before railway transportation into the district was available, considerable quantities of the richer ores were mined; that is, ores rich enough to stand pack-train or wagon transportation down to Kootenay or Slocan lakes, by which routes these ores were taken to market.

In the extraction of these exceptionally rich ores, considerable ore, only relatively of poorer grade, was developed, and consequently, when the railway came into the country, in 1895, there was already a stock of ore awaiting transportation, so that in 1897 there occurred the abnormally high production of ore to the value of \$3,721,231.

It was not to be expected that this high figure would be maintained, as the condition causing it was only temporary, but the district did maintain a production of well over \$2,000,000 each year until 1902, when it dropped below that mark.

During these years and up to 1902 the mines generally had been working, and in many cases had exhausted the large ore-bodies which had been found so near the surface and so easy of access, while few, if any, of the properties had been prospected or developed to any great depth below the surface.

The ore-bodies of the Slocan are, as a rule, found in very strong and often very wide fissures or crushed zones, in which the ore-bodies occur as lenses, shoots, or chimneys, of greater or less size.

It consequently followed that the ore-lenses at first worked were eventually exhausted, and, while in some instances others were found by further development, in numerous cases sufficient development was not done to reach other ore-bodies, and the mines were abandoned upon the exhaustion of the first ore-shoots, the impression gaining hold that, in the Slocan, the ores "did not go down."

In the light of recent developments, some of these unworked mines have become the most promising prospects in the district and best worthy of extended development.

Fortunately, some of the mining companies, not satisfied that the ore "did not go down," continued development workings to considerable depths, often under serious discouragements, and in most cases were rewarded by finding new ore-bodies. For instance, the *Rambler-Cariboo* property, where ore in large quantity and of a grade as good as was found nearer the surface, has been developed on a level 1,200 feet below the first, or outcrop, workings; there are other successes of a similar character.

The immediate result of the success so far met with is that other of the abandoned mines in the Slocan are being again investigated and will be prospected at a greater depth, in the hope of finding other lenses of ore. Of these may be mentioned the old *Payne* mine at Sandon, which has been acquired by W. E. Zwicky *et al.*, of the *Rambler-Cariboo* mine, who, encouraged by his success at the *Rambler*, will endeavour to find new ore-bodies with depth in the *Payne*.

This property was discovered in 1892, and has shipped about 50,000 tons of silver-lead ore, representing a gross value of \$4,000,000, from which dividends to the extent of \$1,438,000 were paid before the property was shut down in 1904.

The *Slocan Star* property, which has been idle for some years—not, however, from any lack of ore, but owing to litigation—is being again opened up, with adjoining properties, by a deep tunnel, having every prospect of success.

With a view of ascertaining just how far and how successfully this deeper development had been carried, and what it demonstrated as to the deeper continuance of the ore-bodies, the Provincial Mineralogist made a trip through the Slocan last fall, visiting those mines on which deeper development had been attempted.

This investigation showed that a surprisingly large percentage of these attempts had been successful; so much so as to give good ground for the belief that, as a rule, the ore-bodies continue to a greater depth than has hitherto been attempted or even hoped for, and strong expectations are raised that the productions of the Slocan District will again take on renewed vigour and continue for an indefinite time.

One new feature in mining in this district is evident, that in the future the operations will, of necessity, have to be carried on by strong companies; the day of the small syndicate mining rich ores near the surface has passed, as far as the known ore-bodies are concerned, although this may not apply to new discoveries, or to small deposits or remnants left in some of the older properties.

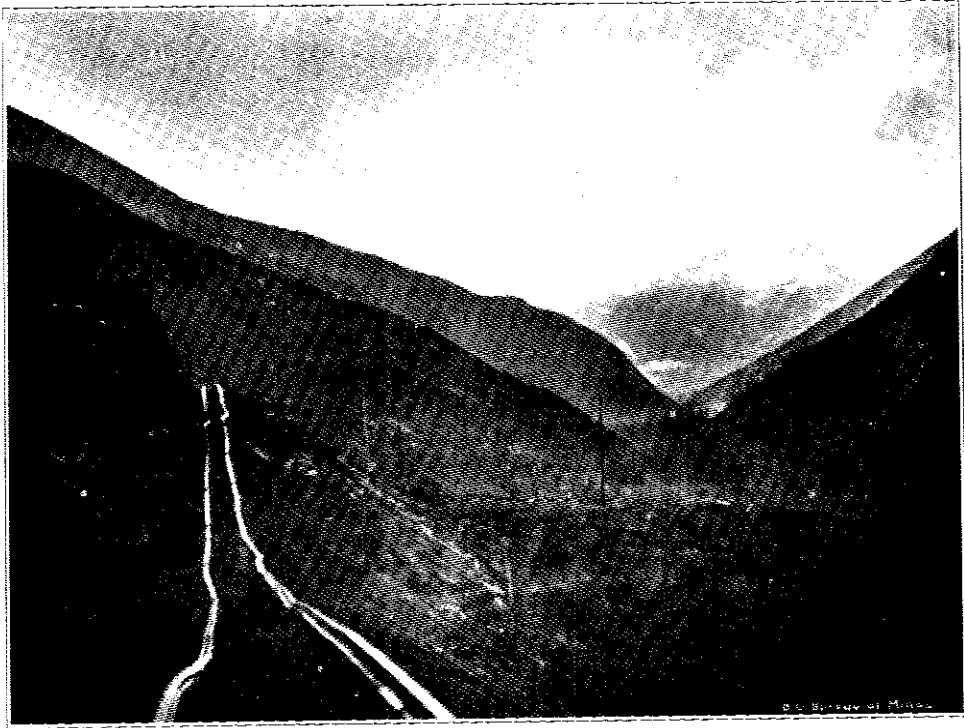
The best way of justifying the impressions just expressed is by giving, in some detail, descriptions of the properties visited, and these follow:—

The *Whitewater Deeps* property has recently been amalgamated with *Whitewater* and the old *Whitewater* mine, which formerly was one of the most regular *Whitewater Deeps*. producers of silver-lead ore. These two mines are on the same vein, and now constitute one mine, the workings connecting. The town of *Whitewater*, about four miles down *Kaslo* creek from *Bear lake*, and so in the *Ainsworth Mining Division*, together with all the plant of the mines, including the concentrating-mill, was completely wiped out by the forest fires of 1910, the fire at the same time destroying the *Kaslo & Slocan Railway*, upon which the mine was dependent for transportation to *Kaslo*. Without these the mine cannot be worked and is not now a producing mine, but prospecting-work is being carried on through an adit tunnel driven in from a convenient height above the old *Kaslo & Slocan Railway* grade. The success met with in this tunnel has been sufficiently encouraging to deserve notice, not only for itself, but as casting some light upon the question as to whether, in the Slocan, ore continued to a depth.

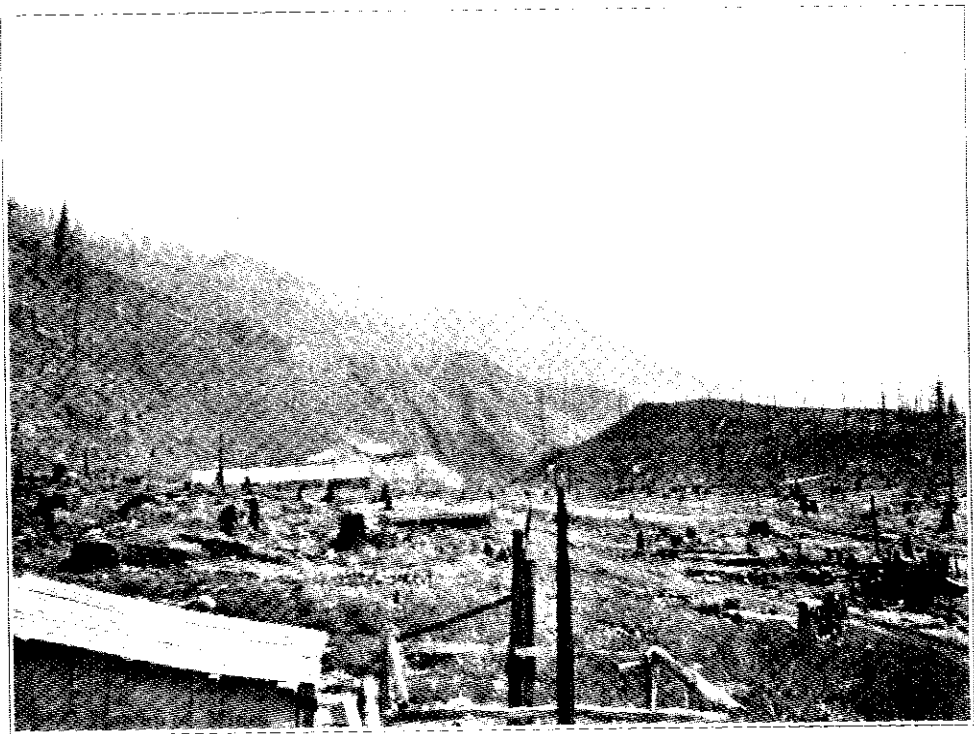
The *Whitewater* mine was opened up by a series of adit levels, numbered from 1 to 8, extending from the outcrop to a level about 540 feet lower, the lowest level—No. 8—being on the level of the mill-bins. The vein has a strike about S. 80° E., with a dip of 40 degrees; the vein-filling of crushed quartz and brecciated slate is, in places, well mineralized for a considerable width, in some places being as wide as 16 feet, while in others the mineralization is a comparatively narrow streak.

The *Deeps* were opened up through two adit tunnels, Nos. 9 and 10, just below the old workings of the *Whitewater*, but, about 1904, a long crosscut tunnel was started from near the railway-grade at *Whitewater* to strike the continuation of the ore-shoot at a depth some 250 feet lower than it had been found in the old workings up the hill.

This tunnel had been driven some 1,800 feet when the vein was struck, where a raise was made to connect with the No. 10 level. This raise has been completed, and is thoroughly equipped with three compartments—a ladder-way, a skip-way, and an ore-chute; the raise is straight and on a uniform angle, and is on the vein all the way, the vein proving here to be remarkably regular as to dip.



Carpenter Creek—from Lucky Jim Mine.



Site of Whitewater Town—destroyed by fire.

From the raise, levels have been broken off and the upper levels extended for several hundred feet. The ore-shoot has been found to extend down practically to the lower tunnel-level, and carries ore of essentially the same grade as was found in the upper levels.

As the mine has been without either a mill or a railway connection since June, 1910, ore could not be mined, and the quantity of ore on levels tributary to this raise is not as yet shown.

The known ore-shoot has been almost completely worked out on the *Whitewater* ground, and although it is possible another shoot may be encountered by the continuation of these levels, they have, for the time being, been abandoned.

As near as can be determined, the total number of tons of ore mined from the combined properties up to date amounts to 89,552 tons, and the shipments, consisting of clean ore and concentrates, amounts to 17,606 tons of lead-concentrates, which contained 1,699,860 oz. of silver and 13,539,174 lb. of lead, together with a small quantity of gold. In addition to the lead-concentrates, there has been produced about 10,173 tons of zinc-concentrates, carrying from 38 to 48 per cent. zinc, averaging on total shipments 43.3 per cent. zinc.

From these figures the average recovered assay value of the ore would be about 19 oz. of silver to the ton, 7.55 per cent. lead, and 5 per cent. zinc; this latter is, however, rather lower than the truth, since the recovery of the zinc was not attempted until the mine had been in operation for some time.

The combined properties are at present held under a bond by a local syndicate, of which J. L. Retallack, of Kaslo, is a member, and also the manager; the work at the mine is under the charge of J. Street, as foreman.

A few houses at the upper workings escaped the fire of 1910—this was all of the old plant left—and the present equipment is only temporary, consisting of a rough shed at the tunnel-mouth, in which is a blacksmith-shop and an 8-drill compressor driven by a 4-foot Pelton water-wheel under a head of 500 feet, the water being brought in by an 8-inch iron pipe.

The following notes as to the amount of work done during the past year have been kindly supplied by Mr. Retallack:—

"*Deep Mine, Limited.*—Work was resumed in the main raise at this mine on the 20th January, 1911, the period between the fire and that date having been consumed in necessary repairs. This main raise was completed by 18th July. From July to September, at which latter date work was resumed, the mine was closed pending certain business arrangements. The following is a description of the work accomplished since 1st January, 1911: Completing main raise, 437 feet; four stations cut, each 12 x 8 x 7 feet; from No. 10 station a drift driven west on the vein, 229 feet; from No. 11 station east on the vein, 264 feet; from No. 12 station west on the vein, 400 feet; from No. 13 station east on the vein, 88 feet; from No. 13 west on the vein, 210 feet; from these stations and drifts, 576 feet of crosscuts.

"The work was undertaken on the assumption that a flat fissure, carrying some zinc and a little lead, encountered first in the long crosscut from the surface, was the main *Whitewater* vein at that horizon. This long crosscut, by the way, is 1,500 feet vertically and 2,000 feet on the slope below the outcrop.

"Consequent on said assumption, No. 13, 150 feet on the slope above the crosscut, and No. 12, about 100 feet above No. 13, were first driven in this small flat fissure, and it was not until quite lately that, by crosscutting and by these drifts leading us into the main vein, we realized that said small fissure is probably only a spur of the main vein, which, at Nos. 13 and 12 levels, was found to be standing practically vertical, with a width of over 50 feet.

Consequently, we have not been able to accomplish much to this date in the true vein at these elevations. What has been accomplished discloses the fact that the vein as aforesaid is nearly vertical and 50 to 60 feet wide. Our work has been mostly at, or near, the hanging-wall, where we have encountered a streak of zinc, sometimes massive, but more generally mixed with spathic iron, of which there is a great abundance in the entire vein-filling. A small streak of galena, 2 to 3 inches, seems to carry along on the hanging-wall side of this zinc. At the moment of writing, this zinc-showing has tightened down in the face of No. 12, but remains strong in the face of No. 13. It was at one place 7 feet thick, of clean blende.

"As to Nos. 10 and 11, the former is a prolongation of the old adit level, and the latter is about 120 feet below. Work in these levels disclosed nothing but the fact that the fissure was as strong and regular as ever. A little galena-blende and spathic iron were mixed with the vein-filling.

"The mine will be closed at the end of this month, and remain so, pending resumption of transportation. We are now snowed in up there.

"Old *Whitewater* mine, being the outcrop of the *Deep*, was bought last October by a partnership consisting of J. W. Stewart, of Foley, Welch & Stewart; Clive Pringle, of Ottawa; and the writer (operating as J. L. Retallack & Co.); since which we have employed about a dozen men. One hundred tons of high-grade selected ore has been shipped to Trail, and we are carrying on through the winter with about eighteen men. The outlook for ore is very favourable. At one point, about 900 feet from the surface longitudinally and 600 feet vertically from the outcrop, we have a very fine showing of high-grade ore, which looks as if it might be the bottom of another important ore-shoot. In surface tunnel No. 9 we are raising into a piece of virgin ground, where also we expect a considerable tonnage. Below No. 9 we have started a new short surface tunnel, to catch the bottom of the ore-shoot we are working on in No. 9. Taking it altogether, conditions at *Whitewater* are very healthy.

"*The Washington Mine, Limited*.—The shares of this company are practically all owned by the same partnership. During 1911 we had a few men at work on development, up to August. The total amount of development carried out in the past two or three years is approximately 3,000 feet. We have developed up there about 40,000 tons of concentrating ore, carrying, say, 5 to 6 per cent. lead, 20 to 25 per cent. zinc, 2 oz. of silver to the unit of lead, and 0.25 oz. to the unit of zinc. We are waiting to avail ourselves of this ore until transportation is established, also milling facilities."

The *Lucky Jim* mine is situated in the Slocan Mining Division, at Lucky Jim. the very head of the Middle fork of Carpenter creek, nearly at the divide between this creek and Bear lake, the headwaters of Kaslo creek. The property is now held and operated by the Lucky Jim Zinc Mines, Ltd., a company of which Weaver Loper is president, and A. J. Becker is in charge of the mining operations.

The property has an interesting history. It was originally opened up about 1894 as a silver-lead mine, and was worked for some years, a considerable quantity of galena being extracted, which ran about 60 per cent. lead and 60 oz. of silver to the ton.

It was soon found that the quantity of galena was small as compared with the amount of zinc-blende present, and, as in those days there was no market for zinc-ore, while zinc mixed in with the lead-ore caused the smelters to charge a higher rate, as a "zinc penalty," the mine was shut down and remained closed until about 1904, when the property was taken over by the late George Hughes, who undertook to work the mine for the zinc-ore, the mine becoming a zinc-mine, the only mine in British Columbia in which zinc is the metal primarily sought.

Since 1904 the property has been regularly worked for zinc-blende, although a small quantity of galena has been produced.

In 1910 a disastrous forest fire not only destroyed all of the surface plant of the mine and the Kaslo & Slocan Railway, over which the ore was shipped, but also smothered several men in the mine-workings. This necessitated a completely new installation and a reopening of the mine.

In the original development of the property, whenever the galena was replaced by zinc-blende, further development was stopped on that level, as zinc was then valueless, with the result that the older workings to-day look like a "rabbit-warren," where the galena was gouged out, leaving the blende.

The general geological formation of the district is what has been described by the Geological Survey as the "Slocan series," and consists of "interbedded slates, quartzites, and sandstones intruded by certain phases of the Nelson granite."

In the immediate vicinity of the mine the country-rock is a dark slate, with which is interbedded a bed of limestone. These measures are tilted, dipping to the south at an angle of about 45 degrees and having a general east-and-west strike. This uptilted limestone is plainly visible, outcropping along the hillsides on both sides of the valley, and from its appearance it is locally known as the "lime-dyke."

The mineral deposits in the *Lucky Jim* mine occur in this lime-dyke, apparently as replacements of the lime. The dyke varies in width from 20 to 200 feet, and appears to be, in places, fissured across diagonally in a north-east and south-west direction, the fissures extending also for some distance into the slates. Along these fissures in the lime the ore-bodies of this property occur, varying in width from 10 to 35 feet. Their length is limited to the diagonal distance through the lime-dyke, which might be averaged at about 125 feet. The continuations of the fissures into the slates do not appear to carry mineral in quantity.

There are two of these cross-fissures, or ore-bodies, about 500 feet apart, developed by the present workings of the mill; both of these ore-bodies extend from the upper workings down to the No. 5 tunnel, a depth of between 300 and 400 feet, where both ore-bodies are of good size, the first 30 feet long and the second 90 feet; the ore is chiefly zinc-blende, averaging between 30 and 40 per cent. of zinc, which can be sorted up to about 50 per cent. with slight expense.

No. 6 tunnel is now in progress and has been driven about 950 feet, crosscutting the slates, and it was calculated that, in September, it would have to be driven some 150 feet farther before reaching the lime-dyke, after which a drift of 75 feet would have to be made along the lime before the continuation of the first ore-shoot might be expected.

This tunnel has been started about 450 feet vertical, or 600 feet on the pitch of the vein, below the No. 5 tunnel, and is some 30 feet above the old Kaslo & Slocan Railway grade, or about 100 feet above the level of the valley.

The following is Mr. Becker's statement of the development of the property:—

"The mine has been developed by eight adit tunnels. In the No. 4 (Geo. Hughes tunnel) a winze was sunk 108 feet on the dip of the vein; much of the zinc-ore shipped by Mr. Hughes was taken out of stopes opened from this winze. No. 5, which was started from a point 200 feet vertically below No. 4, reached the first ore-body at 360 feet from the portal of the adit. This ore-body is here 22 feet wide. At 425 feet farther on, the second ore-body was entered; this proved to be 91 feet in width. In the middle of it there occurs about 10 feet of ore badly mixed with iron, and then about 6 feet of silver-lead ore; after that the ore is all zinc. The total length of No. 5 is between 900 and 1,000 feet. An aerial tramway

was erected from the portal of No. 5 down to the Kaslo & Slocan Railway track, alongside which ore-bunkers were built, but both tramway and bunkers were destroyed by fire last year, just before they were fully completed. No. 6 adit was started at an elevation of 27 feet above the railway-track. It is now in about 925 feet. We expect to reach the first lime-dyke within 100 feet from the present face, and afterwards to have to drive through about 75 feet of lime to reach the ore."

Since the destruction of the Kaslo & Slocan Railway by fire in 1910, the property has been without railway connection, being about four miles from the Canadian Pacific Railway tracks at Three Forks, from which point there is a fair wagon-road, but a branch line from the Canadian Pacific Railway is now under construction and promises to be completed early in the new year.

Pending the arrival of this railway and the location of the tracks, the surface plant of the mine has not been rebuilt, with the exception of an office, a manager's house, a good cook-house, and sleeping-quarters for the men.

About ten men were employed at the mine, and as many more outside.

The present mining plant is only temporary and consists of a 3-drill air-compressor, driven by a Pelton wheel, the water for which is brought in by a wooden pipe-line under a 500-foot head. One power-drill was being used in the No. 6 tunnel. No productive mining will be attempted until railway connection is completed.

As a large amount of concentrating ore is found in connection with the clean ore, a concentrating plant is in contemplation, and this would have to be located at some point between the mine and Slocan lake, where water for power and concentrating would be available, as there is no such supply at the mine.

The *Rambler-Cariboo* group includes the *Rambler*, *Cariboo*, *Antelope*, *Rambler-Cariboo*. *Humphrey*, *Keno*, and *Best Fraction*, situated well up in McGuigan basin, at an altitude of 6,000 feet. McGuigan basin drains into the Middle fork of Carpenter creek, about three miles below the Bear Lake summit. The Kaslo & Slocan Railway grade from Kaslo to Sandon is on this hillside of the Middle fork, at an elevation of about 3,500 feet; this railway formerly supplied transportation to the mine, but since the railway was destroyed by fire in 1910, and has not yet been rebuilt, the only outlet for the mine has been by wagon-road down the Middle fork to the town of Three Forks, a station on the Canadian Pacific Railway.

The Canadian Pacific Railway is, however, this summer engaged in extending its tracks from Three Forks up to Bear lake, the grading being nearly completed this fall, and by next summer should be able to afford additional railway service to the mine.

The mine is now held by the Rambler-Cariboo Mines, Ltd., a company with an authorized capital of \$1,750,000, and the head office at Kaslo, B.C.; A. F. McClaine, of Spokane, is president, and W. E. Zwicky, of Kaslo, general manager.

This property has, under various ownerships, been one of the largest shippers in the district. The following is a rough estimate of the total shipments, including crude ore and concentrates, made by the mine to the end of 1910: Shipments since 1893 have been about 23,384 tons, containing 2,216,800 oz. of silver and 13,676,885 lb. of lead; these figures show the average realized assay of shipments to have been about 95 oz. of silver to the ton and 30 per cent. lead. In addition, the ore carries from 10 to 14 per cent. zinc.

The rock formation of the district is slate, through which a great boss of granite has been forced up, the whole being much cut by porphyry dykes. A well-defined quartz vein



Lucky Jim Mine—near Bear Lake—Slocan Mining Division.

cuts through both the slate and the granite, crossing the contact, and has been traced on the surface for a long distance, in a north-east-by-north direction, with a dip to the south, or into the hill.

The mine was originally opened up by three crosscut tunnels, connecting with levels about 100 feet apart. No. 3 is the main working tunnel, and has a crosscut 510 feet long to the vein, and drifts to the extent of over 1,200 feet; above this level all the ore, except a few small bunches, has been extracted some time ago. From this No. 3 level a shaft has been sunk for 500 feet, with levels Nos. 4, 5, 6, 7, and 8 at intervals of about 100 feet, and here the recent productive mining has been done. From the shaft, drifts have been driven at No. 4 level to the north for 63 feet and to the south for 350 feet (most of which ground has been stoped); at No. 7, to the north 231 feet and to the south 324 feet, of which 250 feet has been stoped; and at No. 8, to the north 94 feet and to the south 101 feet. From this shaft and levels some very good ore was obtained, and it is reported by the management that the ore-body is strong in the bottom of the shaft and is continuing with depth. The expense of hoisting from this shaft to a higher level, together with the cost of keeping it unwatered, added so much to the cost of mining that the company decided to abandon the workings temporarily, and to run a long crosscut tunnel in to the vein at the 1,400-foot level, putting up a raise in continuation of the shaft, thus reaching the known ore-body from below.

Mr. Zwicky said he felt sure he had sufficient ore in sight on levels 7 and 8 to liquidate any loan secured to complete the new work.

The portal of the new tunnel is located on Dardanelles creek, about half-way between McGuigan station and the old mine-workings, and near the wagon-road. The tunnel is $9\frac{1}{2}$ feet high by 7 feet wide ($7\frac{1}{2}$ by $7\frac{1}{2}$ in the clear) and about 4,500 feet long, cutting the vein over 1,400 feet deep, or 600 feet deeper than No. 8 tunnel.

The contract price at which the first 2,500 feet of this tunnel was driven was between \$10.50 and \$11.50 per lineal foot, the company supplying only the compressed air for drills, the contract price covering everything else; the remainder of the tunnel was driven by day-work.

The gross cost of the entire tunnel, including management and all expenses, was \$14.60 a lineal foot, and the rate of progress made was $7\frac{1}{4}$ feet a day of twenty-four hours.

This lower tunnel is about 4,500 feet from the portal into the intersection of the vein on the 1,400-foot level. The vein at this part of the 1,400-foot level was, for some reason, so tight that when the tunnel was driven through it, it was not recognized, and the tunnel was driven 90 feet past the point where the projection of the vein indicated it should be; consequently, it was determined to reach the vein at the nearest point under the old shaft, and a diagonal drift was made, from which a raise was started in the country-rock; when this raise had been put up for 200 feet, at the 1,200-foot level, a crosscut was made, and, after having been driven 47 feet, cut the vein, which was here found to be 8 feet wide, and showed several streaks of clean galena. From the 1,200-foot level upwards, raising was continued, but now on the vein, to the 800-foot level.

Subsequently, a second raise was put up from the 1,400-foot level, so as to connect and be in line with the raise from the 1,200-foot up to the 800-foot level. The ore-shoots above the 800-foot level have been nearly exhausted, and this raise and its levels constitute a new mine.

From the raise, various levels have been driven off on the vein: at the 1,400-foot level, for 390 feet to south and 140 feet to north; at the 1,200-foot level, for 600 feet to south and about 140 feet to north.

Levels were also started at the 1,050- and 900-foot levels, and have been driven some distance.

The ore-bodies in the old workings were chiefly to the north of the line of the raise; one ore-shoot on the 700-foot North level was 60 feet long in the level, and this same shoot was also cut by the 900-foot North level, but it has not, as yet, been found on the 1,050-foot North level, although some scattered ore was encountered.

The 1,200- and 1,400-foot North levels have not been driven far enough to find the ore-shoots which, it is thought, probably exist in that ground.

To the south of the raise a first ore-shoot extends from the 700-foot South level, down past the 900-foot level, but this shoot has not been reached by the 1,050-foot South level, although cut by the 1,200-foot level; the top of another shoot, or lens, appears on the 1,050-foot level and is cut by the 1,200-foot level, on which it extends on the level for some 60 feet, and carries ore, from 8 to 16 inches in width, of the usual grade.

A little farther in on these South levels the South ore-shoot extends from the 700-foot level downwards to the 1,200-foot level; at the 800-foot level it is 75 feet long; at the 900-foot, 160 feet long by about 5 feet wide; at the 1,050-foot level it is about 60 feet long by 7 feet thick; while, at the 1,200-foot level, the level, in September, had been run on the shoot for about 100 feet and the face was still in ore. (Later reports from Mr. Zwicky say that since then the tunnel has been driven for another 100 feet in ore, with ore still in the face, and that the clean ore was, in places, as wide as 7 feet.) At the time the mine was visited this face showed about 4 feet wide of clean ore and about 3 feet of milling ore.

This ore-face was one of the finest showings seen in the Slocan; the ore was unusually rich in silver, carrying much "grey copper."

Both the shoots on the 1,200-foot South are strong in the floor of the level and evidently continue downward, but they had not at that time been found on the 1,400-foot.

No attempt was made to estimate the tonnage of the ore already blocked out, but it is large, and more is being shown up each day as the development progresses.

The development-work in progress provides enough ore at present and no stoping is being done.

The success met with in these deeper developments more than fulfils Mr. Zwicky's anticipations, and justifies his judgment in driving the long tunnel at such a depth and the difficult upraise, an undertaking which, it must be admitted, was considered at the time to be at least risky, and calling for much pluck on behalf of the directorate of the company.

This successful attempt at deep mining, in addition to its effect on this individual company's prospects, has had a marked effect on the future of the Slocan in general, giving encouragement to other companies to develop to a greater depth; several other of these later attempts have also been successful, which has increased the confidence that deeper mining here has not only possibilities, but probabilities. The long tunnel has been driven absolutely straight, is equipped with a single track with appropriate turnouts at the inner end, over which a single horse has no difficulty in hauling a trip of four to six mine-cars, carrying each from $2\frac{1}{2}$ to $3\frac{1}{2}$ tons of material. The workmen are taken in and out through the tunnel on specially designed cars, propelled by hand-power.

The ore from the levels is sent in a chute down the raise to the 1,400-foot level, where suitable bins are provided, from which the ore is run into the tunnel-cars and transported to an ore-house of temporary construction, where it is roughly sorted and clean ore shipped by four-horse teams to Three Forks, a team being able to make one round trip a day.

It is understood that the erection of a concentrating-mill in the near future is contemplated; this would probably be erected in the valley of the Middle fork of Carpenter creek, and a connection with the mine made by aerial tramway, to which the topography of the hillside lends itself very readily; in the meantime the mine plant is very temporary.

In running the main *Rambler-Cariboo* tunnel, a vein was cut at 2,100 *Rambler-Cariboo* feet from the portal, in ground which did not belong to the *Rambler-Cariboo* company, although it was held by allied interests. The vein was apparently not known on the surface, although exhibiting considerable strength at the adit-tunnel level. The development of this vein from the main tunnel is about to be started under the same management as the *Rambler-Cariboo*, but as a separate company.

The Rio Mines, Ltd., is a subsidiary company to the *Rambler-Cariboo*, with a capital of \$25,000, and now holds the *Rio* mine, a property situated higher up in the same basin at an altitude of about 7,000 feet. Here the original owners had driven in an adit tunnel for about 200 feet, cutting, near the surface, a shoot of "dry ore," not sufficiently rich to be shipped from that location at a profit; farther in, a shoot of galena, about 6 inches wide and continuing for 20 feet in the level, was cut.

Since the property has been acquired by the present holders a lot of 15 tons of ore was shipped from this upper tunnel, which netted \$3,500.

To prove these showings with depth, Mr. Zwicky started a crosscut tunnel from a side-gulch at 180 feet lower elevation, and after running for about 500 feet struck the vein.

A drift was run on the vein for 250 feet, when the first ore-shoot from the upper tunnel was struck; this proved to be about 50 feet long and to contain a much higher percentage of galena. After passing through this ore-shoot, the tunnel passed through 180 feet of barren ground, and, according to recent advices, had just reached the second ore-shoot, which, however, has not yet been developed on this level.

Should the development continue satisfactory, the property will be opened up from the No. 3 level of the *Rambler-Cariboo* by a crosscut tunnel of no great length, which would give a depth of about 1,000 feet below the upper workings.

The *Surprise* mine is located in Surprise basin, and lies to the north of, and on the north side of, the ridge from the *Noble Five* group. This property was formerly one of the early producers of high-grade ore during the years 1894-95-96, and was then, as it is now, under the management of Alexander Smith, now of New Denver.

The old workings opened on to Surprise basin, which is without transportation facilities, and these workings were carried down as far as possible with good ore still in lowest levels. It was decided that, to prospect the vein at a greater depth, it would be advisable to do so from the Carpenter Creek (Sandon) side of the hill.

The *Surprise* management was able to purchase an old tunnel belonging to the *Last Chance* company, which had served its usefulness to that company, and approached the *Surprise* ground at a level about 800 feet lower than the old *Surprise* workings.

The *Last Chance* tunnel was continued for some 1,100 feet and into *Surprise* ground, when a raise was started up with the intention of connecting with a winze in the old workings. This raise has already been driven upwards for 660 feet, but towards its upper end it was deflected off its course along a fissure which was encountered there.

It was considered advisable to straighten out this deflection, so, from the point in the raise where the deflection started, the raise was continued in a straight line, and from here up to the bottom of the winze is calculated to be about 244 feet. Of this distance some 60 feet had been driven in September, and the work was progressing at the rate of about $1\frac{1}{2}$ feet a day; the raise, when completed, will be about 800 feet long on the vein, or 775 feet vertical.

This work has been in progress for some years and is being done without power—by hand-drilling—and has consequently progressed very slowly.

Owing to the length of the tunnel and of the raise, with the consequent poor air, it has been found impracticable to work more than one shift of men, so the force underground consists of two miners and two carmen.

The management reports that, at various points in the raise, levels have been broken away, and that, in these, good and profitable ore has been encountered, which, however, it has been impossible to even prospect until after the raise is through, on account of the limited air-supply.

The zinc-concentrating mill at Roseberry was erected a few years ago by the *Monitor* and *Ajax* owners, primarily for the treatment of the ores from those mines, but also with the expectation of doing business as a concentrator. Customs concentrating plant in handling the lead-zinc ores of the Slocan District. The plant was designed and erected by Mr. Fernau, who at that time was associated with an attempt to devise some method of utilizing the zinc values of these ores, a problem which has not, as yet, been satisfactorily solved. The plant was started, but did very little work, the *Monitor* and *Ajax* mines having closed down, and later having had their entire plants wiped out by fire, while the Customs work expected did not materialize. The site of the plant is at Roseberry, at the northern end of Slocan lake, adjacent to the tracks of the Canadian Pacific Railway branch line from Nakusp to Sandon, and on the shore of the lake. The site chosen is almost level, there being only an elevation sufficient to allow of the railway-siding going over the top of the receiving-bins, which are on the ground.

The mill building is beautifully built, and the machinery good of its kind, but the design of the mill is such as to entail an undue amount of handling and elevating of material.

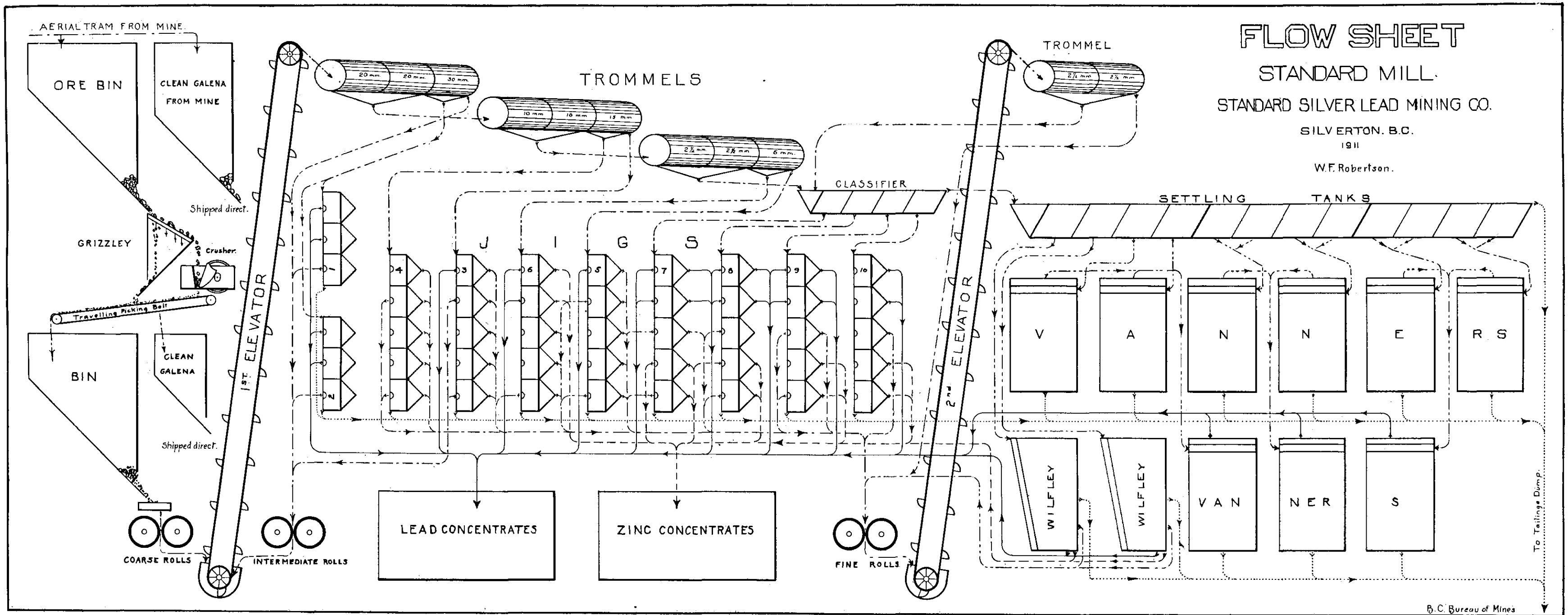
The plan of handling the ore was as follows: The ore was received by train on the Canadian Pacific Railway and dropped into the receiving-bins, of which there is a row 250 feet long, the bins and track being covered by a well-constructed building. The ore from the receiving-bins was discharged by chute-gates into 2-ton cars standing on a track outdoors; these cars were shoved by hand into the mill building, and there hoisted on a platform elevator to the upper floor of the mill and run off to the Blake jaw-crusher.

The crusher discharged on to a travelling picking—or sorting—belt 20 feet long by 2 feet wide, which, in turn, discharged into a Gates fine crusher, the discharge from the Gates crusher passing into the boot of a bucket elevator, by which the ore was again raised to the upper story of the mill. The falling ore passed through a Snyder sampler into a bin, the sample going to a Gates sample-crusher.

From this ore-bin the ore was fed by an automatic feeder to a pair of Hadfield rolls, which discharged into the boot of a second bucket elevator, by which it was again elevated to the top of the mill.

This second elevator discharged into a series of four trommels with 12-, 8-, 4-, and 2-mm. screens respectively, the undersize of each passing to the next of the series, and from the 2-mm. on to a Culver classifier, which, in turn, discharged into a settler 40 feet long. The overflow from the settler goes to the tailings-dump and the settlings to the tables, of which there are two Wilfleys and six Luhrig vanners of a type selected by Mr. Fernau; it is said that there were formerly eighteen of these vanners.

The oversizes of the 12-, 8-, and 4-mm. trommels each pass on to a four-compartment jig; the oversize from the 2-mm. trommel and from the three compartments of the Culver classifier



FLOW SHEET
STANDARD MILL.
STANDARD SILVER LEAD MINING CO.
SILVERTON, B.C.
1911
W.F. Robertson.

each pass on to a five-compartment jig. The middlings of all the jigs are sent to the bucket elevator and returned to the rolls and trommels. The products of the jigs and tables pass to a three-compartment bucket elevator and are hoisted and deposited in bins.

The power for the mill is provided by water-wheels, a 5-foot Pelton driving the rough crushing plant and another the remainder of the plant.

The object of the plant was to make a separation of galena, zinc-blende, and iron-pyrites, making a zinc-blende product that would be sufficiently high grade to be marketable.

The *Standard* mine has, within the last year, shown one of the most *Alpha*, *Standard*, successful developments with depth of any property in the Slocan, and now and *Emily Edith*. has more ore developed—practically ore in sight—than at any time in its history. The *Standard* vein cuts through three properties, the *Alpha*, *Standard*, and *Emily Edith*, each of which has already made a record as a large shipper of silver-lead ore. These properties are situated in the Slocan Mining Division, on the slope of the mountain on the east side of Slocan lake, and on the north side of Four-mile creek, which flows into the lake at the town of Silverton.

The vein-fissure cuts through the Slocan slates in a general east-and-west direction, and has been developed by various adit tunnels from the upper workings of the *Alpha*, the highest of the three properties, at an elevation of 2,834 feet above Slocan lake, down to the lowest workings of the *Emily Edith*, at an elevation of about 720 feet above the lake.

The general slope of the hillside along the line of the fissure is from 20 to 30 degrees, and, as the ore-shoots dip into the hill, the adit tunnels driven become quite long when any depth is attempted.

The fissure in the upper workings of the *Alpha* is somewhat irregular and broken, but as it goes down the hill it becomes more clearly defined. In this fissure there are shoots of ore between which the fissure is almost barren.

On the *Alpha* the ore-shoot was discovered practically on the surface, dipping into the hill, and before the property was shut down in 1894, owing to litigation, some 1,200 tons of high-grade silver-lead ore were shipped, chiefly from a large body of galena and lead-carbonates found near the surface.

This property has lain idle since 1894; it was held for some years by the late N. F. McNaught, and is now owned by his estate.

The development consists of five adit tunnels driven in on the vein; the upper tunnels contained good ore, but Nos. 4 and 5, the two lowest tunnels, did not reach the ore-shoot, although the vein there is clearly defined.

It would seem that these two tunnels had not been driven far enough in to expect to strike the ore-shoot seen in the upper levels, and that allowance had not been made for the dip of the ore-shoot into the hill and the low slope of the hillside.

A scheme was in progress last fall not only to extend these lower levels, but also to prospect the ground at a greater depth by using one of the *Standard* tunnels, permission to do so having been granted by that company.

Standard Mine.—The *Standard* mine is owned by George H. Aylard, of New Denver, and John A. Finch, of Spokane, Wash., and is situated as has been described. The property consists of three Crown-granted claims, the *Shuniewaw*, *Standard*, and *Surprise*, and the same partners have also acquired the adjoining property of the *Emily Edith* company.

The *Standard* mine has been opened up by a series of adit tunnels, the highest at an elevation of 1,987 feet above the lake, or 300 feet lower than the lowest tunnel of the *Alpha*, while No. 6 tunnel is at an elevation of 1,414 feet above the lake, thus developing between these levels a vertical depth of 573 feet, while it is considerably more on the slope of the vein.

No. 1 tunnel appears to have been above the ore-shoot, and was driven in some 85 feet without striking anything very encouraging.

No. 2 tunnel, some 77 feet vertical lower down, was driven in about 250 feet, and passed through a shoot of ore about 150 feet long, which extended upwards to the No. 1 tunnel.

No. 3 tunnel is 81 feet lower than No. 2, and has been driven in 415 feet, passing through the same ore-body as seen in No. 2.

No. 4 tunnel, 100 feet lower, has been driven 900 feet, and has also passed through the same ore-body, which here extended along the level 300 feet.

No. 5 tunnel is 125 feet lower than No. 4, and after having been driven 1,300 feet struck the ore-body, which continued for about 300 feet, having a maximum width of over 40 feet, of which 20 feet was clean galena and 20 feet ore, which would concentrate, approximately, three into one.

No. 6 tunnel had, in September last, been driven in about 1,800 feet, the face showing strong mineralization, with zinc-blende and a little galena, but not enough to constitute ore.

About 200 feet back from the face, a small fissure, carrying a little galena, had been followed off to the left by a drift; this drift in following the ore had assumed the shape of a letter S, and contained a very nice stringer of ore, galena, and blende—quite sufficient, in September, to be workable.

Later advices from the mine indicate that this drift, as it was extended, opened up a very considerable body of galena-ore, and that the drift had become parallel to the main tunnel, but some feet to the left.

Whether this particular ore-body is the downward continuation of the ore-body developed on No. 5 is not yet determined; it appears to be rather too far out, and then, again, it may be the top of an ore-shoot from below which did not extend up to the No. 5 level; work being done will, however, soon solve the question.

The showing of ore on No. 5 level is one of the largest exposures of high-grade galena ever seen in British Columbia, and is practically intact up to No. 4 level, constituting a block of "ore in sight" above No. 5 level, which on a rough calculation figures out to a net value in the neighbourhood of \$1,000,000.

The ore-shoot is at its strongest on the No. 5, and so, undoubtedly, continues for some distance below; whether the ore found in the No. 6, some 200 feet lower, is the same ore-body has not been proved, but it probably is, in which case over \$2,000,000 more of ore will be available.

The ore shipped in former years gave smelter returns which averaged about 60 per cent. of lead and 80 oz. of silver to the ton, and there is no doubt this continuation of the ore-body will run about the same.

Concentrator.—The owners of the property were, last fall, completing the erection of a concentrating-mill, which has since been finished and is now running. This mill is situated on the townsite of Silverton, adjacent to the lake-shore, and is connected with the No. 6 tunnel of the mine by a self-acting aerial tramway, 7,900 feet long.

At both the upper and lower terminals this tramway is provided with separate bins for clean and concentrating ores, so that each can be sent down separately, permitting of the clean ore being shipped from the mill without further treatment, while the concentrating ore will go through the mill process.

The advisability of this procedure is evident, as the higher values in silver are usually contained in grey copper, "freibergite," or some high sulphide which, from its nature, crushes to a fine powder, causing great losses in slimes, so that a large proportion of the values would be lost in water concentration. By shipping the cleaner ores direct this loss is obviated, although at the expense of a somewhat increased freight and treatment charge.

The water for power and washing purposes is taken out of Four-mile creek (sometimes called Silverton creek), about two miles up from the lake; the intake is formed by a short tunnel driven through a projecting shoulder of rock in a canyon forming a natural dam, which cannot be swept away by the freshets to which the creek is liable every spring.

From the tunnel intake the water is conveyed by ditch and flume for about half a mile, passing on the way, by tunnels, through two gravel and clay sliding banks, in which the water is confined in tight flumes.

At a point just below the wagon-road up to the *Emily Edith* mine, the water from the ditch enters a 20-inch iron pipe, and is conveyed down to the creek-level, where, beside the wagon-road, an air-compressor plant has been installed. This plant consists of a 10-drill air-compressor of the Canadian Rand type, driven by a 5-foot Pelton wheel, working under a head of 160 feet, the whole being housed in a well-constructed, permanent building.

The waste water from the compressor plant Pelton is caught up by a second ditch-line, this time on the north bank of the creek, and is conveyed by flume along the hillside to a point directly above the concentrator plant, down to which the water is conveyed by a 16- to 12-inch iron penstock, about 1,200 feet in length.

At the compressor plant a by-pass is arranged so that, if for any reason the compressor Pelton is not in operation, the water can be passed, by opening a valve, from the compressor-penstock directly into the concentrator-flume.

Emily Edith.—The *Emily Edith* mine is an extension, down the hill, of the *Standard*, and, although formerly owned and operated by another company, has of recent years been acquired by the *Standard* company. The *Emily Edith* has not been worked since about 1904, and, as the shale country-rock weathers easily, the old workings to-day reveal nothing and cannot be examined.

The mine was originally opened up by some seven or eight adit tunnels, mostly driven in on the vein from the outcrop, although some were primarily crosscuts to the vein. The highest of these tunnels is at an elevation of 1,128 feet above the lake, approximately 286 feet vertical lower than the present lowest (No. 6) tunnel on the *Standard*. The lowest tunnel on the *Emily Edith* is at an elevation of 720 feet above the lake; therefore the vein has been explored in this property for a vertical height of 408 feet.

As far as can be gathered from the old mine-plans, the tunnels have been driven in, respectively, starting with the highest, 140 feet, 250 feet, 300 feet, 370 feet, 410 feet (partly crosscut), 350 feet, and 220 feet. It would, therefore, seem as if such development as had been done was exceedingly superficial when it is considered that the two lower tunnels in the adjoining *Standard* had to been driven 1,200 feet and 1,800 feet before reaching the ore-shoot which has made its success, and that there remains a considerable section of the vein absolutely virgin and unprospected.

The mine formerly produced a considerable tonnage of galena-ore running well into silver, but associated with a high percentage of zinc-blende.

It is expected that the *Standard* company, the present owners, will push the development of the *Emily Edith* as soon as the *Standard* No. 6 tunnel is producing.

The property is thoroughly equipped with good office, laboratory, bunk and cook houses, from which a wagon-road leads down to the main wagon-road up Four-mile creek.

The accompanying flow-sheet of the *Standard* concentrator, as originally started, has been made from a sketch kindly furnished by the management after the mill was completed.

The Van-Roi Mining Company, a subsidiary company of the Le Roi Van-Roi Mining No. 2, of Rossland, is the successor of the Vancouver Mining Company in the operation of the old *Vancouver* group of mines. The general manager of the company is Ernest Levy, of Rossland, who is also the manager of the *Le Roi* No. 2 of that place. The local manager is Douglas Lay, of Silverton, with T. J. Lloyd as mine superintendent and G. A. Gordon in charge of the concentrating plant.

The property held by the company includes several Crown-granted mineral claims, the *Humboldt*, *Vancouver*, *Zilor*, *Mountain-Boomer*, etc., situated on the south side of Four-mile creek, on a shoulder of the hill between Granite creek on the east and Vancouver creek on the west, some four miles from Silverton, and at an altitude of between 3,900 and 4,500 feet.

The country-rock here, classed as the Slocan slates, consists of a lime-slate formation, and is here cut by at least two well-defined veins, roughly parallel and about 75 to 100 feet apart, having a strike of about N. 70° E. and a dip to the north of about 70 degrees.

These veins, known respectively as the Main, or North, vein, and the Beryl, or South, vein, are quartz-filled fissures, crossing the slates, varying from 4 feet to 10 feet in width, and often containing much brecciated slate. In these veins there are more or less clearly defined ore-shoots or lenses, while between these the vein-matter is not sufficiently mineralized to be of value.

The ore consists primarily of galena and zinc-blende, with high-grade silver minerals and sometimes metallic silver and ruby-silver, which occur in such a manner that they may often be sorted out by hand from the concentrating ore that forms the great bulk of the tonnage.

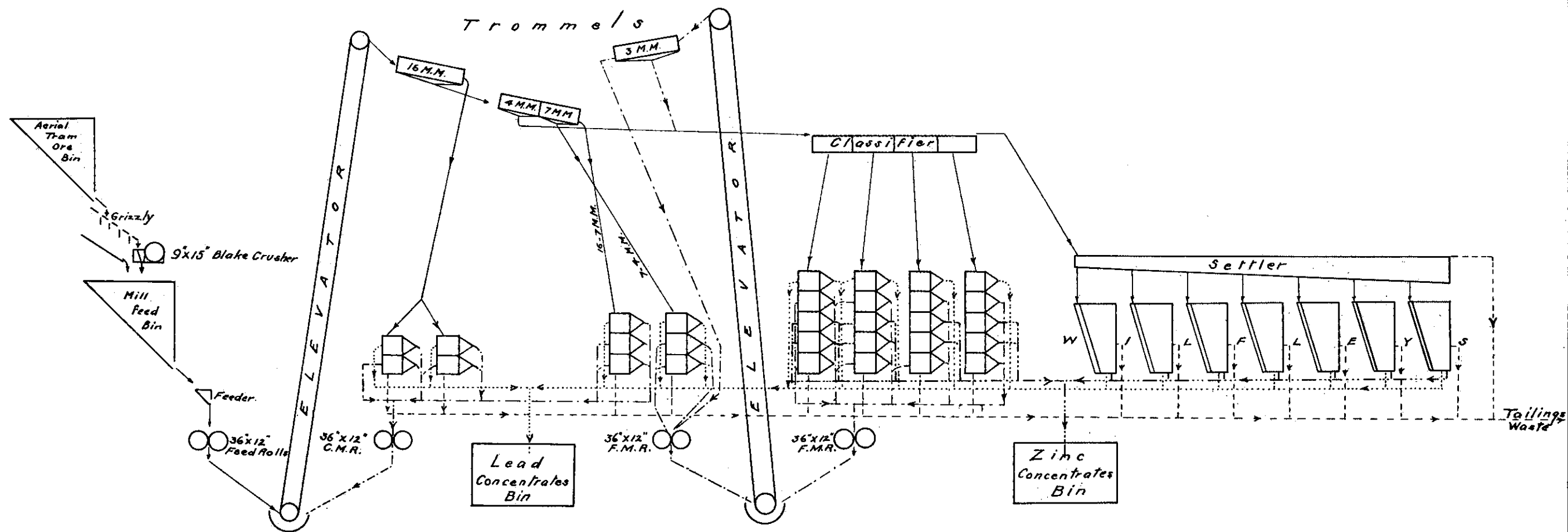
The approximate assay of the concentrating ore as sent to the mill is 4 per cent. of lead, 9.1 per cent. of zinc, and about 11.2 oz. of silver to the ton, while the ore from the eastern portion of the mine, the direction the development is trending, will run up to 15 oz. of silver to the ton.

The present output of the mine is, approximately, 35,000 tons of ore a year, in the production of which 105 men appear on the mine pay-roll, including surface men, and sixteen are employed in and about the mill.

The development of the property has been by adit tunnels run in on the vein; tunnels Nos. 1, 2, 3, and 4 have been driven in from the west side of the hill from the Vancouver Creek slope, while No. 5 tunnel, now the main working tunnel, has been driven in from the east side of the hill from Granite creek.

The property was originally opened up by the *Vancouver* company by an adit tunnel from Vancouver creek, of which No. 2 cut a very considerable ore-shoot, or lens of ore, passing through which this tunnel was continued for some distance without finding another ore-shoot.

No. 3 tunnel was driven in along the vein until it had passed completely under the ore-body seen in No. 2 level, showing that the ore-lens did not extend downward to No. 3, nor did it quite reach up to No. 1. No. 3 tunnel was pushed some distance farther by the old



FLOW SHEET VAN-ROI MILL

LEGEND

- Feed —————
- Middlings - - - - -
- Lead Concentrates
- Zinc Concentrates
- Tailings - - - - -

company without finding another ore-body, and in the meantime the No. 2 ore-body had become practically exhausted.

At this point the old company suspended operations, and the property came, eventually, into the hands of the present company, which continued the No. 3 tunnel eastward into the hill, and after driving less than 100 feet struck a new, and previously unknown, ore-shoot, which continued along the level for a distance of about 240 feet.

This body of ore has now been pretty well stoped out and has been proved to extend upwards nearly to the No. 2 level, 128 feet above, and downwards to the No. 4 level, some 224 feet lower, where it is 200 feet long. This ore-body proved to be, in places, as wide as 20 feet, and it is reported to have yielded over 100,000 tons of ore; a short distance to the east, about 50 feet, from this large ore-body, a second ore-shoot has been encountered on the No. 3 level, which is about 80 feet long, rising to a height of 40 feet above the level, and how far below has not been demonstrated. Continuing to the east from the end of this second ore-body, after an interval of 60 feet of barren ground, a third ore-shoot has been cut, and in this the level has been run for a distance of 54 feet; in September, the face of the tunnel was still in ore, and how much farther the ore will continue remains to be proved. The level at this point is about 650 feet deep and lacks about 600 feet of being through to daylight on the east side of the hill.

No. 4 tunnel, driven in from the west side of the hill, is from 1,800 to 2,000 feet long; at 400 feet in from the portal a large ore-shoot was encountered, which had a length of 300 feet on this level. This ore-body is now being stoped and is shown to extend above the level for a height of from 40 to 50 feet, while it continues below the level to No. 5, some 100 feet lower, but has there tapered down to small dimensions; this ore-body below No. 4 is being stoped from No. 5; continuing to the east the level cut the big ore-shoot from No. 3 level, and this is now being stoped. The ore-body continues below the level, how far has not been determined; the indications are, however, that it does not extend very deep, and it certainly does not appear in No. 5.

To the east of the main ore-shoot a smaller ore-body was also cut by No. 4, and is now being stoped; this extends above the level for a height of from 40 to 50 feet; it is also in the floor of the drift, but has not, as yet, been proved in depth, unless, as seems quite possible, it is the top of a somewhat similar ore-body cut in No. 5 and which continues below that level.

No. 5 tunnel, at present the lowest working tunnel, has been driven in from the eastern side of the hill, from the Granite Creek slope, and has been run in for about 2,000 feet; it had to be driven for 1,500 feet before it came under the point where the main ore-shoot was found in the upper levels, which was, however, not found in this No. 5 level.

In this long distance no ore-body was encountered, although two small, but very rich, shoots were found, one nearly 75 feet long with 18 inches of very high-grade ore, while at the inner or western end of the level there are three other small ore-bodies, and all these ore-bodies continue below the tunnel-level.

The Beryl vein is reached by crosscut tunnels from the main vein, the two veins being worked together, the ore going out by the main No. 5 tunnel to the upper terminal of the aerial tramway, by which it is conveyed to the concentrating-mill located in the valley of Four-mile creek. The Beryl vein has been developed on three levels—namely, No. 3, on which drifting has been done for about 220 feet; the No. 4, with 400 feet of drifting; and the No. 5, with 200 feet of drifting.

There appears to be, to the east, a large section of the hill that is still virgin ground and quite unexplored, through which the vein cuts with much regularity.

The present development shows the veins to be quite continuous, and the ore occurs in lenses of variable size, continuing below the lowest levels, a vertical depth of approximately 600 feet in these workings.

The *Mountain-Boomer* workings, on the Granite Creek slope, on a claim owned by the company, are at a lower elevation, and, although not now worked, will come in when the greater depth is attained on the Main vein.

The following is a description of the tramway and concentrating-mill, and is accompanied by a flow-sheet of the mill kindly prepared by Mr. Lay:—

Aerial Tramway.—The aerial tramway from the *Van-Roi* mine down to the concentrating-mill is 2,100 feet in length; the difference in altitude of the upper and lower terminals respectively is 980 feet. The ore is hauled in trains from the No. 5 level to grizzlies over the upper-terminal ore-bins, where as much waste as is practicable is roughly sorted out and the ore then passed to the terminal bins, which have a capacity of approximately 400 tons. It is conveyed thence to the mill in buckets, of which there are twelve on the tramway with a capacity about 850 lb. each.

Concentrating-mill.—From the lower-terminal bins, the capacity of which is 75 tons, the ore passes by gravity to a grizzly having $1\frac{1}{2}$ -inch spaces between its bars. The undersize goes direct to the mill feed-bin, and the oversize to a 9- x 15-inch Blake crusher, whence it passes to the mill feed-bin, capable of holding 75 tons. An automatic feeder feeds the ore to a pair of 36- x 12-inch rolls, from which it is elevated to the trommels by an ordinary belt and bucket elevator. The trommel system consists of four trommels, respectively 16, 7, 4, and 3 mm. The original mill-feed never reaches the last mentioned, which is a middlings-trommel only. The screen feed coarser than 4 mm. passes to eight Hartz jigs—namely, two 2-, two 3-, and four 5-compartment jigs. The feed passing 4 mm. goes to a hydraulic classifier prior to being jigged. The oversize from the 16-mm. trommel goes direct to the two-compartment jigs, the object being there to get rid of all the foreign matter such as wood chips, iron, etc. Three sets of 36- x 12-inch rolls regrind the middling products of the various jigs. The overflow from the classifier passes to a settler, whence the feed is drawn off to seven Wilfley tables; the overflow from the settler goes to waste. Two products are made on both jigs and tables—namely, lead-concentrate averaging about 66 per cent. of lead, and zinc-concentrate containing about 45 per cent. of zinc.

On the lowest floor of the mill are placed four concentrate-bins—two each for lead and zinc. These bins are in duplicate, so that concentrate can be delivered to one bin while the product is being sacked from the other. All the bins are of similar dimensions; each will hold about 100 tons of lead-concentrate or 60 tons of zinc. The overflow from the concentrate-bins passes to tanks where the slimes are settled, there being, of course, separate tanks for the lead and zinc slimes respectively.

The mill machinery is operated by power derived from Pelton water-wheels, of which there are three in the building. A 24-inch Pelton, developing 75 horse-power, operates all the machinery excepting the crusher and Wilfley tables, which are independently driven—the crusher by a 15-inch Pelton, developing a maximum of 25 horse-power, and the Wilfleys by a 12-inch Pelton, developing a maximum of 15 horse-power. The waste water from the wheels is used in the mill as wash-water.

The mill plant is housed in a wooden building, having a trussed roof, shingled. This building is substantially constructed, all truss members being 10- x 10-inch timbers. The lowest, or concentrate-bin, floor is 66 x 38 feet; the second, or rolls and tables, floor is 78 x 66 feet; the third, or jig, floor is 46 x 40 feet. In the unfloored space above the last mentioned are the elevator head, trommel system, classifier, etc.

The buildings are lighted by incandescent electric lights, current being obtained from a 140-light dynamo driven by a 12-inch Pelton, the lighting plant being placed in the compressor building.

Fire Protection.—Provision for fire protection is as complete as it is practicable to make it. Running along the top of the gables, over the roof of the mill building, are launders 24 inches wide by 6 inches deep, which launders can in a few seconds be filled with water from pipes, and the water overflowing would envelop the building in a sheet of water, thus affording most effective protection against forest fires. Further fire protection is provided on each floor of the mill by 50 feet of 2½-inch standard hose coupled up ready for instant use, while outside the mill, 50 feet from the nearest corner, are two hydrants, to one of which is coupled 200 feet and to the other 150 feet of similar hose. The head of water available is 600 feet, giving a pressure equal to 260 lb. per square inch.

Compressor Plant and Water-power.—Close to the concentrating-mill is situated the compressor building and plant; this was put in two or three years ago, during which period it has supplied compressed air for power uses in the mine. The compressor is cross-compound, furnishing 708 cubic feet of free air a minute; it is operated by a 6-foot Pelton, developing 130 horse-power.

Water for the generation of power is obtained from Granite creek, a tributary of Four-mile, the mill and compressor buildings having been erected near the junction of these creeks. A 24- x 24-inch wood flume conveys water 3,900 feet to a 6- x 6-foot penstock built of lumber, whence the water is piped to the mill and compressor plants. The pipe through which the water flows to the Pelton wheels is constructed of lap-riveted steel. The main line is 1,500 feet in length—200 feet of 16-inch, 700 feet of 14-inch, 300 feet of 10-inch, and 300 feet of 6-inch diameter pipe. There are, as well, the requisite branches to mill and compressor buildings. Granite creek gives an abundant supply of water all the year round, without the risk of occasional interruption from freshets and floods when melting snow or heavy rains at times would cause the larger stream to give much trouble and do damage to a connected water-supply system.

The Hewitt Mining Co. was incorporated in 1907 under the laws of the State of Delaware, with a capital of \$800,000, and is registered in British Columbia as an extra-provincial company. The company was formed to acquire and operate the *Hewitt* and *Lorna Doone* groups, consisting of 400 acres of Crown-granted mineral claims, situated to the south of Four-mile creek at an altitude of from 4,000 to 5,000 feet, and distant three miles and a half from Silverton, on Slocan lake. The operations of the mine are under the direction of George Stillwell, who for many years has vigorously carried on the development of the properties, and to whom and to Montague S. Davys is to be credited the amalgamation of the properties and the organization of the present company, the Silverton Mines, Ltd., a small company formed in England to develop the property which it holds under lease and option. The property was originally opened up from the west side of the hill, where four adit tunnels were run in, and from the mouth of No. 3 tunnel a short aerial tram delivered the ore to bins on a flat to the east of Silverton, to which town it was hauled by wagon.

In later years, however, the tunnels followed the veins through to the east side of the hill, on to the slope of Vancouver creek, a creek flowing into Four-mile creek, and now three of the tunnels pierce the hill—i.e., No. 2, 1,250 feet long; No. 3, 1,750 feet long; and No. 6, 3,154 feet long.

The camp also has been moved to the eastern side of the hill, and from the mouth of No. 7 tunnel an aerial tramway, one mile long, leads to the old *Wakefield* mill on Four-mile

creek; the mill has been leased by the present company, and some concentration tests have been carried out there during the past year.

The following is taken from Philip Argall's description of the property in the Report of the Zinc Commission:—

"There are two east and west veins and two cross-veins, one of which, however, the M vein, is merely a connecting branch between the two principal vein systems. The east and west veins occur chiefly in the Slocan slates, and are most productive in and adjacent to a granitic intrusion which has shattered the slates, opening wide and extensive fissures. The cross-veins occur chiefly in the intrusive granite. The ores are siliceous, though containing a small percentage of lead in the granite-area, and often considerable galena in the shattered slates away from the granite. Quartz is everywhere the predominant mineral, carrying grey copper, ruby-silver, galena, and zinc-blende. The high grades of silver-ore are relatively more abundant in the upper workings, while on the lower levels zinc-blende is the more abundant ore.

"*The Mine.*—Perhaps the more prominent and important feature in the mine is the fact that the granite-area is the most productive of high-grade ores, from which it is a fair inference that the granitic intrusion was, at least, one of the determining causes of the deposition of pay-ore. For example, all the drifts from No. 1 to No. 5 extend for some distance in a poor and even barren vein in the slates, but where granite forms one or both walls of the vein, pay-ore is invariably present; in some cases, however, pay-ore occurs in the vicinity of the granite-area, while the vein is yet in slate."

The veins are: Main vein (No. 2), North vein (No. 1), South vein (No. 3), and Main South vein (No. 4). The North and Main veins connect at about the middle of the mountain, and form one vein in No. 3 tunnel, in what is known as the L stope, going down as one vein; the eastern portion is all one vein in Nos. 2 and 3 tunnels.

Size of veins: The veins will average from 7 to 8 feet in width, but range up to 22 feet wide (mostly ore) at the widest place, which is in No. 4 level, where the two veins are running side by side; in No. 5, a blind-level, the ore is 12 feet wide. The strike of the veins is about N. 65° E., with a dip of 80 degrees to the north.

The Main and North veins are 35 feet apart, running pretty regular, as shown by the connecting crosscuts.

The ore is distinctly a "dry ore," consisting of a quartz gangue carrying galena, zinc-blende, and siderite, with considerable quantities of grey copper and ruby-silver. As these high-grade silver minerals would be largely lost in a concentrating-mill, as much of the ore as practicable is sorted out by hand and shipped direct. In the lower levels the percentage of siderite present seems to be getting less and the percentage of lead slightly greater.

Shipments.—From June, 1900, to December, 1902, the ore shipments from the property amounted to 2,752 tons, which assayed 77.1 oz. silver, 4.8 per cent. lead, and 11.6 per cent. zinc. This ore realized at the smelter \$69,870 net.

In 1904 the property was leased to M. S. Davys, who in 1904 and 1905 shipped about 800 tons of ore, averaging about 150 oz. in silver to the ton, 6.5 per cent. lead, and about 12 per cent. zinc.

In 1906 about 119 tons of ore were shipped, containing 15,675 oz. silver and 10,768 lb. lead.

In 1907 the shipments were 657 tons, containing 88,036 oz. silver; in 1908, 408 tons, carrying 44,511 oz. silver and 65,737 lb. lead.



Van-Roi Mine—from the Hewitt Mine.



Members of Western Branch of Canadian Mining Inst. at Standard Mine.

There is no record of any shipments in 1909. In 1910 there were shipped 127 tons of ore, carrying 15,127 oz. silver and 9,219 lb. lead.

In 1911 the concentrating plant was in use, and the ore shipments amounted to 5,326 tons of ore—both rich and concentrating—carrying 68,500 oz. silver and 190,000 lb. lead, with 258,000 lb. of zinc saved in concentrates. The zinc-concentrates run high in silver—between 70 and 90 oz. to the ton.

The year's operations included the following work :—

Extending No. 6, working from the east side, 382 feet, making connection with a drive from the west side ; total length of No. 6 through the mountain, 3,154 feet. Raising between Nos. 6 and 5 and between Nos. 5 and 4, each raise 110 feet vertical. Driving intermediate level from raise (on hanging-wall side of vein) between Nos. 7 and 6. Raising from No. 7 to No. 6 on foot-wall side of vein, which is here 58 feet wide. No. 7 (working from east side) was extended 472 feet, making it approximately 900 feet to the face ; also driving a crosscut and two parallel drifts, each 30 feet on this level. Did stoping on No. 4 and up to No. 2 level, but had to stop, as the bins at the mine and mill were full of ore. In November there were more than 1,000 tons of clean milling-ore, from which both the high-grade ore and the waste had been picked out.

The year's output of rich ore shipped to the smelter was from 375 to 400 tons, averaging about 140 oz. in silver, 10.6 per cent. lead, and 13 per cent. zinc. No new ore was developed during the year above No. 6, but the ore previously developed has been blocked out.

No. 7 Level.—As far as No. 7 has been driven, it has passed through three ore-shoots and touched the crown of an ore-shoot not found in the back of the level above. No. 7 entered ore at about 460 feet from the portal, and remained in ore for 148 feet—mostly high-grade shipping ore, running about 135 oz. in silver. No stoping has been done on No. 7 nor on No. 6.

As to the probable continuation of the ore to a greater depth, the *Van-Roi* mine is working and getting good ore on what is almost certainly a continuation of one of the *Hewitt* veins, at a point just across the creek valley and 450 feet lower than the lowest workings of the *Hewitt* mine.

Mill.—The milling operations were more of an experimental nature—although about 4,000 tons were treated, to see what could be done with the ore before erecting a mill, as the old *Wakefield* mine is not up to date and is out of repair. The operations consisted of the ordinary water concentration, with the treatment of zinc-middlings by the Elmore process. The mill made three products—lead-concentrates, zinc-concentrates, and zinc-middlings—these latter going to the Elmore process.

SLOCAN CITY MINING DIVISION.

REPORT OF HOWARD PARKER, MINING RECORDER.

I have the honour to submit my report for the Slocan City Mining Division for the year ending December 31st, 1911.

The improvement in mining matters shown in the previous year has been maintained ; more development-work has been done, although the quantity of ore shipped was not so great as the previous year.

The *Eastmont*, situated at Ten-mile creek, employed from fifteen to twenty men the year round, chiefly at development-work, besides shipping over 200 tons of high-grade silver-lead ore, yielding about 175 oz. silver per ton.

The *Enterprise*, situated near the *Eastmont*, has shipped 77 tons, and has employed ten men the greater part of the year.

The lessees of the *Meteor*, on Springer creek, have obtained a further lease on the property; some 40 tons of ore was shipped, which yielded about \$250 per ton.

The following mines made small shipments during the year: *Ottawa*, *Neepawa*, *Arlington*, and *Hampton*, which latter mine yielded 632 oz. silver per ton.

The *Lily B*, operated by the Hobson Mining Company, has fifteen men employed erecting buildings and installing mining machinery.

Two or three men are working at the *Black Prince*, running a 500-foot drift to tap the ore shown on the surface.

OFFICE STATISTICS—SLOCAN CITY MINING DIVISION.

| | |
|---|-------|
| Free miners' certificates (ordinary) | 97 |
| " " (company) | 3 |
| Certificates of work recorded | 138 |
| Locations recorded | 50 |
| Conveyances recorded | 16 |
| Certificates of improvements recorded | 2 |
| Cash paid in lieu of work | \$500 |

TROUT LAKE MINING DIVISION.

REPORT OF F. MUMMERY, MINING RECORDER.

I have the honour to submit herewith my report of the progress of the mining industry in the Trout Lake Division for the year 1911.

The past year has been one of unusual stagnation and dullness in this Division, and both the output and the number of men employed much below the average of former years; this unfortunate condition is chiefly due to the fact that the *Silver Cup* mine, which has hitherto steadily employed a large force, in January reduced the force to about fifteen men, with consequent large diminution of output. However, the prospects of renewed activity on this and other properties for the year 1912 are very good. On Great Northern mountain transfers of considerable magnitude are now pending; the season's development on the *Winslow* has also been of a very satisfactory nature; new discoveries of ore have been made on the *Canadian Boy* and *Chance* mineral claims, and more properties are now being taken in hand by leasers on a royalty basis.

Shipments of ore totalled 459 tons for the year; development, incline
Silver Cup. shaft, 100 feet; drifting, 50 feet; output and development being limited to *Sunshine* mineral claim. The main shaft and workings were flooded in June, caused by the breaking-down of one of the pumps, the remaining pump being unable to keep the flow under control. Unwatering has been proceeded with for some time, and the workings are expected to be free by the 20th January, when work in that portion of the mine will be resumed.

This group consists of the *Winslow*, *Glad Hand*, and other claims, and
Winslow. is owned by White, O'Donnell & Bennett. During the year a crosscut tunnel was driven 300 feet, intersecting the vein 100 feet vertically below No. 2 tunnel. The vein was broken into about 3 feet, when further work for the season was suspended owing to a heavy fall of snow occurring sooner than was anticipated; the vein, as far as explored, carrying the same character of ore and was as heavily mineralized as in the

upper tunnels. It is the intention of the owners to have the work resumed in the spring, and I am informed by Mr. White that he hopes to have a suitable reduction plant and other equipment in course of erection during the present year.

On the *High Grade* claim of this group, J. W. Livingstone has done a considerable amount of work during the year, and recently shipped $3\frac{1}{2}$ tons of ore, from which high returns are expected, the ore being almost solid grey copper, assaying very high in silver. Two tunnels, of about 25 feet each in length, were driven and some crosscutting done, with ore exposed varying in width from 2 to 6 inches. Mr. Livingstone, who is the principal owner, has laid in supplies and intends to continue work all winter.

This claim, owned by Craig & Hillman, is now being worked under lease by three men, who started work in December; although they had a lot of work of a preparatory nature to do before any underground work could be started, they report having already about 10 tons out towards a car-load they hope to be able to ship shortly.

This property is situated in Horsefly basin, about four miles from Gerrard, the group consisting of ten claims and fractions. Lamphere & Rady secured a lease from the owners and started work in October. Camp buildings had to be erected, about a mile of new trail built, and other preparations for the winter completed before the lessees were able to do much towards opening up the mine. I wrote the lessees, asking for information for the purpose of this report, but have received no reply. However, I learn from other sources that a shipment of 33 tons of silver-lead ore was shipped about the 20th ult.; this is expected to give returns of from \$75 to \$80 a ton. Shipments, it is expected, will continue, large quantities of ore being in sight. Six men are employed.

This group of two claims, comprising the *Chance* and *Chance Fr.* mineral claims, is situated at the head of Brown creek, and is owned by Cameron & Morgan. Development has been confined principally to the *Chance Fr.*, and consists of a crosscut tunnel of 60 feet and 140 feet driven on the vein, the last 25 feet of which, driven this summer, is in ore, showing, at face of drift, 10 inches of ore on the hanging-wall, 3 inches on foot-wall, with several small stringers in the gangue. This claim is a south-easterly extension of the *Triune*, and the ore is of a similar character and values to that formerly shipped from that mine. Several tons are now on the dump, and will be shipped by the owners as soon as a trail can be completed to the property next summer.

This claim, owned by Alex. McLean, is also situated near the head of Brown creek. Two tunnels have been driven; the upper one, of 30 feet, is driven on the vein, and shows ore from 10 to 14 inches in width for its entire length, averaging about 90 oz. silver to the ton. The lower tunnel is now in 50 feet, and is designed to cut the vein at a distance of 150 feet, and at a vertical depth of 125 feet below the upper one. Three other veins, carrying values, are known to exist on this claim, but no work has been done on them so far. Fourteen tons of ore were shipped from this claim some six years ago, which gave returns of \$83 a ton.

This group, comprising the *Pady*, *Parrsboro*, and *Canadian Boy* mineral claims, owned by Kirkpatrick, Daney, and others, is situated at Seven-mile, on the South fork of Lardeau creek. Considerable work has been done on the *Canadian Boy* claim this season; a body of ore was uncovered, a shaft was sunk on same 40 feet, when the heavy flow of water necessitated a change in the plan of

development, and a tunnel was started to tap the ore-body and shaft; this has now been driven about 175 feet, of which 130 feet is on the vein, and, although not yet under the shaft, they have a very good showing of ore for some distance back from the face.

This group is situated on Five-mile creek, about six miles from Trout lake, and consists of three claims, the *Silver Bell*, *O.K.*, and *Cracker Jack*.

On the *O.K.*, besides numerous open-cuts, 150 feet of tunnel has been driven, the ore exposed varying from 3 to 8 inches, of galena, with a wide streak of quartz that in places carries considerable quantities of grey copper with high silver-contents. Work on the *Silver Bell* and *Cracker Jack* consists only of open-cuts, and the ore uncovered is of a concentrating character.

On this group, owned by a Philadelphia company, work was resumed after some years of idleness, eight men being employed for some time; later the force was cut down to four men and a foreman for the winter. Some ore is being taken out in development and by sorting over the dumps, and a shipment will be made in a short time.

OFFICE STATISTICS—TROUT LAKE MINING DIVISION.

| | |
|---|-----|
| Free miners' certificates (ordinary) | 79 |
| " " (company) | 3 |
| Mineral claims recorded | 42 |
| Certificates of work issued | 165 |
| Bills of sale, agreements, etc., recorded | 25 |
| Certificates of improvements recorded ...* | 11 |

NELSON DISTRICT.

NELSON MINING DIVISION.

REPORT OF W. F. TEETZEL, GOLD COMMISSIONER.

I have the honour to submit the annual report on the Nelson Mining Division for the year ending December 31st, 1911.

GENERAL REMARKS.

The year 1911 did not come quite up to expectations in ore production owing principally to two reasons; the stoppage of shipments by the *Yankee Girl* mine at Ymir while the property was changing hands being one of the causes, and the other that no shipments of any consequence were made by the copper properties of the district.

The resumption of shipments by the *Yankee Girl*, the increased tonnage from the *Molly Gibson*, the operation of the new *Mother Lode* mill by that company, the possibility of some shipments from the *Dundee* toward the end of the year, and the probability of shipments being started from the *Hudson Bay* group on Sheep creek, all tend to promise a large ore production for the coming year.

Six stamp-mills have been in operation during the year; the *Queen* and the *Granite-Poorman* continuously, and the *Nugget*, *Athabasca*, *Wilcox*, and *Second Relief* intermittently. Of these latter, the *Nugget* 4-stamp mill will probably not be operated again, the development-work now having reached such a point that a larger and more efficient mill is warranted. The *Athabasca* is troubled with a shortage of water, and will probably put in electric power to be able to operate continuously during the coming year. The *Wilcox* is undergoing a period of vigorous development, and as soon as this is completed the mill will probably be operated full force. The same may be said of the *Second Relief*.

Toward the end of the year, A. Gordon French completed his experimental work in his electrolytic zinc-reduction plant, and the process is now being thoroughly investigated by Eastern capitalists with a view to purchase.*

NELSON CAMP.

A very large number of claims have been staked this year, principally due to the excitement caused by the reported finding of platinum by A. Gordon French in the ores of the *Granite-Poorman*. This company is now building a large plant to treat these ores. Later, A. Gordon French announced the discovery of a new metal of the Platinum group which he named Canadium, and which he claims exists in considerable quantities in some of the ores of this district.†

Toad Mountain.

Silver King.—From the *Silver King* mine a shipment of 13 tons to England and one of 4 tons to San Francisco were made for testing purposes, the object of the company being to obtain, if possible, a suitable method of concentration for their lower-grade ores. It is expected that development-work will be started this coming year to tap the ore-bodies at greater depth.

* See description of this process by Provincial Mineralogist, page 162.

† See notes by Provincial Mineralogist, page 165.

Athabasca.—At the *Athabasca*, development-work was continued steadily during the year until December, when the water-supply became insufficient to run the air-compressor. The mill was operated intermittently, the object being to mill only enough ore to pay for development-work; 750 tons were put through the mill before the shut-down. It is the intention of the owners to put in electric power in the spring, so that henceforth operations may be carried on steadily and efficiently.

California.—The *California* was operated steadily by the leasers, Hudson and Bell, 33 tons being shipped to the Trail smelter and some to the Granby smelter at Grand Forks.

Perrier.—At the *Perrier*, on Cottonwood creek, the shaft was sunk a short distance during the year. It is expected that the Huntingdon 12-ton mill will be operated during the coming year, and enough ore taken out to pay for continued development.

Fern.—From the *Fern*, on Hall creek, a small shipment was made by leasers.

Eagle Creek.

Granite-Poorman.—The *Granite-Poorman*, on Eagle creek, operated its 20-stamp mill continuously. An addition to the mill, 36 x 70 feet, was built, in which is a plant for the treatment of iridium and palladium, stated by Mr. French to be contained in the ore, and which is just ready to be put in operation. A new sorting-house was built at the No. 4 *Poorman* tunnel to facilitate sorting the waste from the ore. The development-work during the year has greatly added to the reserves of the property. In the No. 4 *Poorman* tunnel a vein called the "Hardscrabble," that had been crossed when the tunnel was driven, was drifted on for 432 feet and a raise put up 90 feet. This opened up an ore-shoot for 300 feet, showing from 6 inches to 3 feet of ore, 8 feet being the width of the vein in the face at present, which is at a depth of 200 feet below the surface. As this is a parallel vein to the old *Poorman* vein, it adds greatly to the life and value of the property. There was also done during the year 197 feet of crosscutting in the *White*, 145 feet of drifting and 370 feet of raising in the *Greenhorn*, and 315 feet of drifting and 354 feet of raising in the No. 5 level of the *Poorman*.

Eureka.—At the *Eureka* copper-mine, situated above the *Poorman*, the tunnel-workings were connected by a raise with the drift from the 200-foot level of the old shaft; 250 feet of drifting was also done. This company has several shoots of ore opened up with from 250 to 300 feet depth, and very little ore has been shipped from them; the ore carries copper, silver, and gold, with an average smelter return from 2,200 tons shipped of 5 per cent. copper, 0.20 oz. of gold, and 2 oz. of silver per ton.

Pingree.—At the *Pingree* the tunnel was carried ahead another 100 feet during the year.

Royal Canadian and Nevada.—The syndicate developing the *Royal Canadian* took a lease and bond from J. P. Swedberg on the *Nevada*, from which one car of ore was shipped to the Trail smelter. They expect to develop the two properties and ship the ore taken out in development-work during the coming year.

Forty-nine Creek.

Gold Hill.—At the *Gold Hill* A. MacDonald did 100 feet of drifting during the year.

Bird Creek.

Ophir.—At the *Ophir* J. B. Baxter drove 125 feet and shipped a trial shipment of 5 tons of gold-ore to the Trail smelter.

King George V.—At the *King George V.*, owned by John Smallwood, the crosscut was completed and 30 feet of drifting done during the year. Some ore has been sacked, and more is being mined preparatory to making a trial shipment to the Trail smelter.

Kokanee Creek.

Molly Gibson.—On Kokanee creek the *Molly Gibson* has undergone a period of vigorous development and construction work. Owing to the shortage of water, a new air-compressor and power plant was installed to take the discharge-water from the mill and utilize it lower down. The mill had to close down in November, awaiting the completion of this work, as there was insufficient water to operate the mill and the air-compressor at the same time. Approximately 5,900 tons of ore were put through the mill and 1,226 tons of ore and concentrates shipped to the smelter. The average assay value of concentrates was 49.33 oz. silver and 16.97 per cent. lead. The development-work consisted of: drifting, 200 feet; cross-cutting, 450 feet; raising, 50 feet. On June 30th the annual statement of the Consolidated Mining and Smelting Company, who own and operate the property, showed ore reserves of 14,000 tons. The lower crosscut, 800 feet in length, which will tap the lead 250 feet below No. 5 level, will be finished this winter. Excavations have been made for the removal of the upper terminal of the tramway to the mill, to the crosscut-tunnel entrance.

Ymir Camp.

Yankee Girl.—The *Yankee Girl* mine at Ymir changed hands during the year, and shipments have not as yet been renewed.

Dundee.—On the *Dundee*, on Dundee mountain, development-work has continued steadily this year, with the exception of a shut-down in the latter end of November for repairs to the compressor. The tunnel has 900 feet to go to be under the shaft, when a raise 744 feet will be put up to connect with the upper workings.

Wilcox.—The *Wilcox*, on Wild Horse creek, changed owners during the year. Development-work is steadily being pushed ahead, working eleven men. An electric power plant with an air-compressor is being installed.

Foghorn.—At the *Foghorn*, adjoining the *Wilcox*, 330 feet was driven this summer. The ore was reached just as winter came on, and operations had to be discontinued on account of danger from snowslides.

Mint.—The operations of the *Mint* group, on Ymir mountain, finished the 60-foot tunnel on the *Jennie Bell*, as well as the 60-foot crosscut on the *Mint*, and did some open-cuttings during the year.

Nevada.—At the *Nevada*, on Porcupine creek, three-quarters of a mile from Porcupine Siding, D. E. Grobe is driving a 40-foot crosscut, and will drift on the lead as soon as it is reached.

Erie Camp.

Arlington.—The *Arlington* mine, owned by the Hasting (B.C.) Exploration Syndicate, Ltd., three miles from Erie, produced steadily during the year; 690 tons were shipped to the Granby smelter, but, owing to the shut-down of that plant on account of the coal strike, the company shipped 220 tons to the Trail smelter during the latter part of the year. The company has had from twenty-eight to thirty men continuously employed, with a fairly steady output, for the last ten years, of 75 tons a month of ore running about \$50 a ton in gold.

Canadian King.—Thirty-eight tons of ore were shipped to the Trail smelter from the *Canadian King*, adjoining the *Arlington*.

Second Relief.—At the *Second Relief* the mill was run intermittently, and 108 tons of ore and concentrates were shipped to the Trail smelter. Toward the end of the year development-work was continued in three faces, all of which have broken into ore; this development will be continued and sufficient ore taken out to pay expenses the coming year until enough ore has been opened up to supply the mill steadily.

SHEEP CREEK CAMP.

In the Sheep Creek camp the *Queen* 20-stamp mill has been operated continuously, and the *Nugget* 4-stamp mill till October. The *Mother Lode* mill is nearing completion, and will add greatly to the ore production the coming year. The *Queen* shaft has been sunk 200 feet this year and the ore-bodies proven for another 100 feet in depth. The shaft leaves the ore below No. 5 level, and it has not been crosscut as yet. By far the most important development of the season has been that carried on by the Consolidated Mining and Smelting Co. on the *Hudson Bay* group of silver-lead claims.

Yellowstone Mountain.

Queen.—The *Queen* mine milled 14,550 tons of ore and shipped 1,459 tons of concentrates to the Trail smelter during the year. The shaft was sunk 200 feet farther, and an intermediate level cut, on which 150 feet of drifting was done; some exceptionally rich ore was opened up on this level. The ore-body at the shaft was 26 feet wide, of which Mr. Buckley, the manager of the property, gave the following results of sampling: Four samples across 8 feet, average value, \$132; next 10 feet, a little over \$6; and the remainder, \$3. In the 3-dollar rock some very heavy sulphide ore was encountered. The exceptionally high values at 600 feet below the creek give evidence of a continued high grade of ore with depth. The average values recovered during the year were about \$12. The company is building a 6,000-foot flume to take the effluent water from the *Mother Lode* mill to replace the high-line flume which encroached on the *Mother Lode* water rights.

Vancouver.—The *Vancouver*, adjoining the *Queen*, has been under lease to Max Lomfrey, who shipped 83 tons to the Trail smelter during the year. Owing to his serious illness the property was not operated for a while during the year, but operations are again being carried on.

Kootenay Belle.—The *Kootenay Belle* drifted on the small lead and opened up the larger lead in two places from the lower crosscut. The small lead shows from 6 to 13 inches of pay-streak running from \$108, with, in places, 2½ feet of ore carrying from \$14 to \$27. The company shipped in March this year 31 tons of ore from this lead, which yielded 236.01 oz. of gold and 121.43 oz. of silver; a total gross value of \$4,784.55 and an average gross value a ton of \$153.71. The large lead farther in gave \$14 across 7 feet 8 inches, while 4 feet of it gave \$40. These are very promising returns, and no doubt when more work has been done on this property it will be one of the large gold-producers of the district.

Dominion Mountain and Fawn Creek.

Clyde-Belt.—The *Clyde-Belt* has been purchased by the Britannia Copper Co., who completed its title during the year. The crosscut has reached the ore, and the dyke which faulted it, drifted on, and the ore was found on the other side. Development-work is being continued steadily, five men being employed.

Golden Belle.—At the *Golden Belle* 320 feet of crosscutting and drifting was done during the year. The ore was caught 60 feet from the portal of the lower tunnel. It was stated to run at this point: 4½ feet, \$8; 8 inches, \$163; and 5 feet on the other side of the pay-streak, \$6.40. The face of the present drift will be continued 100 feet to catch an ore-shoot opened up in the upper tunnel, 250 feet above.

Mother Lode.—At the *Mother Lode*, adjoining the *Golden Belle*, a small force of men was put on toward the end of the year, building chutes and back-stopping, preparatory to mining ore on the completion of the new mill. An aerial tramway 3,600 feet long, with a drop of 1,900 feet, has been installed during the year. A complete and up-to-date stamp-mill,



Rambler-Cariboo Mine.



Sandon, B.C.

with a tube-mill and cyanide plant of the most modern type, was built at the valley-level. Seven miles of pipe-line, giving a 700-foot head, was put in to supply power for the mill and compressor. About 135 men have been employed at construction-work during the year. The heavy development-work, opening up a large tonnage of ore, and the building of such an up-to-date mill mark a new era for Sheep creek. No doubt during the operation of this company's mill next summer the gold output of the camp will be larger than ever before in its history, and another dividend-payer will shortly be added to the list of the Province.

Nugget.—At the *Nugget*, on the Fawn Creek side of Dominion mountain, 1,110 feet of drifting, 448 feet of raising, and 22 feet of crosscutting were done during the year. Approximately 3,500 tons of ore, with an average gross value of \$20 a ton, were put through the 4-stamp steam-mill, which was closed down in October. The company now has sufficient ore reserves opened up to warrant the building of a larger and more efficient mill, and will discontinue the use of the present mill, which has served its purpose of providing sufficient funds to develop the property. The concentrates made during the mill-run are now being rawhided down, preparatory to shipment to the Trail smelter.

Grey Copper.—On the opposite side of Fawn creek McColeman & Qua are working on a grey-copper showing this winter.

Skookum.—At the *Skookum* some seven or eight men were doing surface work for a short time this summer.

Davenport.—Surface work on a rather extensive scale was carried on for most of the summer on this property.

Silver Lead.—Across the creek from the *Skookum* is a new discovery of silver-lead carbonates, which is being stripped and opened out this winter. In the spring it will be further prospected by ground-sluicing, and a crosscut tunnel and drift will be run to get into the sulphide zone.

Devlin Lode.—Adjoining is the *Devlin Lode* group, on which some surface work was done this year.

Other Sheep Creek Properties.

Eureka.—At the *Eureka*, on Cariboo creek, a small force of men worked steadily, endeavouring to pick up underground some surface showings. Work will be carried on steadily this winter.

Summit.—The *Summit* property, on Vernon mountain, shipped 50 tons of high-grade ore to the Trail smelter during the summer. Operations were discontinued with the coming of winter.

Hudson Bay.—At the *Hudson Bay*, on Deer creek, which is under lease and bond to the Consolidated Mining and Smelting Co., a 350-foot crosscut tunnel is being driven and two shafts are being sunk on a lead-carbonate showing. The ore-shoot appears to be from 6 to 15 feet wide and from 700 to 800 feet long.

Emerald.—At the *Emerald*, on Iron mountain, owned by the Iron Mountain, Ltd., operations have been carried on steadily; 2,000 tons ore, averaging 38 per cent. lead, 2 oz. silver, and 7 per cent. zinc, have been shipped this year to the Trail smelter. The vein runs from 6 inches to 7 feet of solid shipping ore, and six men stoping, with two men on development, keep two 4-horse teams hauling ore to the railroad at Salmo, seven miles distant. In the fall and spring, when the roads are in bad condition, shipments have to be curtailed.

Silver Dollar.—The *Silver Dollar*, at Salmo, was bonded by the Consolidated Mining & Smelting Co. this summer. A shaft was sunk 50 feet and a car-load of ore taken out for shipment to the smelter. The ore is silver-lead, carrying considerable zinc.

BAYONNE CAMP.

In the Bayonne camp considerable work was done by prospectors during the year, and a number of new claims were staked on Cultus and Summit creeks. At the Bayonne mine some 45 feet of drifting was done during the year, making some 1,670 feet of development-work done on this property, which has large ore reserves opened up. When a wagon-road for this camp has been constructed, there will undoubtedly be an era of development, but the distance from adequate transportation brings the cost of supplies so high that, at present, work on a small scale only, is carried on.

LA FRANCE CREEK.

On La France creek, on the east side of Kootenay lake, the La France Creek Mining Co. worked steadily at development during the year running an intermediate drift. The ore was encountered in December in the face of this drift. It is now found that the lower drift will have to be driven from 100 to 150 feet farther to catch this ore-shoot, on account of the shoot in the lead. When this is done the company will have three 150-foot levels. Only one shift is worked on account of bad air, as no raises have been run as yet. There is stated to be from 6 inches to 3 feet of galena and grey copper, carrying high silver values. The mine is at an altitude of 8,200 feet, being above timber-line, and a distance of nine miles from Kootenay lake.

OFFICE STATISTICS—NELSON MINING DIVISION.

| | |
|---|-----|
| Free miners' certificates (ordinary) | 730 |
| " " (special) | 2 |
| " " (company) | 9 |
| Claims recorded | 607 |
| Placer claim recorded | 1 |
| Assessments recorded | 728 |
| Relocation recorded | 1 |
| Transfers and other documents of title recorded | 185 |

Revenue.

| | |
|---------------------------------|-------------|
| Mining receipts | \$6,460.65 |
| Free miners' certificates | 3,944.75 |
| | <hr/> |
| | \$10,405.40 |

NELSON MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

FRENCH'S PROCESS FOR SEPARATION OF ZINC AND LEAD.

For the past year or so, A. Gordon French has been conducting a series of experiments in Nelson, with the object of separating and saving the zinc occurring in the Slocan ores in conjunction with silver-lead and iron. He has equipped the old city electric-light station on Cottonwood creek as an experimental plant, where a series of experiments have been carried on which culminated in the development of a process which Mr. French claims has solved the problem commercially and produced an electrolytic zinc product of great purity.

Much publicity has been given to this process and to the claims of its success, and, since a commercially feasible process would be of great importance to the district, the matter was investigated by the writer, who, in September, visited Nelson, where he was shown over the plant by Mr. French and the process explained.

The following description of the process, written by the Provincial Mineralogist and afterwards examined by Mr. French, formed a report made in October last to the Honourable the Minister of Mines :—

“FRENCH’S ZINC PROCESS.

“Mr. French’s process aims at the extraction and recovery of the zinc contained in ores, such as the silver-lead-zinc ores of the Slocan, leaving as a residue the silver-lead, iron, and gangue-matter, which would be afterwards smelted in the same manner as a lead-ore free from zinc.

“The advantages claimed by such treatment would be :—

“(1.) The recovery of the zinc in a metallic and marketable form :

“(2.) By the removal of the zinc from the original ore—

“(a.) The residue would become a lead (sulphate) ore free from zinc, and as such would obtain a lower smelting-rate and avoid any ‘zinc penalty’ that would have been attached to the original ore :

“(b.) The residue, carrying all the lead and silver of the original ore, would be lesser in weight than such original ore, by the weight of zinc extracted. Consequently, it would contain a higher percentage of lead and silver and there would be a proportionately lessened tonnage to smelt :

“(3.) The silver actually occurring in the blende would remain in the residue and so be recovered by smelting, whereas it would be lost if the zinc-blende were to be separated from the lead-ore by any mechanical process.

“*Ore experimented upon.*—The ores experimented upon have been chiefly zinc-concentrates containing galena, zinc-blende, iron-pyrites, and iron-carbonate, together with the gangue-matter, quartz and shale, and, apparently, a percentage of manganese in some form.

“*Treatment.*—The ore is crushed to pass through a ten-mesh screen. It is then roasted in an ordinary calcining-furnace until the ore is nearly ‘dead,’ which reduces the original sulphides, theoretically, to oxides, although in practice there are probably sulphates and some sulphides left, depending in quantity upon the completeness of the roast.

“While the roasted ore is still in the calciner, at the hot end, a small percentage (about 5 per cent.) of ‘nitre-cake,’* in powdered form, is thrown in with the ore and thoroughly rabbled into the ore, making an intimate mixture. This mixture is thoroughly stirred (rabbled) under heat for a short time.

“The effect of this operation is that the oxides in the ore are almost all converted into sulphates, until the sulphuric acid supplied is used up. When this action is considered complete, the charge is removed from the furnace and allowed to cool. The reaction is quick, about fifteen minutes being sufficient.

“This roasted and treated ore, after having sufficiently cooled, is transferred to a wooden leaching-tank, and water, acidulated by a small quantity of nitre-cake or free sulphuric acid, is added. This dissolves out such oxides and sulphates of zinc and manganese as may have been formed, together with the sulphate of soda formed by the splitting-up of the nitre-cake. The sulphate of lead formed is not soluble and the silver can be rendered insoluble ; these remain in the tank, as does all gangue.

* NOTE BY W. F. R.—Nitre-cake is a bisulphate of soda with some free sulphuric acid in it (about 25 per cent.), and is a waste product of sulphuric-acid works.

"Mr. French claims that the sulphates of iron are not leached out until all the zinc is in solution, and, if the leaching is stopped before the zinc is all out, that the iron will be left undissolved. The solutions in the works did not carry much iron, which seems to confirm his statement.*

"The filtrate from the leaching-tank, containing the sulphates of zinc, manganese, and soda, are run into a wooden box in which are hung alternate sheets of zinc and lead, immersed in the filtrate or electrolyte. The zinc plates are connected to the positive pole and the lead sheets to the negative pole of a direct-current dynamo of low voltage.

"The action of the electric current is to plate the zinc sheet with metallic zinc, which accumulates in a dense hard mass over the entire side of the plate. When this deposit of zinc has attained the desired thickness, it is lifted out and a new zinc sheet put in its place. The electrically deposited zinc is afterwards easily stripped from the zinc sheet, the latter to be used again, and the former now ready for market after having been melted and run into bars.

"On the negative pole manganese is precipitated as a black oxide of manganese in a powder which is brushed off occasionally and collects in the bottom of the box. This black oxide of manganese has a commercial value.

"The filtrate from the leaching-tank flows into the electrolytic precipitating-box and out again, being pumped back to the leaching-tank, this flow keeping the solution at a normal strength in zinc-contents.†

"The plant that Mr. French has at Nelson is only an experimental one and is very crude, sufficient only to demonstrate the principle, and is capable of treating only a batch of from 500 to 1,000 lb. of ore at a time. The whole plant is home-made and the process cannot be thoroughly demonstrated in it.

"The plant consists of a small calcining-furnace, with a hearth about 20 feet long by about 5 feet wide, built of concrete with a brick arch, heated by cordwood used in an ordinary fire-box; working-doors on one side only. The calcining-hearth is inclined at an angle of about 10 degrees for the upper part of its length, but is level for the lower 5 feet. The ore is fed in at the upper end through the side door by shovel, and is rabbled by hand. There is one leaching-tank and a couple of wooden tanks for the storage of solutions."

Mr. French has patented at least a portion of the process, his Canadian Patent No. 136341 covering the process down to the getting of the zinc into solution in water slightly acidulated with sulphuric acid, and Mr. French has stated to the writer that he has applied for another patent covering the fractional electrolytic deposition of the zinc, but whether this has been issued is not known.

This Bureau has made no attempt to test the commercial value of the process, but has made some investigation as to the principles involved.

The electrolytic zinc produced in the experimental plant was assayed, and found to contain 99.5 per cent. zinc, 0.5 per cent. of copper, with 0.2 oz. silver to the ton, a highly satisfactory product.

In an investigation as to the effect of sulphuric acid on the oxides of lead and zinc present in the roasted ore, it was found that the acid had a selective action, and first

*NOTE BY MR. FRENCH.—In practice there is only a trace of iron in the solution, and the iron does not accumulate owing to the effluent from the electrolytic cells being returned to the leaching-vats, where any soluble iron is acted upon by the zinc-oxide and precipitated. If there was a large proportion of iron in the solution it would certainly go down in the electrolytic cells, but at the anode, as Fe_2O_3 , along with the MnO_2 , fouling the manganese, but not the zinc.

†NOTE BY MR. FRENCH.—I am applying for a "fencing" patent to cover the novelties in the electrolytic process, especially the recovery of the manganese as dioxide and the protection of the anodes from oxidation and consequent destruction. A copy of the specification of this will also be sent.

converted the lead-oxide into lead-sulphate before reacting on the zinc-oxide to any extent. This selective action was noted both in the roasted ore and also with definite quantities of the pure oxides, as will be seen from the following experiments.

An experiment was made to further demonstrate this point as follows: Pure oxide of lead (litharge) and oxide of zinc were mixed; to this was added dilute sulphuric acid, but not in sufficient quantity to sulphate all the lead-oxide present. With repeated stirrings, this was allowed to stand for twenty-four hours at a temperature of 40° C., when it was found—first, that there was no free acid remaining, and, second, that lead-sulphate had been formed but practically no zinc-sulphate, the zinc remaining as an oxide.

A further experiment was made as follows: Commercial zinc-sulphate was dissolved in water; to this solution lead-oxide (litharge) in excess of the acid was added and allowed to remain for twenty-four hours under similar conditions, when it was found that the zinc-sulphate had been converted into zinc-oxide and some of the lead-oxide into lead-sulphate.

It would seem from this that the amount of "nitre-cake" necessary to add must be sufficient to contain enough sulphuric acid, first, to sulphate all the oxide of lead present in the roasted ore, and, in addition to this, sufficient to afterwards sulphate the zinc-oxides present. Consequently, if a large percentage of lead were present in the ore, perhaps a prohibitively large amount of "nitre-cake" would be required.

REPORTED DISCOVERY OF PLATINUM.

While in Nelson, A. G. French made some investigation into the ores, etc., in the neighbourhood, and it was announced that he had discovered in certain dykes in the vicinity of Nelson—notably in dykes in the *Granite-Poorman* mine—that platinum and metals of the Platinum group existed in considerable quantities, and that he had evolved a process by which they could be economically extracted. This statement might have been allowed to go unchallenged but for the great publicity given to the matter and its effect upon the District of Nelson.

As noted by the Gold Commissioner of the District in his report annexed hereto, "A large number of claims have been staked this year, principally due to the excitement caused by the reported finding of platinum metals, by A. Gordon French, in the ores of the *Granite Poorman*. This company is now building a large plant to treat these ores; an addition to the mill 36 x 70 feet has been built, in which is a plant for the treatment of iridium and palladium ores."

It was recognized by the Department that, if there was a foundation of truth in the statement of discovery attributed by the press to Mr. French, it was of much importance to the Province; while, if there was no truth in it, great harm was being done to the Nelson District. Consequently, the Honourable the Minister of Mines decided that the matter be investigated.

As a preliminary, the Bureau offered to Mr. French its co-operation in making analyses to corroborate his discoveries, and asked for some of the identical samples in which the platinum minerals were reported to have been found. Mr. French accepted the offer with thanks, and undertook to send the samples at once; but none were received from him.

The Bureau then obtained samples from the portions of the dykes in the *Granite-Poorman* and *Devlin* properties, from which results in platinum were reported as having been obtained; these samples were taken for this purpose by an independent party.

These samples were each crushed and divided into identical packages, which were sent out as follows:—

First. A package of each to the S. S. White Dental Co.'s Assay and Metallurgical Division, Princes Bay, New York, who make a specialty of assaying for metals of the Platinum group.

Second. A pair of identical samples was sent to the Platinum Metals Company, of Brooklyn, New York, chemists and assayers, who also make a specialty of metals of the Platinum group.

Third. Identical samples were handed to H. Carmichael, Provincial Government Assayer.

The following is from the letters of instruction accompanying the samples, under date of November 18th, 1911:—

"I am mailing you to-day two samples, *No. 1 Poorman* and *No. 2 Devlin*, in which I wish you would very carefully determine the platinum and report to me by telegraph. This ore is expected to carry other metals of the Platinum group; I tell you this to put you on your guard, but it is the platinum I wish determined now."

The following replies were received:—

First. From the S. S. White Dental Co.'s superintendent, F. A. Johnston. Telegram of December 7th, 1911: "Assay of your samples shows—*Poorman*, gold one-tenth ounce per ton, no platinum metals; *Devlin*, gold one-sixth ounce per ton, no platinum metals. Letter follows."

The letter following shows that the samples had been assayed for platinum, silver, palladium, and osmiridium, but none of these metals could be found.

Second. The Platinum Metals Company replied by telegraph: "No platinum in either sample."

The letter following says: "I can say with confidence that the samples you sent contain no palladium, platinum, or other known platinum metals."

Third. Mr. Carmichael reports that he has assayed both the samples, and that none of the Platinum group of metals were present in either.

From these results it may be safely stated that these samples did not contain even traces of any of the Platinum group of metals.

Before making any public statement as to these results, it was decided to send out another lot of samples, the authenticity of which samples should be beyond question.

It was in the *Granite-Poorman* that Mr. French claimed to have found metals of the Platinum group in commercial quantities; as a result, the company had gone to the expense of erecting, under the personal direction of Mr. French, a plant for their recovery. Consequently, the following letter was sent to that company:—

"Kootenay Gold Mines, Ltd.,
Williams Siding, Nelson, B.C.

"GENTLEMEN,—I am instructed by the Honourable Mr. McBride, Minister of Mines, to obtain an authentic sample of the dyke or portion of the dyke in your property, the *Granite-Poorman*, in which it has been reported in the press that metals of the Platinum group have been found in appreciable quantities.

"I would like to get not less than 20 lb. of the sample, and better if it was greater, and I want the sample to be *absolutely authentic and vouched for* as being from the part of dyke referred to.

"Can you supply me with such sample? Or, if not, I would like to get your consent to my sending an engineer in to get it.

"I understand you made a test run of 50 tons of the dyke, and, presumably, you kept a careful sample of this feed; if you could let me have some of this sample, I would be pleased, as it is more representative.

"If you can send me this sample, I will have it assayed by the most competent chemists either in America or Europe, and would be glad to give you copies of their results.

"My reason for being so particular about the authenticity of the samples, as you can see, is that I do not wish to go to this expense for assaying on an indefinite sample.

"I am not anxious to have an average sample of the whole dyke, but of the portion of it supposed to be richest in Platinum group metals, with some statement as to the thickness and extent of the class of material sampled.

"Any expense in getting or shipping the sample would be met by the Government. I should be greatly obliged if you would favour me with a reply at your early convenience.

"I am, etc.,

"W. F. ROBERTSON,
Provincial Mineralogist."

The following replies were received from the company:—

"P.O., GRANITE SIDING, B.C., February 7th, 1912.

"W. Fleet Robertson, Esq.,
Provincial Mineralogist, Victoria, B.C.

"DEAR SIR,—In answer to your letter of the 3rd inst., requesting sample of dyke-matter reported to contain platinum metals, would state that we shall be pleased to send you a sample of the same, and will guarantee it to be authentic, as you have requested.

"We are also sending a sample of concentrates; these concentrates were recovered whilst running a sample of 50 tons.

"I hope that you will have the dyke-matter assayed for gold and all the platinum metals, and, as you have promised, by the best men obtainable.

"Yours truly,

"KOOTENAY GOLD MINES, LIMITED (NON-PERSONAL LIABILITY),
"THOS. GOUGH, *Manager.*"

"P.O., GRANITE SIDING, B.C., February 19th, 1912.

"W. F. Robertson, Esq.,
Victoria, B.C.

"DEAR SIR,—In answer to your letter of the 15th inst., would state that the large sample was taken across the face of the dyke proper, where it is about 5 feet wide, so you will understand that the dyke consists of the same matter as the sample.

"The sample of concentrates sent was taken from concentrates recovered from a run of 20 tons of dyke-matter (same as large sample) through the stamps and then over Wilfey tables.

"Thanking you for your interest in this matter, and waiting returns with interest,

"Yours truly,

"KOOTENAY GOLD MINES, LIMITED (NON-PERSONAL LIABILITY).
"E. E. GUILLE, *Secretary.*"

The samples thus received from the Kootenay Gold Mines, Ltd., the authenticity of which is vouched for by them as being from the dyke and from that part of the dyke reported to have given results in the platinum metals.

These samples were carefully quartered down to appropriate bulk and then ground in the Government Laboratory under the personal supervision of D. E. Whittaker, Assistant Assayer, after which the pulp was put up in identical packages by Mr. Whittaker in the presence of the writer.

Four pairs of samples—one of the straight dyke-matter and the other of the concentrates from the Wilfleys, as described in the company's letter—were sent for assay:—

First. To Ledoux & Company, chemists and assayers, New York, with the following letter of instructions:—

"Messrs. Ledoux & Co., Inc.,

"February 22nd, 1912.

99 John Street, New York, N.Y.

"GENTLEMEN,—I am sending you by mail to-day two samples, No. 1 and No. 2. (Our Nos. 6684 and 6685.) No. 1 represents a general sample of the dyke in *Granite* mine. No. 2 represents concentrates caught on a Wilfley table, on running some 40 tons of No. 1 through a stamp-mill.

"I want both of these samples carefully examined for any of the metals of the Platinum group, and if there are any such metals present I want them determined, and your certificate setting out your results.

"I would say that I am having these samples assayed by yourselves and others, to absolutely test the truth of certain claims, that have been given wide publicity, as to the finding of platinum and other metals of that group in this material.

"It might be of interest to you to say that it was in this material that a Mr. French stated he had found a new metal which he had been pleased to call 'Canadium.'

"You will see, therefore, that this is not a matter for any 'prentice hand, and I would commend it to your Mr. Smoot's personal attention. I should like to have your results as soon as may be possible.

"I am, etc.,

"WM. F. ROBERTSON,
Provincial Mineralogist."

Under date of March 11th, 1912, Ledoux & Co. replied as follows:—

"William Fleet Robertson, Esq.,

"NEW YORK, March 11th, 1912.

Provincial Mineralogist,

Department of Mines, Victoria, B.C.

"DEAR SIR,—In submitting the enclosed certificates, Nos. 172243 and 172244, containing the results of our assays of a sample of ore and a sample of concentrates, we wish to assure you that the greatest care was used in this work, but that we could not detect the presence, even of a trace, of platinum metals. The method used would have shown easily very small amounts of platinum metals, even as little as 0.002 or 0.003 oz. per ton in the ore; and since the concentrates were obtained from the ore, and should therefore be enriched in platinum metals had there been any present in the ore, we feel sure that no platinum metals are present.

"Very truly yours,

"LEDoux & Co."

"CERTIFICATE OF ASSAY.

"No. 172243.

"NEW YORK, March 11th, 1912.

"The sample of ore from Wm. Fleet Robertson, Esq., marked 6684, No. 1, *Granite* dyke, and submitted to us for assay, contains: Platinum and Platinum group metals—None.

"LEDoux & Co."



Stoan Star and Ruth Mines—Sandon.



Richmond-Eureka Mine—Sandon.

"CERTIFICATE OF ASSAY.

"No. 172244.

"NEW YORK, March 11th, 1912.

"The sample of concentrates from Wm. Fleet Robertson, Esq., marked 6685, No. 2, *Granite* concentrates, and submitted to us for assay, contains: Platinum group and Platinum group metals—None.

"LEDOUX & Co."

Second. To Johnson, Matthey & Co., Ltd., London, England, Assayers to the Mint, etc. These samples were sent through the Hon. J. H. Turner, Agent-General of British Columbia, with the following instructions:—

"The Honourable J. H. Turner,

"February 22nd, 1912.

Agent-General for British Columbia,

Salisbury House, Finsbury Circus, London, E.C., England.

"DEAR MR. TURNER,—I am sending you to-day, under separate cover, two samples, No. 1 (in duplicate) and No. 2; these are pulped and in separate bags, and represent—No. 1, a general sample from dyke in *Granite* mine, Nelson, and No. 2, concentrates from 40 tons of same ore.

"I would be obliged if you would have these delivered to Messrs. Johnson & Matthey, assayers, etc., of London, with the request that they each be assayed for any of the metals of the Platinum group.

"You might inform Messrs. Johnson & Matthey that this is the material in which A. G. French claims to have found platinum in commercial quantities, and also the supposed new metal of that group, 'Canadium.' These assays are to prove or disprove these statements, and require to be made with unusual care.

"I am, etc.,

"WM. F. ROBERTSON,

Provincial Mineralogist."

The following report was received from Johnson, Matthey & Co.:—

"JOHNSON, MATTHEY & Co., LTD.,

OFFICES: HATTON GARDEN, LONDON, E.C.,

"The Hon. J. H. Turner,

LONDON, 13th April, 1912.

The Agent-General for British Columbia,

Salisbury House, Finsbury Circus, E.C.

"DEAR SIR,—With further reference to your favour of the 18th and 20th inst., we have now completed our most careful tests of the two samples submitted to us with the first-named letter, and we beg to enclose herewith our certificate of assay (in duplicate) showing the results we have obtained.

"We also enclose an account for the nominal fee of four guineas, which is much less than our ordinary charge would be for this specialized work.

"It will be observed that, whilst there are traces of gold in the 'mineral' and $6\frac{1}{2}$ dwts. of that metal per ton of 'concentrates,' we are obliged to report quite negatively as regards the presence of any of the platinum metals.

"With respect, also, to the question of the possible presence in these samples of the widely advertised 'new' metal, 'Canadium,' we can only remark that we have been quite unable to find anything whatever corresponding to the description (as it has been circulated) of the new discovery. It seems to us that neither sample possesses any special features or any actual or potential values apart from those which appertain to the gold-contents indicated.

"May we add, by the present opportunity, that, in view of our great interest in all the platinum metals, we should be only too glad of an opportunity of elucidating the mystery which at present attaches to Mr. French's discovery, and that we think it would be of general interest and advantage if he could be induced to furnish, through your good self, some of the metal he found, in order that it might be examined.

"With compliments, we are, etc.,

"JOHNSON, MATTHEY & COMPANY, LIMITED."

"CERTIFICATE OF ASSAY.

"LONDON, E.C., 13th April, 1912.

"For Agent-General for British Columbia.

"We have assayed the two samples of mineral, etc., as under, and find the following to be the result:—

| | Produce of Gold. | Produce of Platinum Metals. |
|---|------------------------|-----------------------------|
| "6684, No. 1, B.C. Bureau of Mines, <i>Granite</i> dyke, two bags of sample mixed . . . } | Traces under 6 grains. | <i>Nil.</i> |
| "6685, No. 2, B.C. Bureau of Mines, <i>Granite</i> concentrates } | 6 dwts. 12 grs. | <i>Nil.</i> |

Per ton of 2,240 lb. of mineral, etc.

"JOHNSON, MATTHEY & Co."

Third. To the Canadian Geological Survey, Ottawa, from which the following returns were received, with permission given by the Director to publish the same:—

Sample of dyke-matter (No. 6684) contained trace of gold; sample of concentrates (No. 6685) contained 0.23 oz. gold per ton. Neither sample contained even a trace of iridium or platinum.

In a further letter, Mr. LeRoy, of the Survey, stated that he had been unable to find platinum in any of the samples he had obtained at Nelson.

Fourth. Duplicate samples of these same pulps were assayed in the British Columbia Government Laboratory independently by both Herbert Carmichael, Government Assayer, and by D. E. Whittaker, Assistant Assayer. They both report *not a trace* of any of the platinum metals in either sample.

As will be seen by the evidence just given in detail, this Bureau has tried impartially to ascertain whether there was any foundation of fact in the alleged discovery of the platinum metals in these dykes, but the conclusion which must be arrived at is that they do not exist in the material tested. Should it be claimed that these metals do exist in other dykes in the vicinity, that fact will have to be very thoroughly established before it can be accepted.

ARROW LAKE MINING DIVISION.

REPORT OF WALTER SCOTT, MINING RECORDER.

I have the honour to submit the annual report on the Arrow Lake Mining Division for the year ending December 31st, 1911.

On the *Millie Mack* group, situate in the vicinity of Burton, development-work has been carried on all summer, showing a large quantity of high-grade ore; assay values: Gold, 2.17 oz.; silver, 31.3 oz.; and lead, 9.5 oz. per ton.

On the *Hector* group, situate near Needles, a good showing of galena-ore was disclosed during development-work.

On the *Big Ledge* no extra development-work has been done this season, further than the annual assessment-work. Upon this property there is a large showing of zinc; values, 12 to 45 per cent. zinc per ton.

OFFICE STATISTICS--ARROW LAKE MINING DIVISION.

| | |
|---|-------|
| Free miners' certificates | 23 |
| Certificates of work recorded | 24 |
| Mineral claims recorded | 4 |
| Bills of sale recorded | 1 |
| Cash paid in lieu of work | \$700 |

ROSSLAND DISTRICT.

TRAIL CREEK MINING DIVISION.

REPORT OF J. KIRKUP, GOLD COMMISSIONER.

I have the honour to submit the report of mining operations in the Trail Creek Mining Division during the year 1911.

The mining operations in this district during the past year were, as for some years past, confined chiefly to the companies operating on Red mountain, viz.: The Consolidated Mining and Smelting Company of Canada, Limited; the Le Roi Mining Company, Limited; and the Le Roi No. 2, Limited. In addition, a number of small properties were worked to some extent either by the owners thereof or under lease.

The shipments of ore were somewhat greater than those of the previous year, the output being 254,062 tons, of an approximate value of \$2,881,366, as compared with an output of 253,471 tons, valued at \$2,966,096, for the previous year. However, on account of some of the properties in the South Belt looking so favourable, and the old *Le Roi* mine and other properties of the Le Roi Mining Company having been acquired by the Consolidated Mining and Smelting Company of Canada, Limited, it is believed that the shipments during the coming year will eclipse anything that has taken place in the camp during former years.

The average number of men employed during the year was 695, as compared with 655 during the previous year, and this number should be largely increased during the coming year.

This group of mines, the property of the Consolidated Mining and Smelting Company of Canada, Limited, consisting of the *Centre Star*, *War Eagle*, *Iron Mask*, *Idaho*, *Mugwump*, *Enterprise*, *Red Mountain*, *City of Spokane*, *Pilgrim*, *Monita*, *Lulla*, and *Stewart Fraction* (the majority of which are of the oldest locations on Red mountain), and comprising some 205 acres, has been worked continuously during the past year, the work being generally distributed over the group, the shipments of ore being 190,676 tons.

Development-work during the year consisted of the following: Driving and crosscutting, 9,310.5 feet; raising, 1,348 feet; winzing, 209 feet; together with 15,383 feet of diamond-drilling. The average number of men employed during the year was 490.

These properties, which for many years were owned and operated by the Le Roi Mining Company, Limited, have recently been acquired by the Consolidated Mining and Smelting Company of Canada, Limited, and are now being operated by that company through the *Centre Star* mine, which adjoins the *Le Roi* on the north-east. Mining was carried on by the Le Roi Mining Company on these properties during the early part of the year, during which time 6,915 tons of ore was shipped, and since falling into the hands of the present owners the shipments amounted to 13,480 tons. Development consisted of: driving and crosscutting, 878.5 feet; raising, 220 feet; and diamond-drilling, 2,006.7 feet. The average number of men employed was seventy.

These claims, in conjunction with those held by the Consolidated Mining and Smelting Company of Canada, Limited, for some years past, are considered to be a very valuable property, are equipped with the finest kind of machinery, and it is quite probable will produce a large tonnage of ore of good value for many years to come.

This group of mines, consisting of the *Josie*, *Annie*, *Annie Fraction*, *Poor-man*, and *No. 1*, situated on the west slope of Red mountain, and adjoining the properties of the Consolidated Mining and Smelting Company of Canada, Limited, is owned and operated by the Le Roi No. 2, Limited, and, although the whole group contains only 51.54 acres, the shipments of ore are fairly heavy, and the average value of such is higher than that from other large properties. During the year 43,579 tons of ore was produced, 18,778 tons of which was milled on the premises, and produced 1,594,938 tons of concentrates.

Development-work during the year consisted of: driving, 3,154 feet; raising, 337 feet; crosscutting, 2,257 feet; and diamond-drilling 14,698.5 feet. The average number of men employed was 122. Additions to the plant during the year costing, approximately, \$1,500.

This property, owned and operated by the Blue Bird Mining Company (foreign), is situated in what is known (locally) as the "South Belt," about one-half mile south from the city of Rossland, and, although the production of ore during the year has been small, some 51 tons, the development-work consisted of a shaft 110 feet deep and a drift on the 90-foot level, from which stoping is being carried on; some very fine ore, running \$40 to the ton, is being taken, but, on account of the lack of capital, the work is being carried on on a small scale, only three men being employed.

This, another of the properties in the South Belt, lying to the south and west of the *Blue Bird*, is being operated by J. L. Warner, under bond from Samuel Forteath and associates, who are the owners of such; although a trial shipment only has been made from this property, the development-work, consisting of surface work only, has shown some very fine ore, and should within the next few months develop into a mine of some prominence. As at the *Blue Bird*, only a few men are employed.

This property, situate on Grenville mountain, in the extreme western portion of the Mining Division, and owned by the Inland Empire Mining and Milling Company, Limited (foreign), seems to have been idle during the whole of the year, with the exception of an addition to the plant, at a cost of \$30,385, some eight men being employed at such work.

This property is situated about one mile south of the city of Rossland, and was worked under lease during the past year by R. T. Evans, two men being employed. The shipments made during the year amounted to some 96 tons of fairly high-grade ore, having an average assay, according to the official returns, of 1.88 oz. of gold and 2.87 oz. of silver to the ton.

This property, lying to the south of and adjoining the *Centre Star* mine, was worked under lease during the early part of the year, and, although 354 tons of ore was shipped, the undertaking was at a loss to the lessees, who were working miners.

In addition to the foregoing, the only work done was that required as annual assessment on a comparatively small number of claims, as shown by the accompanying office statistics.

OFFICE STATISTICS—TRAIL CREEK MINING DIVISION.

| | |
|---|-----|
| Mineral claims recorded | 36 |
| Certificates of work | 56 |
| Money paid in lieu of work | 1 |
| Certificates of improvement | .. |
| Bills of sale, etc., recorded | 12 |
| Free miners' certificates (company) | 8 |
| " (individual) | 123 |
| " (special) | .. |

BOUNDARY DISTRICT.

GREENWOOD MINING DIVISION.

REPORT OF W. G. McMYNN, GOLD COMMISSIONER.

I have the honour to submit the annual report on mining operations in the Greenwood Mining Division for the year 1911.

The quantity of ore mined during 1911 was approximately 1,200,000 tons, as compared with 1,661,261 tons in 1910.

The Granby Consolidated Mining, Smelting & Power Co., Ltd., suspended operations for about five months during the year 1911, owing to the strike of the miners in the Crowsnest coal-mines causing a difficulty in procuring sufficient coke, which lessened the ore production of this company from its mines near Phoenix to 605,880 tons, as against 1,075,000 tons in 1910. The value of the metals obtained from these ores amounted to about \$1,817,600. The number of men employed by the company at the mines near Phoenix would average about 500. The underground development-work in these mines consisted of: drifting, 3,364 feet; raising, 3,071 feet; and diamond-drilling, 5,934 feet.

The British Columbia Copper Company, Limited, imported 41,500 tons of coke from Pennsylvania, at an additional cost of about \$145,000, in order to avoid closing down its mines and smelter, and increased its ore production to 550,182 tons in 1911. Most of this ore came from its *Mother Lode* mine, near Greenwood, in which a new method of mining it was adopted. The ore-body in this mine was divided into a series of stopes, of a maximum width of 25 feet; 2,433 holes were drilled, each one being about 14 feet in length, and charged with over 10 tons of 40-per-cent. dynamite. This charge was exploded by electricity, and enough ore, about 100,000 tons, was thereby broken down to keep the smelter running for about three months. Particulars of the ore shipments in 1911 are: *Mother Lode*, 329,091 tons; *Wellington*, 25,944 tons; *Emma*, 11,450 tons; *Rawhide*, 176,354 tons; and *Athelstan*, 7,343 tons. The total amount of ore treated in the Greenwood smelter, including shipments from the United States, amounted to 574,354 tons, and the total production of metals were valued at \$1,868,281: Gold, 30,127 oz., \$617,603; silver, 129,826 oz., \$68,892; and copper, 9,497,526 lb., \$1,181,786.

OFFICE STATISTICS—GREENWOOD MINING DIVISION.

| | |
|--|-----|
| Mineral locations recorded | 119 |
| Certificates of work issued | 244 |
| Transfers recorded | 42 |
| Free miners' certificates issued | 278 |

GRAND FORKS MINING DIVISION.

REPORT OF S. R. ALMOND, GOLD COMMISSIONER.

I have the honour to submit the annual report on mining in the Grand Forks Mining Division for the year 1911.

Owing to the prolonged strike in the Crowsnest coal-mines the production of the metalliferous mines in the Grand Forks District falls far short of the tonnage of 1910. The strike amongst the coal-miners, although lasting eight months or more, did not stop the

Granby Smelter's production for more than about five months, as that company ran for some time after the coke-supply from the Crowsnest was cut off on coke imported from Pennsylvania, but, as this method of keeping the smelter running proved too costly, it was reluctantly relinquished, and the result was that the mines and smelter closed down until the strike was settled and fuel from the Crowsnest could again be obtained.

L. B. Reynolds, M.E., in his report in the "Mining Review" of the *Nelson News*, says:—

"The falling-off in the production is due almost entirely to the coal strike, which, from the fact that it placed a heavy extra expenditure upon the smelters by compelling them to bring coke from the East to carry on their operations, resulted not only in the curtailment of the operations of the Consolidated Mining & Smelting Co. of Canada, and in having a deterrent effect upon the operations of the British Columbia Copper Company, but in the closing-down for some months of the Granby mines and smelter. As the Granby mines are the largest producers of ore in the Province, it may easily be realized that the cessation of the company's operations for a lengthy period could not fail to make a very marked difference, both in the total tonnage treated for the year and in the values produced. While there was a reduction in the production, the amount of development-work carried on in all parts of the district exceeded all records of previous years."

Of the latter company, E. Jacobs, in his report on the "Mining Industry of British Columbia" in the *Mining Exchange* of January, says:—

"The Granby Company's mines were non-productive about half of the year, owing to cutting-off of fuel-supply consequent on the coal-miners' strike in the Crowsnest Pass, whence is obtained coke for the smelter blast-furnaces. The year's output of ore was about 600,000 tons. During the company's last fiscal year, ended June 30th, 1911, 1,248,000 tons of ore was blocked out in the mines, as against 957,000 tons shipped, an increase of 291,000 tons, making total ore 'estimated in sight' 6,720,000 tons. Notwithstanding the reduced tonnage treated, smelting costs were 3 cents per ton lower. A new method for the disposal of slag, previously dumped molten, was arranged for while the eight 500-ton furnaces were out of blast; this consists principally of granulation of the slag by water and sluicing it to central storage-bins, where it will be dewatered, and conveyance of drained slag thence on conveyor-belts up an incline to an elevation of 100 feet above the old dump and distribution there. Dump-room for 6,000,000 to 10,000,000 tons of slag is thus provided. The Granby Company smelted 1,200 tons of Customs ores in addition to that from its own mines. Statistics published in New York show an output of copper in 1911 of rather more than 11,000,000 lb., which was 9,000,000 lb. less than in 1910."

The value of the product of the ores smelted by this company in the past year was considerably over \$2,500,000, not a bad showing for little more than a half-year's run.

In speaking of the Granby Company's mines at Phoenix, I again quote Mr. Reynolds:—

"The average output of this mine is well over 1,000,000 tons a year, and it has produced about 7,500,000 tons to date. Owing to the above-stated causes, this year's output was only a little over 600,000 tons. The company operates what appears to be two distinct sets of ore-bodies. The oldest and largest of these are on the *Knob Hill* and *Old Ironsides* claims, while the latter is half a mile to the east on the *Gold Drop* and adjoining claims. The ground above the No. 1 tunnel was worked by open-cuts, steam-shovels being employed. After nearly 1,000,000 tons had been taken out a fire destroyed the crusher. It was rebuilt at No. 2, 100 feet lower, in such a way that the ore drops from it directly into the railroad-cars, or, if none are available, through to No. 3 tunnel. All ore below No. 3 tunnel is hoisted from the Victoria shaft, the levels below being the 200, 300, and 400. No. 2 tunnel and the Victoria shaft are served by the Canadian Pacific Railway, while No. 3 tunnel and the Victoria shaft

are served by the Great Northern Railway. There are really four distinct mines, with separate crews, rolling-stock, bins, crushers, etc., the *Gold Drop* making the fourth. The idea of this is that, in case of any accident to any part of the mine or to either of the railroads, the output from three of the outlets can be kept up and the smelter assured of a steady supply. The average output is a trifle over 3,000 tons per day."

B.C. Copper Company and New Dominion Copper Company.—As some of the mines worked by these companies are in the Grand Forks District—viz., the *Emma*, *Athelstan*, *Jackpot*, and *Rawhide*—I cannot do better than again fall back on Mr. Reynolds's "Review," and give the following excerpts:—

"The British Columbia Copper Company, which owns 64 per cent. of the stock of the New Dominion Copper Co., has this year operated the *Mother Lode* mine at Deadwood camp; the *Wellington*, *Athelstan*, and *Emma* at Wellington camp; the *Rawhide* at Phoenix; the *Napoleon* group at Boyd's, Wash.; and the *Lone Star*, just across the boundary-line in Washington. The company also has leases and bonds on sixty-four claims in Voight's camp, Similkameen; on the *Copper* and *Riverside* claims in Franklin camp; the *Greyhound* at Deadwood camp; and the *L.H.* at Silverton.

"From the *Rawhide*, at Phoenix, the company shipped about 800 tons a day, employing 160 men when in full operation. The buildings destroyed by fire in 1910 have been replaced. The mine has been closed down, off and on, on account of expensive coke, but is now being got into shape with a small force of men to resume operations. Last year 172,000 tons of ore were shipped, and it is expected that this amount will be greatly exceeded the coming year. The mine adjoins the *Gold Drop* of the Granby Company. The ore averages 1.4 per cent. copper, 0.5 oz. silver, and 0.045 oz. gold. It is developed by six tunnels and a 185-foot shaft, as well as open-cuts. The ore is all handled through the main tunnel and put through a 1,000-ton per day capacity crusher. The main crusher is a 42- x 30-inch Jenckes-Farrell-Bacon, weighing 125,000 lb., being one of the largest in the world.

"*Wellington Camp.*—In the Wellington camp, the company shipped from the *Wellington* 27,500 tons and 8,000 tons from the *Athelstan*. These are oxidized ores, as the sulphide zone has not as yet been reached. The copper values are very low, but the silver is about 1 oz., while the gold goes from 0.3 to 0.4 oz. As this ore is very siliceous, only a limited tonnage is used, or it would be necessary to add flux to the charge.

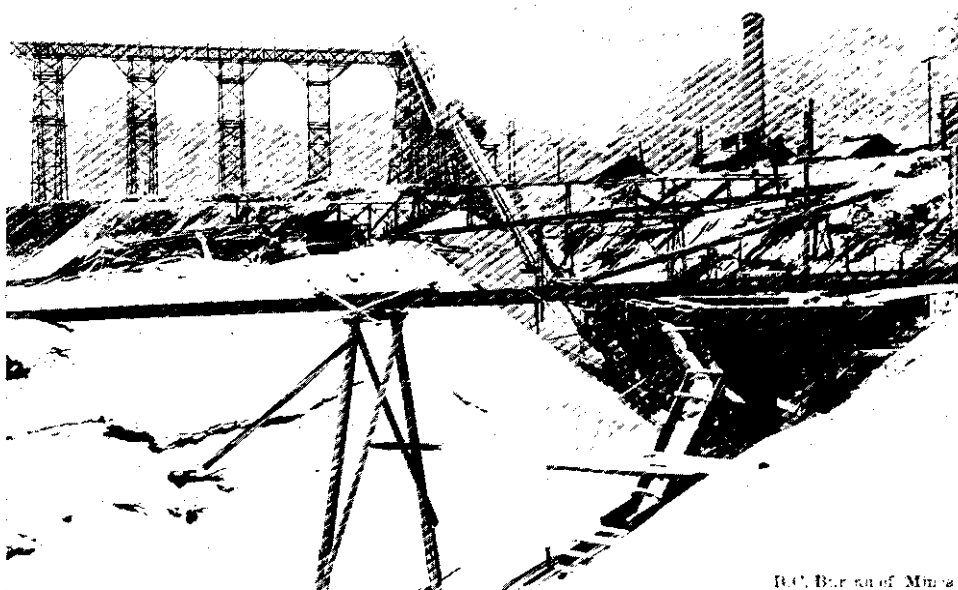
"*Emma Mine Operations.*—The *Emma* shaft is about 100 feet from the C.P.R. Eholt-Phoenix line, two miles from Eholt. The deposit is a vertical, sharply defined deposit on a contact of limestone and grano-diorite. The ore is basic, iron and lime with some copper-sulphide, and is valuable as a fluxing ore for the company's more siliceous ores. The surface plant consists of one cross-connected, 25 x 16 x 24, two-stage Rand compressor, driven by a 200-horse-power motor; one 8½ x 10 Allis-Chalmers-Bullock hoist, handling a 1½-ton skip, with the necessary buildings. There are two levels, the 150 and the 250. The ore is mined by back-stopping, and seventeen men working one shift are producing 95 tons daily. After hoisting, the ore is trammed in a 3-ton car and dumped over a grizzly. The large boulders are broken by hand."

Snowshoe mine, in Wellington camp, worked for some years past by the Consolidated Mining & Smelting Company of Canada, stopped shipping ore in April, as the lease the company held expired about that time. Up to the time of closing down, the *Snowshoe* had shipped over 30,000 tons of ore since the commencement of 1911.

Fife Mines.—In July of the past year 5,000 feet of diamond-drilling was done on this company's property, and work was suspended during the balance of 1911, but has commenced again this year.



Granby Smelter—general view.



R. C. Burson of Mines.

Granby Smelter—New Slag Conveyor.

In and around the Burnt basin, east of Christina lake, some little work is being carried on, the following description of which was given by Mr. Reynolds in the *Nelson News* "Mining Review" for 1911:—

"*New Mill at Paulson.*—The Inland Empire Mining & Milling Co. built at its property, three miles and a half from Paulson, a 10-stamp mill last summer. The mill is to be operated by steam, and was finished so late last fall that it could not be started up. Three or four men are working at development-work this winter, while about forty or fifty were employed on construction last summer. The property is worked from a shaft, which is down 300 feet.

"At the *Molly Gibson*, in Burnt basin, the owners are rawhiding ore two miles to Coryell. They have ore running about \$20 in gold, and are working on a fairly large body of it, right on the surface."

In Franklin camp, some fifty miles up the North fork of Kettle river from Grand Forks, quite a little excitement was caused last summer by the B.C. Copper Company taking bonds on several of the claims in that camp, viz.: The *McKinley* and *Hanna*, to be developed by tunnel and prospected by diamond-drill; the *Rawhide* and *Copper*, on which eight men were kept at work until late in the fall, and on which work will be commenced again this spring.

Shipments from different mines in the district consisted of 50,450 tons by the *Rawhide*, 24,164 by the *Jackpot*, 17,813 from the *Athelstan*, 1,023 from the *Emma*, and 280 from the *Oro Denoro*.

OFFICE STATISTICS—GRAND FORKS MINING DIVISION.

| | |
|-----------------------------------|-----|
| Locations | 81 |
| Certificates of work | 205 |
| Transfers | 33 |
| Filings | 27 |
| Certificates of improvement | 18 |
| Crown grants | 33 |
| Free miners' certificates | 174 |
| " " (company) | 1 |

OSOYOOS MINING DIVISION.

REPORT OF RONALD HEWAT, MINING RECORDER, FAIRVIEW, B.C.

I have the honour to submit herewith the annual report of the mining operations in the Osoyoos Mining Division for the year 1911.

This past year the work done near Fairview has been confined to the necessary assessments, but it is expected that work will be commenced on the *North Star* group at an early date, as this property has been recently examined by a mining engineer, and it is understood that as a result of his report work will be started at an early date.

In regard to the work done in Camp Hedley, it is almost wholly confined to the *Nickel Plate* and *Kingston* groups.

The report of progress in mining in Camp Hedley for the year 1911 is again practically confined to the operations on the *Nickel Plate* and other claims of the group owned by the Hedley Gold Mining Company. The *Kingston*, at the end of the year, was still in litigation, with every prospect, however, of the matter being decided in the course of a week or more. The year has proven to be altogether the best year in the history of the *Nickel Plate*,

and has served to demonstrate that all the mine wanted was that development-work should go hand-in-hand with ore-extraction. This new policy of keeping the development in advance of extraction has now been in vogue for two years, but for four years before that, the operations were confined wholly to ore-extraction, and, with forty stamps to be kept supplied all this time, the drain upon its resources were such that few mines in the world could have stood it.

The story of the year's operations will be best told by the general manager, G. P. Jones. In his annual report to the directors of the company in New York, Mr. Jones says:—

"Owing to causes beyond our control the regrinding machinery was not in operation until March. From March until the end of the year all the new machinery purchased in 1910 has been in continuous operation and has done splendid work, as the returns show. The tonnage milled is greater than hoped for by the president and consulting engineer, and the extraction is well up to their figures. Several minor changes were made to get the most profitable extraction.

"Since the installation of improvements to the power plant the mill has been continuously operated, and 57,815 tons of ore treated, with an average value of \$11.99 per ton, from which an extraction of 94 per cent. was made.

"During the year a 7,000-foot ditch, to convey water from the melting snows of Peterson and Dividend mountain to the Stray Horse lake, has been completed; this extra water will increase the present supply about 40 per cent.

"The ore for the mill has been mined from the *Nickel Plate* and *Sunnyside* stopes, the reserve of 10,000 tons of broken ore in the stopes being maintained.

"Thanks to the care and attention shown by each official in the several departments, the plant has been kept up to its maximum efficiency.

"*Sunnyside No. 3 Mine.*—The main incline is down to 410 feet, and the third level opened out. As the trend of the ore-shoot is diagonally across the foot-wall to the north, it will be necessary to drift to the north to cut it. A drift from the third level is in 80 feet, but so far has not cut the ore, having only encountered small layers that average about \$5 a ton. Within 25 feet the main ore-body should be cut, when stoping will begin from this level. A pocket is now being built, and preparations made to do considerable development. Ore has been shipped continuously from this property, the stopes easily maintaining the usual milling grade of \$12 a ton. Connections were made with *Sunnyside No. 4*, and the ore-body, discovered in 1910, between the two properties opened up. This section has produced high-grade ore, and the shipment of 20 tons a day has been maintained.

"*Sunnyside No. 4 Mine.*—Work done on this property has been developed only, with considerable diamond-drilling to the foot-wall, but no new ore was discovered. A drift 145 feet to the south, at the 600-foot level, was run in low-grade ore; the same drift is now being extended to the north, on this ore-bearing lime-silicate.

"*Silverplate Mine.*—Ore was found under the main bunk-house, which looks promising. At present an incline is down 40 feet on ore which assays \$14 a ton, with 10 feet in the face.

"*Nickel Plate Mine.*—Ore from this property has been shipped continuously and the milling grade of \$12 a ton easily maintained. A very small tonnage has been drawn from between the No. 3 and No. 4 levels, excepting new ore taken from beyond the boundaries as estimated in 1910. From the No. 4 tunnel level a crosscut was extended 210 feet to the west, which intersected the main ore-body at 195 feet. A drift 70 feet to the north and 40 feet to the south of this crosscut has been opened, which proves the ore of a payable grade, and

diamond-drill holes indicate the ore to extend below the level. This work has proven the main *Nickel Plate* ore-body to extend 225 feet beyond the lines as laid down by the examining engineers in 1909.

"While running this 'west crosscut' another ore-body was discovered at 80 feet from the No. 4 tunnel, and so far we have not been able to connect it with any known ore-body. We have drifted on this ore, which is known as 'No. 1 North Drift,' for a distance of 130 feet, and the distance between walls, at right angles to the foot-wall, is 20 feet, and the average value \$14 a ton. Drill-holes have proven the ore to extend down 140 feet, where the drill entered the foot-wall; but there is no reason to believe that this is the full extent of the ore, as the last 40 feet was of higher grade and the ore had the appearance of permanency. The average of the whole distance drilled was \$14 a ton. This section of the property looks very promising.

"The intermediate ore-body, below the sheet andesite which is the foot-wall of the main ore, has been proven down to the No. 4 tunnel level. The No. 6 raise from the No. 4 tunnel to the workings above having passed through 12 feet of ore which averaged \$10 per ton, it is safe to figure that there is as much ore blocked out in this body as was in sight last year. Altogether the *Nickel Plate* mine has considerably more ore in sight than last year, and apparently has a bright future.

"The actual tonnage in sight in *Sunnyside* is probably less, but the *Nickel Plate* has more than made up for it. So that we have no hesitation in stating that there is now a tonnage in sight equal to the tonnage of January, 1910, and of equal value; with excellent prospects of opening more ore in the *Nickel Plate*, as well as in the *Sunnyside* and *Silverplate*.

"The machinery and plant is in good order. The *New York Fractional* mineral claim is being Crown-granted, and the *July Fraction* has been secured.

"The total lineal feet of development for 1911 is as follows: *Nickel Plate*, drifting 330 feet, sinking 70 feet, raising 120 feet, diamond-drilling 1,353 feet; *Sunnyside No. 3*, drifting 155 feet, raising 90 feet, sinking 185 feet, diamond-drilling 433 feet; *Sunnyside No. 4*, drifting 170 feet, sinking 170 feet, raising 25 feet, diamond-drilling 724 feet. Miscellaneous diamond-drilling, 650 feet. Total development, 1,315 feet. Total diamond-drilling, 3,160 feet."

The treasurer in his report says:—

"The net profits for the year were \$318,152.21. The dividends for the year aggregated \$300,000, or 25 per cent. upon the issued capital stock. The undivided profits, after all dividends, were \$200,961.34, on January 1st, 1912. All expenditures, of every kind, during 1911, were charged to operating expenses, including cost of ditch, explorations, development, repairs, additions to plant, etc."

The Apex.—This property, on Independence mountain, about six miles east of the *Nickel Plate*, was bonded in October by T. D. Pickard, with whom are associated M. K. Rodgers and L. W. Shatford, M.L.A. The property consists of seven claims—the *Acacia*, *Apex Fraction*, *Acadia*, *Australian*, *Acacia Fraction*, *Alpha*, and *Utopia*—which were Crown-granted in the early part of the year. A corporation, the Colonial Gold Mining Company, had been incorporated three years ago to take over and develop the property, but did very little work and failed to make their payments. Under the new bond taken by T. D. Pickard and his associates, work began early in November. A contract was let for 100 feet of tunnel to meet a drift from the bottom of the shaft. This was completed about the end of the year, and arrangements were made to continue the work all winter. Good pay values have been obtained from most of the workings.

The Oregon.—This group, on the Similkameen river, on the watershed between Sixteen-mile and Eighteen-mile creeks, and owned by F. H. French, L. W. Shatford, and associates, had also some important prospecting done during the fall, and good results obtained.

Kingston.—Representatives of the Boston principals who hold the bond on the *Kingston* have been on the ground all the year, awaiting settlement of the litigation with the Quebec owners with a view to beginning work at once. They took a bond on the *Sacramento* claim from W. A. Haining, doing considerable development-work by open-cuttings, and, as a result, have purchased the property outright. It is understood that this property is to be incorporated with the *Kingston* group, which it adjoins.

Beyond that of some assessments, no other work of importance was done in the camp.

OFFICE STATISTICS—OSOYOOS MINING DIVISION.

| | |
|----------------------------------|-----|
| Location records..... | 85 |
| Certificates of work..... | 119 |
| Free miners' certificates..... | 153 |
| Certificates of improvement..... | 12 |
| Conveyances, etc..... | 16 |

VERNON MINING DIVISION.

REPORT OF L. NORRIS, GOLD COMMISSIONER.

I beg to report that there was no improvement last year in the mining industry in this Division, a fact pretty clearly demonstrated by the subjoined office statistics furnished me by H. F. Wilmot, Mining Recorder.

There was no development-work done of any importance on any of the metalliferous mines.

Six coal claims were staked last June on Shorts creek, on the west side of Okanagan lake, by S. C. Smith, of Vernon, and associates. They spent several thousand dollars in development-work, with, I understand, satisfactory results.

OFFICE STATISTICS—VERNON MINING DIVISION.

| | |
|--------------------------------|-----|
| Free miners' certificates..... | 100 |
| Claims recorded..... | 38 |
| Certificates of work..... | 19 |
| Conveyances..... | 4 |
| Crown grants..... | 4 |
| Placer claim..... | 1 |
| Coal claims..... | 6 |

YALE DISTRICT.

KAMLOOPS MINING DIVISION.

REPORT OF E. T. W. PEARSE, GOLD COMMISSIONER.

I have the honour to submit the annual report on the Kamloops Mining Division for the year ending December 31st, 1911.

No unusual activity has marked this year's record. Assessment-work has been faithfully kept up and Crown grants have been applied for in many instances, but the lack of local smelting facilities is still felt, and the camp cannot progress until such are to be had.

A showing of copper on C. B. Frederick's properties on the north side of Kamloops lake was developed by the Canadian Northern Railway Company in blasting for a road-bed through his ranch, a very strong and distinct ledge of white iron being exposed at the same time. I have been disappointed at not receiving a report from Mr. Fredericks, and even now I have nothing to hand.

The Seymour Arm prospectors are still very hopeful and confident, as will be seen by the short report of F. M. Daniels below.

There is good heart also in the reports from the Yale Division, in spite of the bursting of the Steamboat Mountain bubble.

Nothing much seems to have been done in prospecting for coal.

A flutter of excitement was caused late last fall by the discovery of placer gold on Rose hill, south of Kamloops. Severe frost set in shortly after the discovery and stopped the work of prospecting, which it has not been possible to resume since; consequently, nothing definite can be reported as to the extent or probable permanency of the discovery.

KAMLOOPS CAMP.

Wheal Tamar, etc.—(From O. S. Batchelor.) On the *Wheal Tamar* group at Jacko lake only assessment-work has been done this summer. A large quantity of copper-ore is available on this group, carrying values in gold and silver. A local smelter is badly needed near Kamloops.

The *Kamloops Goldfield* shows an ore-shoot which carries \$15 in gold; this is a milling proposition.

Free gold has been found on the hills near the *Cash* mineral claim. A shaft has been sunk 100 feet deep on this vein, and 200 feet of drift run. The quartz is blue, showing free gold. A stamp-mill is required to test this ore.

Python.—(From W. F. Wood.) The tunnel on this property is now extended some 530 feet, the last 50 feet being in vein-matter, with the best ore yet encountered in the face of the tunnel, which is at a depth of over 200 feet below the surface.

SEYMOUR ARM CAMP.

Cotton Belt Group.—(From F. N. Daniels.) The *Cotton Belt* owners have done no work on the property this summer, but intend to push the tunnel on another 100 feet next summer.

Mr. Irwin did assessment on the *Mountain Chief*; the ledge on this claim shows about 5 feet of nearly solid ore carrying galena.

The *Tartar* claim has had the shaft sunk about 30 feet; it is now down something like 60 feet, the bottom showing 8 feet of ledge, nearly solid ore.

Homan and Gillman have done a considerable amount of surface work on their claim, the ledge here being 5 feet, well mixed with galena.

W. J. McConnell has done the assessment-work on his claims, the ledge on these properties showing about 3 feet.

John Gavin has done the assessment on his claim. This is about all the work done on the *Cotton Belt* ledge.

On what is known as the *McLeod* ledge, Lund and McLeod have done a good deal of work, having been up there one month themselves, and having three miners about one month more. The *McLeod* ledge is about 6 feet, and clearly outcrops at that width over 1,000 feet; composition of ledge is calcite, carrying a good showing of chalcopryite and galena, with some zinc. The work is showing this to be apparently a valuable property.

On the *Sinclair and Munger* ledge some work has been done this last spring. This ledge is apparently 50 or 60 feet in width, showing some fine specimens of bornite, malachite, cuprite, and chalcopryite in a gangue of calcite.

More work would have been done on these claims had there been a trail to take in supplies; this difficulty has been partially removed by the Government putting in a trail that a horse can get over with about 100 lb., but some more work on this trail is still needed to make it passable for loaded pack-horses.

Camp McLeod and Steeple Jack.—(From F. A. McLeod.) Work on the *Camp McLeod* and *Steeple Jack* group for the last year was very favourable, and we had six men at work on the group. We drove 20 feet on the tunnel, and the ore is improving as depth is gained. We have done sinking, crosscutting, and stoping, and we are satisfied that we have a strong ledge, and have shown surface ore capping for a long distance, and from now on work will be depth. We had all our powder and provisions packed to the claims by Mr. Daniels, this being the first year we were able to get pack-horses to the claims, and we are indebted to our member, Mr. Shaw, for aid on the trail-building, and we hope to see big tonnage come out of Seymour Arm camp.

OFFICE STATISTICS—KAMLOOPS MINING DIVISION.

| | |
|-----------------------------------|------------|
| Free miners' certificates..... | 330 |
| Certificates of work | 57 |
| Records, mineral..... | 73 |
| " placer..... | 22 |
| Bills of sale..... | 12 |
| Certificates of improvement | 10 |
| Total receipts..... | \$3,039.75 |

ASHCROFT MINING DIVISION.

REPORT OF H. P. CHRISTIE, MINING RECORDER.

I have the honour to submit the annual mining report for the Ashcroft Division during the year 1911, and the office statistics.

The situation remains practically unchanged; the assessment-work has been recorded on the majority of claims, but very little actual mining has been done.

OFFICE STATISTICS—ASHCROFT MINING DIVISION.

| | |
|--|-----|
| Free miners' certificates issued | 111 |
| Certificates of work recorded | 37 |
| Transfers, etc., recorded | 14 |
| Locations recorded..... | 64 |

YALE MINING DIVISION.

REPORT OF L. A. DODD, MINING RECORDER.

I have the honour to submit herewith the annual report and statistics for the year ending December 31st, 1911.

As will be noted, the period has been the most active in the history of the Division, it being found necessary, for the convenience of the public, to establish, in April last, a sub-office at the town of Hope.

PLACER-MINING.

Two locations were made on the Coquihalla river some eight miles from Hope. Very little work was done on these, and I have no information that any gold was recovered. On Siwash creek four claims were recorded, but no work was done. On Hidden creek, which runs into Eight-mile creek some six miles due north of the forks of Siwash creek, two claims were recorded; no work has been done on these, as the season was too far advanced at the time of location. The prospects, however, are reported as being rich.

An application for a dredging lease covering the five miles of the Fraser river from the tunnel about a mile above Yale down to the lower end of Emory bar has been made by D. A. Macdonald on behalf of Vancouver and Victoria parties, and I am informed that they intend (subject to the granting of their lease) to do some prospecting and preparatory work during the present stage of low water.

The only placer-mining work of any account in the Division during the past year is that which has been carried on by the Siwash Creek Mines, Limited. This company was formed to take over, and has taken over, the six creek leases on Siwash creek originally granted to Stout, Mueller (2), Thomas, McBeth, and Lockwood. They have at present, and have had for some months past, some seventeen men at work in active development-work on the property.

The following remarks are contributed by G. A. Love, managing director of the company:—

"The Siwash Creek Mines, Limited, has acquired the six leaseholds on the Siwash extending from below the falls to above the forks, approximately three miles, and has begun operations with a view to opening up the channel at the falls to the bed-rock, and from this point to proceed by ground-slucing and hydraulicking to expose the bed-rock and recover all values therefrom. We have now about fifteen men at work preparing our sawmill, cutting logs, and opening up a rock-cut. The sawmill will cut all the lumber required for the flume-building operations. It is expected that the actual washing for gold will not begin before May next, but all indications go to show that the values in this property will go high; and, as the confidence of the stockholders is unusually strong, there is very little of the stock available for purchase at any price. After the extraction of the coarse gold the 'black sand' is found to give values in gold and platinum; there are immense quantities of this black sand on the property."

QUARTZ-MINING.

A large number of quartz claims were located in this Division during the past twelve months, the majority being in the Skagit district. While those situated on Steamboat mountain have apparently not justified the excitement that was aroused during the early part of the year, still I am informed by prospectors and others who have had sufficient faith in the district to do their assessment work, and other general prospecting, that as soon as transportation is available there is a future for the district from a mining standpoint, particularly in the neighbourhood of Red mountain, Twenty-three-mile, and Lightning creek.

On Red mountain, the *Yellow Jacket* group was developed in the early summer by F. C. Whitwell sufficiently to demonstrate the existence of a considerable body of ore that it would pay to operate even with present transportation conditions. The property was then acquired by R. Dalby Morkill and William Maher, of Vancouver, who have recently announced their intention to spend a large sum on development in the early spring. Late in the autumn many new locations were made on Red mountain by J. M. Carlyle.

On Lightning creek, W. H. Webb, of the Lightning Creek Mines, a Seattle company, maintained a crew of six men from April to November and accomplished a lot of open-cutting. Mr. Webb states that the property contains a ledge of ore 50 feet in width, from which the lowest assays obtained give gold values. On the same creek Jackson & Johnston, of Seattle, worked for three months with a force of eight men, after they had completed their assessment-work on the *Champion* and *Monarch* groups on Steamboat mountain. They were reticent about results, except to say that they will resume operations in the spring in both fields.

A number of locations have been recorded from the neighbourhood of Laidlaw (late St. Elmo), but beyond doing the assessment-work necessary to keep the claims in good standing, no further development has been reported.

On Silver creek, about three miles from Hope, the *Jumbo* group was acquired early in the summer from N. E. Holmgren by the Aufeas Gold Mining Company, of Hope. Two tunnels have been driven and 300 feet of open-cutting on a vein averaging 18 inches in width at the surface. The company has also established a permanent camp and built a mile of mountain-trail. The ore is a mispickles, with a high percentage of arsenic, varying from 20 to 40 per cent. The company has already made provision for the installation of an aerial tram and the continuation of the working tunnel. It is also proposed to equip a plant near the property for the recovery of the arsenic.

On Siwash creek, the *Ward* mineral claim was worked the past season by Dr. A. W. Moseley and associates. Some gold was recovered, but the cost of getting supplies in has been found prohibitive. There is a large body of free-milling ore on this and adjoining properties.

A considerable number of locations were made in the Siwash Creek area during the year, but, owing to the collapse of the Steamboat Mountain bubble, this district was adversely affected in the money market, and did not receive the attention it deserves; consequently, the majority of the locations are being allowed to lapse, although the assessment-work has been done on the most promising of them.

The *Roddick*, a Crown-granted claim, has been recently bonded. The discoveries of the rich free-milling ore by Carpenter and Reysbech in January last are on adjoining locations.

On Hidden creek, rich free-milling ore was discovered by W. A. Foulk and J. H. Neill in June last. The ore is found in quartz stringers in a porphyritic dyke. Quite a little local excitement was caused, but no outside capital has as yet been interested.

On the divide between the Fraser river and Anderson creek, nearly opposite Spuzzum, Foulk and the Macdonald Bros. have discovered what they consider is the continuation of the Hidden Creek ledge. They and associates have located a number of claims, and active prospecting-work is being carried on. The outcroppings are very rich in free gold. They are now tunnelling into the lead, which they expect to strike in the course of a month or two, and should it prove that the ore is as rich at the depth at which the tunnel strikes the lead as on the surface, it will be proven to be a rich property.

During the past season the Dominion Government Geological Survey party, under Chas. Camsell, made a very thorough examination of the Skagit, Siwash, and Hidden Creek areas. The report is not yet to hand, but from conversations with Mr. Camsell and other members of the party, I came to the conclusion that they were very favourably impressed with the possibilities of the Siwash and Hidden Creek properties which they examined, and as soon as the report is published, should it prove as indicated, it will no doubt cause the areas to be carefully prospected. Mr. Camsell also made a careful inspection of several properties at Twenty-three-mile, on the Skagit, and stated that the ore appeared to be of high value and the bodies apparently very extensive.

Taking everything into consideration, although no great development has been done, it has been a very satisfactory year from an exploratory standpoint, and with transportation facilities such as are now becoming available, by which the V.V. & E. will tap the Skagit and the C.N.R. will enable the Siwash creek and neighbouring areas to be economically worked, there should be a great future in store for this Mining Division.

The office statistics, which are given hereunder, show that the work and revenue derived therefrom about double the largest previous years, and more than double most of them.

OFFICE STATISTICS—YALE MINING DIVISION.

| | |
|---|------------|
| Free miners' certificates issued | 408 |
| Locations recorded | 974 |
| Certificates of work issued | 121 |
| Bills of sale, powers of attorney, options, agreements, etc., recorded .. | 235 |
| Filings | 30 |
| Revenue, all sources | \$8,433.65 |

NICOLA MINING DIVISION.

REPORT OF W. N. ROLFE, MINING RECORDER.

I have the honour to submit herewith the annual report and statistics of the Nicola Mining Division for the year ending December 31st, 1911.

The situation remains practically unchanged from former years, but owners of mineral claims appear to have confidence in the future, and diligently keep up the necessary assessment-work on their respective properties, pending facilities being provided for ore shipments.

A new feature of interest in the district has been the opening-up of a gypsum-deposit, about a mile north of the city of Merritt, which has been operated by the Industrial Development and Finance Co., of Vancouver, B.C. The development on the property consists of two open-cuts, exposing the deposits in pockets, which vary in thickness from 1 to 6 feet. Shipments to the extent of about 500 tons have been made, the greater portion being consigned to the Coast. The mine, however, was closed down on the approach of winter, but it is anticipated that further development will be carried out early in 1912.

OFFICE STATISTICS—NICOLA MINING DIVISION.

| | |
|--|----|
| Locations recorded | 39 |
| Free miners' certificates issued | 93 |
| Certificates of work | 85 |
| Certificates of improvement | 4 |

SIMILKAMEEN MINING DIVISION.

REPORT OF HUGH HUNTER, MINING RECORDER.

I have the honour to forward the annual mining report on the Similkameen Mining Division for the year 1911.

During the past year considerable attention has been paid to placer-mining. A number of dredging leases have been acquired and in some cases the ground has been prospected, especially the ground leased by the Platinum Gold Fields, Limited, situated on the Tulameen river near Princeton. This company used a churn-drill while the ice lasted, and prospected afterwards by means of shafts sunk to bed-rock.

On Slate creek, the Platinum Company has done considerable work on its property, running a tunnel to tap bed-rock. This creek produced a large amount of placer platinum in the early days, the shallow ground only being then worked.

The B.C. Copper Co. has taken a working bond on the *Voigt* properties at Copper mountain, and started work late in the year with a force of twenty men.

In Summit camp a syndicate of Spokane men are opening up some silver-lead properties which they have acquired. Assessment-work has been generally performed on claims not Crown-granted.

The B.C. Portland Cement Company, whose factory is to be situated near Princeton, has almost completed the buildings, and the machinery is now on the way. A spur has been constructed to connect with the main line of the Great Northern Railway; this spur has been extended to enable the United Empire Company to ship coal from its mine, where there is a good working seam, supplying local demands and shipping to outside points.

By the courtesy of G. L. Fraser of the Columbia Coal & Coke Company, and Arthur Hickling of the Princeton Coal & Land Company, I am able to give a report of the progress made in their respective properties during the year.

The Columbia Coal & Coke Co., Ltd., Coalmont, B.C., owns ten square miles of coal lands in the Tulameen valley, situated about fourteen miles from Princeton and about sixty miles from Merritt, in what is known as the Coldwater Coast series.

During the past year the company has engaged in the development-work necessary for the opening-up of a large mine, and has also made preparations for installing a modern and up-to-date tippie and plant for handling the output.

A well-timbered working tunnel is now in a distance of 2,000 feet. The first coal-seam tapped at this point is a 15-foot seam, and at the present time is being developed by two drifts, east and west.

The difficulties of opening up a mine in a practically unsettled country are many. The company has had to build trails and roads, to construct bridges, and overcome the difficulties of transporting supplies and machinery to carry on the work in the absence of railroad connection.

With the object in view of installing a tippie and plant early in 1912, much of the preparatory work has already been done, a line for the tramway from the mine to the tippie has been cleared and graded, the site for the tippie has been cleared, and side-tracks laid out and graded.

The V.V. & E. Railway has the rails laid through the company's property, and the depot, section-house, tank, etc., nearly completed at the town of Coalmont. Coalmont is already assuming the appearance of a prosperous business centre, with its large and well-equipped hotel and numerous up-to-date stores to cater to the wants of a rapidly increasing population.

In order to carry on development-work in the mine, a compressor plant was installed early in the year. All machinery, boilers, etc., were hauled in from Merritt. The company's saw-mill at Tulameen supplies lumber for the company's buildings, bunk-houses, boarding-houses, and dwellings, as well as material for the many stores and houses in the new town of Coalmont. A new mill has recently been built and is now in operation. The company has large timber holdings and will be able to supply the demands of a rapidly growing community.

Many miles of wagon-trails have been built on the property, also a substantial Howe-truss bridge of 120-foot span and two Queen-truss spans of 66 feet each over the Tulameen river.

In addition to the Coalmont townsite, the company has reserved and erected thereon workmen's cottages, dwellings for the officials and staff, a school-house and barn, and offices.

The year 1912 will see many changes on the Columbia Coal & Coke Co.'s property. With the advent of the railway, all heavy machinery will be brought in and the building of a plant will be rushed to completion. Before another year a substantial tonnage will be leaving Coalmont.

Princeton Colliery of the Princeton Coal & Land Co.—The operations in this colliery during the past year have been entirely in the nature of development-work. Over a mile of tunnelling has now been completed, and the mine is being opened up to maintain an output of 500 tons per day. The inclines and leadings are to be operated by small 25-horse-power hoists, four at present being installed, and the coal is now being cut by post-puncher machines.

The total output of the mine for 1911 was nearly 24,000 tons. The number of men employed averaged about sixty-seven.

The Princeton Coal & Land Company, Limited, owning this mine, is now installing an up-to-date plant with all modern improvements. The instalment of this plant will be completed by the end of February, and should be running to its full capacity by then.

OFFICE STATISTICS—SIMILKAMEEN MINING DIVISION.

| | |
|--|-----|
| Free miners' certificates | 324 |
| Location records | 353 |
| Certificates of work | 267 |
| Conveyances (mineral claims) | 36 |
| Placer leases | 43 |
| Gold Commissioner's permits (placer) | 10 |
| Powers of attorney (placer) | 27 |
| Conveyances (placer) | 13 |

LILLOOET DISTRICT.

LILLOOET MINING DIVISION.

REPORT OF C. PHAIR, GOLD COMMISSIONER.

I have the honour to submit the annual report on the progress of mining in Lillooet Mining Division during the year 1911.

PLACER-MINING.

The *Jespersion* leases, on Cayoosh creek, were operated by J. T. Mellott during the season. He sank twenty-seven holes with an Empire drill from 18 to 49 feet in depth, and is very pleased with the results. He graded 2,300 feet for the pipe-line and now has the pipe on the ground. He expended \$12,000 during the year for wages and material. No other leases have been worked. Three placer claims have been worked, with one or two men to each.

Late in the season, Eldorado creek, a tributary of Gun creek, was discovered to contain gold by Grant White, who states the creek is about eight miles in length and, seemingly, the whole of it is gold-bearing. It carries about 2,000 inches of water and is at an altitude of over 5,000 feet, so the season for mining will be short—not over four or five months. He further states that the gold is distributed almost equally from the grass-roots to bed-rock, showing there was very little water-action. There are thirty claims recorded on it; some of the parties going in on snow-shoes to stake.

MINERAL CLAIMS.

The Coronation Mines, Limited, of Victoria, purchased the *Ben d'Or* group and the adjoining *Countless* claim, on Cadwallader creek. Operations were carried on during the year with an average force of ten men, and are being continued during the winter. The superintendent (C. L. Copp) spent the year in development-work and did not operate the mill, but he intends to mill next season. He constructed a ditch 3,000 feet in length and brought water on to the *Countless* claim, by which means he crosscut the vein in several places and found it to be continuous, about 4 feet wide, with well-defined walls. He ran 564 feet of tunnelling on the other claims, and has several thousand tons of ore blocked out.

This claim adjoins the *Countless* and was purchased by a Vancouver Pioneer. syndicate. The work done by five men during the season proves the ledge to contain very rich ore. A tunnel, 200 feet in length, is being driven this winter under contract.

These mines are situate about a mile east of the *Coronation* mines, and were worked during the season by five men. A tunnel was driven 250 feet to tap the vein at a depth of about 400 feet, and a raise of 60 feet was put through. Eighty-four tons of ore were milled, yielding \$1,420.

A tunnel, 200 feet in length, is being driven by contract on the Wayside Group. *Wayside* claim. The owners informed me it is their intention to equip the property with a milling plant the coming season.

Note by Provincial Mineralogist.—The following additional notes have been received from D. C. Paxton, owner of the *Wayside* mine: "I take the liberty of sending you at this time some mining data, which could not be furnished the Gold Commissioner up to December 20th, 1911. This refers to the *Wayside* mine, on Bridge river. Taking up your observation in your 1910 report of the development-work done on the *Wayside*, that there were probably more veins of ore not uncovered, I set to work on this information, and shortly opened up two parallel veins 70 feet lower than the lowest tunnel opened, each of about 6 feet in width, which were 16 feet apart and 128 feet north from the lowest tunnel. I drove 26½ feet of tunnel on the upper (south) one, which we call No. 4, and made a contract for continuing work before leaving. As this vein is nearly vertical and Nos. 2 and 3 are about 38 degrees pitch, they must be each separate spurs from No. 4. The upper tunnel No. 1 is undoubtedly on the same vein as No. 4 tunnel, also the ore looks to be the same. As tunnels Nos. 2 and 3 swing sharply in the direction of the line of Nos. 1 and 4, this indicates that they do not break from the main lead on a horizontal plane, but with a down-hill slope; this would make the upper point of fracture start somewhere in the neighbourhood of No. 1 tunnel, and the indications point to such, as the surface for an area of 100 square feet is one mass of completely decayed quartz."

Work was carried on during the season on other claims, and assessment-work was recorded for ninety-two claims.

It is believed there will be a rush of miners to the Bridge River country next season. The printed report of the Provincial Mineralogist on this section has caused the attention of prospectors and capitalists to be given to it. The Government wagon-road to the Bridge River mines is expected to be completed next year, which has also given a stimulus to the mining industry, as the cost of transportation of goods and machinery will be much decreased.

OFFICE STATISTICS—LILLOOET MINING DIVISION.

| | |
|--|-----|
| Mineral claims recorded..... | 159 |
| Placer claims recorded..... | 37 |
| Certificates of work recorded..... | 92 |
| Conveyances recorded..... | 90 |
| Mining and dredging leases in force..... | 40 |
| Free miners' certificates issued..... | 142 |

Revenue.

| | |
|---------------------------------------|-----------|
| Free miners' certificates..... | \$ 728.45 |
| Mining receipts, general..... | 3,367.75 |
| Tax—Crown-granted mineral claims..... | 628.00 |
| Mineral-tax..... | 29.15 |
| | <hr/> |
| | \$4753.35 |

CLINTON MINING DIVISION.

REPORT OF F. C. CAMPBELL, ACTING GOLD COMMISSIONER.

I have the honour to submit the annual report for the Clinton Mining Division of Lillooet District for the year ending December 31st, 1911.

I regret that no mining activity can be reported from this section of the Province. Although the office statistics show a slight increase in number of free miners' certificates issued and mineral claims recorded, yet it will be observed that the number of certificates of work issued remain the same as last year.

Of the new claims recorded, the greatest number are situated in the country tributary to Whitewater river, a tributary of the Chilko river. This is a new section of the Division to be exploited, and lies just east of the Tatlayoko Lake District, a district which the Provincial Mineralogist visited in 1910 and reported to be of some promise. (See Minister of Mines' Report, 1910, page 154.) It is therefore to be hoped that with development this section will take its rank with the mineral-producing districts of the Province.

OFFICE STATISTICS—CLINTON MINING DIVISION.

| | |
|--|----|
| Free miners' certificates (individual) | 59 |
| Mineral claims recorded | 88 |
| Certificates of work issued | 15 |
| Conveyances recorded | 1 |

VANCOUVER ISLAND AND COAST.

ALBERNI DISTRICT.

ALBERNI MINING DIVISION.

H. C. RAYSON, GOLD COMMISSIONER.

I have the honour to submit the annual report on mining in the Alberni Mining Division during the year ending December 31st, 1911.

There have not been any shipments of ore, other than that shipped for testing purposes, and, with the exception of on the Taylor River group and the *Big Interior* group, there has not been any great amount of work done.

The owners of the *Saucy Lass* group, situated in the Uchucklesat harbour, have done a great deal of prospecting-work, opening up some good leads, and believe they have mines that will prove valuable.

Work has been continuously carried on in the different prospects along the Alberni canal, especially on the *Gladys*, *Teddie*, and the *W. J.*

A great deal of development-work was done on the *Balmoral* group of cinnabar-mines at Sechart, and the showings are very encouraging.

A great deal of interest has been taken in the mountains to the north and north-west of Great Central lake, and several claims have been located.

The owners of the *Big Interior* group have done a great deal of development-work, and have made preparations to work on a larger scale next season.

A large sum of money has been expended on the claims at the head of the Taylor arm of Sproat lake, and it is hoped that this work will be continued this year, as the showings are far better than was expected.

Now that the railway is completed to Alberni and other railways are making surveys through the district, there is no doubt that prospecting will be facilitated on a great many of the well-known deposits that have hitherto been neglected on account of their inaccessibility.

Considerable development-work was done on the coal-seam in the townsite of Port Alberni, and the coal was pronounced good; it is expected that there will be further prospecting done on the property this season.

OFFICE STATISTICS—ALBERNI MINING DIVISION.

| | |
|--|-----|
| Free miners' certificates issued | 85 |
| Mineral claims recorded | 24 |
| Certificates of work issued | 51 |
| Transfers | 13 |
| Certificates of improvement | 11 |
| Powers of attorney | 6 |
| Crown-granted mineral claims on roll | 209 |

Revenue.

| | |
|--|------------|
| Free miners' certificates | \$ 550 75 |
| Mining receipts, general | 2,601 60 |
| Tax on unworked Crown-granted mineral claims | 1,740 50 |
| | <hr/> |
| | \$4,892 85 |

CLAYOQUOT MINING DIVISION.

REPORT OF W. T. DAWLEY, MINING RECORDER.

I have the honour to submit the annual report on mining operations in the Clayoquot Mining Division for the year ending December 31st, 1911.

I regret to report that there has been a slight decrease in returns for the year.

Assessment-work was recorded as follows:—

Copper King No. 3, owned by P. Sullivan—tunnelling and stripping.

Golden Gate, owned by J. Chesterman—cash in lieu of work, \$100.

Pete and Iron King, situate at Ahousat, owned by W. Wilson—survey.

Roosevelt and Prince Alfred, owned by P. J. Wollan—tunnelling and stripping.

Ivanhoe and Double Standard, owned by W. Wilson.

Elkshore, Galena, Sulphide, and Sylvanite, owned by D. N. Hanbury—two years' work.

Bear River, owned by F. E. Drinkwater—tunnelling and stripping.

Jay Gould and Rothschilds, owned by J. Thompson.

Brown Jug No. 3, situate at Hesquiat lake, owned by A. E. Waterhouse—\$100 cash.

Hetty Green, owned by J. Thompson—tunnelling.

Lilly May and Great Western, owned by J. Thompson—two years' work.

OFFICE STATISTICS—CLAYOQUOT MINING DIVISION.

| | |
|--|----|
| Free miners' certificates issued | 29 |
| Mineral claims recorded | 42 |
| Certificates of work recorded | 40 |
| Transfers, etc., recorded | 8 |

Revenue.

| | |
|---------------------------------|----------|
| Free miners' certificates | \$113 00 |
| Mining receipts, general | 562 50 |
| | <hr/> |
| | \$675 50 |

QUATSINO MINING DIVISION.

REPORT OF O. A. SHERBERG, MINING RECORDER.

I have the honour to submit the annual report on the mining operations in the Quatsino Mining Division for the year ending December 31st, 1911.

During the past year there has been more interest taken in prospecting than the year previous, and, according to reports, some valuable discoveries made. A new discovery was made at Elk lake, which lies about half-way between Alice lake and Nimpkish lake. One group of thirty-one mineral claims has been located this fall, and it is reported that samples from several places carry values mostly in copper. As this ground was located late in the season, no work has been done on any of the claims.

On the *Quatsino King, Paramount, Hillside, Alexander, and Aldyth I.* mineral claims, situated at Teeta river, South-east arm of Quatsino sound, and owned by the Teeta River Mining Company, more than \$12,000 has been expended in development-work. Besides open-cuts, strippings, etc., a tunnel was driven on the main ledge 125 feet, and then crosscut 25 feet, the ledge not being cut through.

On the *A. T. Monteith* mineral claim, situate at Kokshittle arm, Kyuquot sound, work has been carried on through the summer months. Several small shipments of ore were taken out, building wharf, and opening up new places.

On the *Eldorado*, *Stafford*, and *Golden West* mineral claims, situate at Klaskino inlet, and owned by the Klaskino Gold Mines, Limited, work was carried on for four months this summer, with satisfactory results. The work consisted of a tunnel driven 60 feet and sinking a shaft 37 feet; 100 sacks of quartz-ore has been shipped, which all shows values in free gold.

Under the management of Thomas P. Pearson, development-work has been carried on continuously on the coal property owned by the Quatsino Coal Syndicate. This property is situated on the West arm of Quatsino sound. The underground work has been extended 800 feet. On the several other claims on the sound very little work has been done this year.

OFFICE STATISTICS—QUATSINO MINING DIVISION.

| | |
|--|----|
| Free miners' certificates..... | 56 |
| Mineral claims recorded | 90 |
| Certificates of work recorded | 26 |
| Certificates of improvement recorded | 4 |
| Bills of sales, etc., recorded | 12 |

NANAIMO DISTRICT.

NANAIMO MINING DIVISION.

REPORT OF GEORGE THOMSON, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on the mining operations in the Nanaimo Mining Division for the year ending the 31st December, 1911.

TEXADA ISLAND.

Malaspina Mine.—The main tunnel, 9 x 7 feet in size, is now in a distance of 890 feet towards the vein, but considerable drifting will have to be done before the vein is reached, and the rainy season is making it difficult to push forward the work. Plans are being arranged for the advancement of the work and for the necessary plant.

Marble Bay Mine.—This mine is still a good shipper. A report from the management failed to reach me at this time. (See notes by Provincial Assayer.)

VALDES ISLAND.

Magnet.—This claim has 130 feet of tunnel, attaining a depth of some 60 feet. The ore carries gold and copper values, and there is also showing large bodies of magnetite.

Mystery.—Very little work has been done on this property.

Stemwinder shows magnetite, some 8 to 10 feet in width, carrying values in gold and copper.

Last Chance shows about 6 feet pyrrhotite, carrying gold and copper values.

Madison.—This claim is directly north of the *Lucky Jim* group, and the *Jim* contact strikes through it, also a dyke showing some copper. Very little work has been done on this claim.

Rising Sun.—Adjoins the *Madison*. This claim has a splendid showing, 2½ feet of ore, carrying good values in copper and gold.

Lucky Jim.—This claim was one of the first staked on the island, and has a shaft down 116 feet, with one drift at 50 feet. Lower down, at 100-foot level, drifts have been run some 220 feet and quite an amount of merchantable ore taken out.

Guilher.—This claim has a shaft 30 feet in, a garnetite showing some fine copper-ore and also some free gold. Adjoining this claim are the *Condor* and *Anaconda*, which have large showings; some 25 feet in depth has been worked.

OFFICE STATISTICS—NANAIMO MINING DIVISION.

| | |
|--|-----|
| Free miners' certificates (individual) | 303 |
| " " (company) | 2 |
| Mineral claims recorded | 202 |
| Certificates of work recorded | 287 |
| Paid in lieu of work | 9 |
| Certificates of improvement | 8 |
| Transfers and agreements recorded | 48 |

NANAIMO MINING DIVISION.

NOTES BY HERBERT CARMICHAEL, PROVINCIAL GOVERNMENT ASSAYER.

TEXADA ISLAND.

A large amount of limestone was quarried on this island during the past year, as is noted in detail in the notes on "limestone." Lode-mining has been prosecuted on a commercial scale at the *Marble Bay*, *Little Billie*, *Cornell*, and *Copper Queen* mines, and on a lesser scale at a number of prospects.

The *Marble Bay* mine has been worked practically continuously since 1897, though it has changed owners several times since, and it is now owned by the Tacoma Steel Company. Within the last two years a number of improvements have been made on the surface, the pit-head having been rebuilt and a larger hoisting-engine installed. The main shaft has been sunk to the No. 10 level, 863 feet below the surface, and, from the bottom of the shaft, drifts run both to the north and south; on the northern drift, 160 feet from the main shaft, No. 2 shaft has been sunk and is now within 6 feet of the No. 13 level, or a distance of 1,157 feet from the surface.

Stoping and development-work are in progress in nearly all the levels, the biggest stopes being on the No. 11 level, and the greatest amount of ore is being taken out between Nos. 11 and 12 levels, there being an intermediate between the levels just mentioned. On levels Nos. 2, 3, 4, 6, 7, and 9, stoping and prospecting in a lesser degree is being carried on.

The ore is a mixture of bornite and copper-pyrites in a felsite-gangue. High-grade bornite-ore is being taken from the lowest level, although it was thought in the earlier stages of the mine that it would give place to copper-pyrites.

The ore is found in a light-coloured felsite, more particularly where the latter runs into the limestone country-rock; ore is also found in pockets of actinolite and sometimes associated with garnetite, though, as a rule, where the latter is found there is no ore. There is little to guide the management in prospecting for new ore-bodies, as all the felsite-shoots do not contain ore. A little ore may show up in a drift and may open out into a large and profitable ore-shoot, while, again, a good showing may be blown out in a few shots. Diabase-dykes occur all through the mine, but these appear to have been formed prior to the felsite-dykes, as pieces of the former seem to have broken off and fallen into the felsite when it was formed, the diabase retaining all its angular corners.

Taken in conjunction with the mineralogical conditions disclosed by recent work on the *Little Billie*, there is increasing evidence to lead one to believe that the felsite-dykes carrying the ore-solutions had their origin in the great granitic flow noted on this part of the coast, this rock being the most recent in the series, and that the basic materials were held in solution until they were precipitated where the felsite came in contact with limestone.

A number of veins of calcite were seen in the mine, and these contained crystals of pyrite and sometimes copper-pyrites.

An average of fifty men has been employed underground during the year, and regular shipments have been made three or four times a month.

The *Little Billie* mine is on the east coast of Texada island, half a mile south of Van Anda wharf. Work was first done on this property in 1897, when a drift was run 60 feet under some mineralized felsite; work was then discontinued for a number of years and nothing was done until a lease, with the option of purchase, was given by Henry Treat to the Reliance Mining and Exploration Company, having its head office in Vancouver.

The latter company sunk a shaft some 200 feet back from the sea; starting at an elevation of about 80 feet, the shaft reaches the first level at 10 feet above the sea-level; from the shaft drifts were run to prospect for the mineralized felsite seen on the surface.

A drift was run south-easterly for 50 feet in a felsite and granite intrusion cutting into the solid limestone, from which crosscuts were run north-east and south-west for over 50 feet each way; the south-western crosscut is in solid limestone all the way, the other reaching felsite in 40 feet; from this point a drift was run south-east for 150 feet on a limestone and felsite contact, and a considerable body of ore was worked in one stope. A drift was run north for 50 feet entirely in granite, and some prospecting was done to the west of the shaft, also in granite. Work was then stopped on this level and the shaft sunk 102 feet farther, or 92 feet below sea-level. From the bottom of the shaft a drift was run south-easterly to get below the ore seen on the level above. For the first 25 feet granite was cut through, then a diabase-dyke was cut; the drift then ran into limestone and at 125 feet from the shaft is in this rock. At 78 feet in on this drift another drift has been run nearly easterly, and at 18 feet cut through the limestone and struck ore in a felsite-gangue; this is probably the ore seen in the drift on the upper level; this drift is being continued.

From the shaft a drift has been run west a distance of 80 feet. For 32 feet this is in granite, and for the rest of the way is in limestone, cutting a diabase-dyke diagonally at 70 feet. Work in this direction has been suspended.

Where the granite gives place to limestone on this drift, another drift has been run north-westerly 110 feet to get under some felsite seen on the surface. The drift runs through limestone, at one point cutting the dyke noted on the west drift. At 110 feet the drift cut through a contact of granite with the limestone, and this contact has been followed westerly 115 feet and easterly 175 feet, in both cases striking ore in the end of the drifts; further development-work in this direction is in progress.

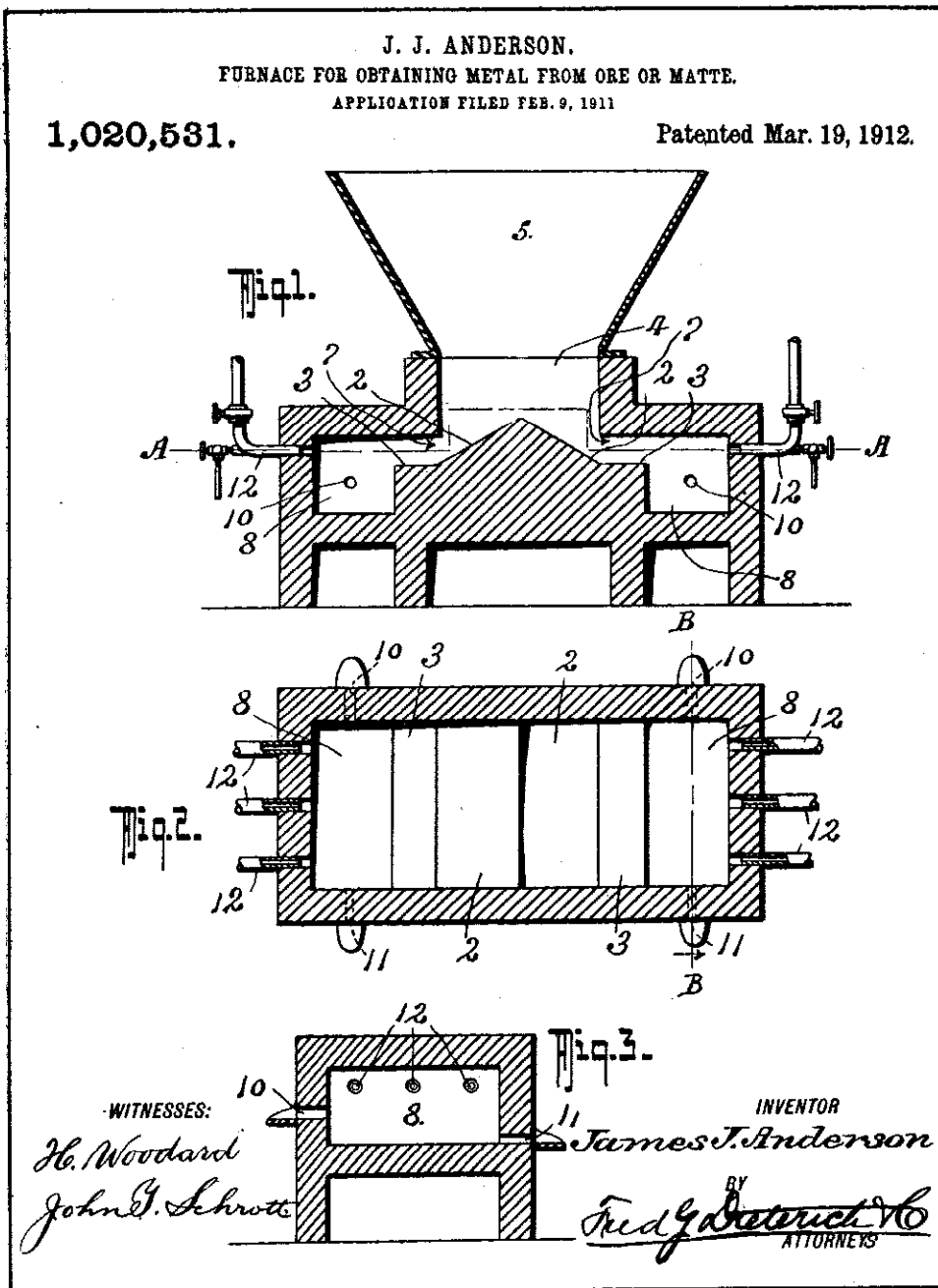
The ore is copper-pyrites, with a little bornite in a felsite. Sometimes masses of pure actinolite are found, but they do not carry any ore. The mine is equipped with a good hoisting-engine and air-compressor.

Raven.—On the *Raven* claim, two miles farther south on the Texada Island coast, a drift has been run 200 feet, but appears to have run away from the ore, which is magnetite. The drift is entirely in country-rock.

NANAIMO MINING DIVISION.

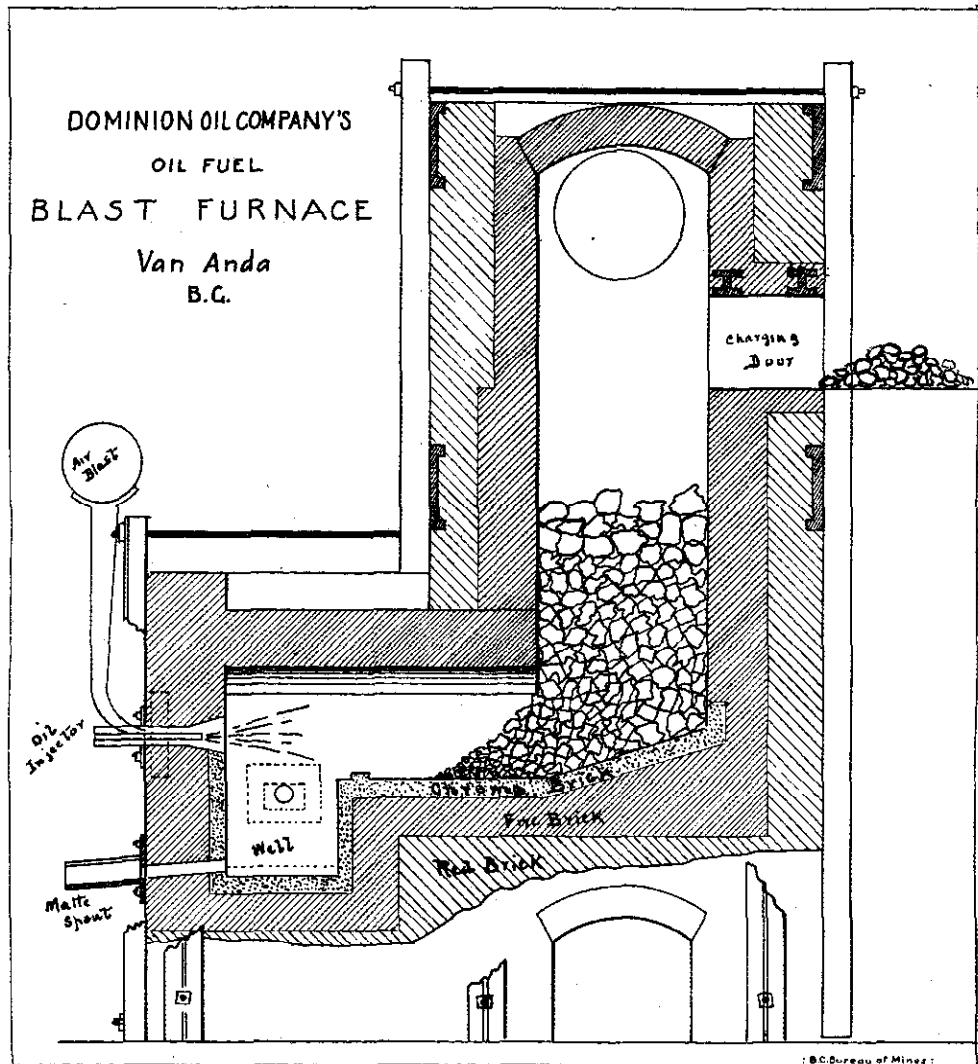
NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

For the past couple of years the Dominion Oil Smelting Co., Ltd., in Vancouver, has been conducting a series of experiments in the old Van Anda smelter, in an attempt to perfect or render practicable an oil-fired furnace for the smelting of ores, and has achieved a degree of success such as to render the process worthy of very serious consideration. The particular form of furnace being experimented with is covered by Canadian patents granted to J. J. Anderson and acquired by the company. Mr. Anderson recently—in March, 1912—has taken out a further patent in the United States for a new furnace, which is a modification of his Van Anda furnace, along lines suggested by Mr. Kiddie after he had made a trial of the Van Anda plant. A cut of the patent drawing of this furnace is given herewith.



The Van Ande furnace, of which a rough sketch is given, is essentially a shaft-furnace superimposed above one end of a reverberatory furnace or combustion-chamber. The operation is that the ore, with suitable fluxes, is fed into the shaft from a charging-floor passing down on to one end of the hearth of the reverberatory, the shaft thus serving as a feeding-hopper for the reverberatory. The reverberatory is fired by four injectors, squirting vaporized oil into it from the front, the flame therefrom impinging on the foot of the ore-column in the shaft,

the flame and products of combustion passing up through the ore-column, thereby heating it to near the melting-point and escaping through a suitable flue and chimney. The melted ore flows down over the inclined hearth of the reverberatory into a well or sump, in which the matte and slag separate by gravity and are each tapped off at suitable levels. The injectors for vaporizing the oil are operated by steam-pressure, a sufficient amount of air for proper combustion being supplied by a pressure-blower.



The furnace undoubtedly requires and will receive considerable modification before it is in a commercially successful form, but that a considerable advance towards that goal has already been made is indicated by the following report of an experimental run made by

Thomas Kiddie, a well-known metallurgist of British Columbia, whose previous extended experiment with oil-fired smelting-furnaces at the Orford Copper Company Works in New York gives his opinion additional weight :—

" 19 IMPERIAL BLOCK,
VANCOUVER, B.C., July 11th, 1911.

" *Messrs. The Dominion Oil Smelting Co., Ltd.,*
Vancouver, B.C.

"DEAR SIRs,—In compliance with your request, I proceeded to Van Anda, accompanied by Mr. Carlsrud, general manager, for the purpose of making a further demonstration with the oil-burning furnace. Tuesday and Wednesday were occupied in overhauling water-pipes, machinery, furnace, engine, blower, and water and oil pumps, all of which were tested before the demonstration was begun.

"The ore-mixture smelted consisted of Boundary ore, iron-ore as a flux and copper-slag from a previous operation. The furnace was started at 11 a.m., using two burners until it became sufficiently heated, when two more were started. Everything went along satisfactorily; slag began to flow at 12 noon; the slag was hot and continued to increase in quantity until it ran a pot of slag in one minute of time until 2.30 p.m., during which time it smelted without trouble or interruption.

"Allowing one hour for the heating-up of the furnace—a very conservative allowance—we used 157 gallons of oil in 2.33 hours, and 60 gallons for heating up the furnace, or 217 gallons in all.

"This gives an average of 14.6 gallons of oil per ton of material smelted = 43.8 cents per ton of ore. The rate of smelting was 110 tons per twenty-four hours, an increase of over 100 per cent. over the best previous demonstration.

"I have no hesitation in saying that these conditions can, and will, be much improved upon when certain changes are carried out, so that full advantage may be taken of better and more complete combustion of the oil, when the cost of oil consumed per ton of mineral smelted should approximate 30 to 35 cents per ton of ore. The saving of labour costs at the furnace I estimate at 9 cents per ton of ore.

"As a result of this and previous demonstrations, I strongly recommend that the furnace be remodelled along the lines already submitted by me to your company, and endorsed by at least two independent metallurgists of the highest standing in British Columbia.

"(Signed.) THOS. KIDDIE,
Metallurgist."

After the furnace had been somewhat modified along lines proposed by Mr. Kiddie, another experiment run was made some four months later—in November—by W. C. Thomas, formerly manager of the Boundary Falls Smelter, Midway, B.C., and who also was at one time a furnaceman with the Orford Company while oil-fuel was being used. Mr. Thomas evidently was hampered by ineffective machinery, etc., but the following is an extract from his report dated November 18th, 1911 :—

"VANCOUVER, B.C., November 18th, 1911.

"*The Dominion Oil Smelting Co., Ltd., Vancouver, B.C.*

"GENTLEMEN,—As requested by your board of directors, I left for Van Anda, accompanied by Mr. Carlsrud, November 6th, for the purpose of making a smelting-test with your oil-burning furnace which was reconstructed along lines suggested by Mr. Thomas Kiddie.

"Tuesday was spent in making arrangements for getting wood hauled, securing men, etc., and drying out furnace. Wednesday, the blast was turned on at 4.50 p.m.; slag commenced running at 5.40 p.m.; after running for thirty minutes, we tapped out, having found everything satisfactory for a run when necessary.

"We were expecting a party to witness the run on Friday, but Saturday I received word from you that party could not come. Monday, the 13th, we got ready for the run. The material smelted consisted of slag clean-up of the previous tests and a mixture of ores I found on the charging-floor that was very barren of metals for matte-producing. At noon, blast was turned on for warming-up. We commenced smelting at 1.30, when something went wrong with the engine; after some delay we started again; slag commenced running at 3 p.m. and continued until 9 p.m. without interruption. When our smelting material was exhausted we closed down.

"Twenty-five tons of material was smelted at the rate of 100 tons per twenty-four hours. Oil consumed, 380 gallons, allowing 100 gallons for warming-up; 280 gallons was consumed in smelting or 11.2 gallons per ton of ore, a cost for fuel of 33.6 cents per ton. This is a most gratifying showing, proving beyond a doubt the feasibility of your oil-furnace for smelting.

"(Signed) W. C. THOMAS,
Metallurgist."

A furnace and process very similar in principle was patented some six years ago in the United States by the late J. W. Nesmith, of the Colorado Iron Works, but, as far as can be learned, this was never in extended commercial use. Recent information, however, is received that one of the large copper-mining companies, the Pioneer Smelting Co., near Tucson, in Arizona, has erected a 200-ton experimental plant to test the process commercially, using California crude oil as a fuel. A description of this plant was given in the issue of May 4th, 1912, of the *Engineering and Mining Journal*.

J. L. Wells, formerly an assayer in Colorado, and now of Lordsburg, N.M., took out a somewhat similar patent so many years ago that it now expires in three years. In Mr. Wells' furnace the shaft was over the middle of a reverberatory furnace, so that the heat attacked the ore-column at its base on all sides. Oil was used, supplied through injectors and air from a pressure-blower. As far as is known, this furnace was not run on a commercial scale.



Britannia Mine—Upper Workings.



Britannia Beach, B.C.

VICTORIA DISTRICT.

VICTORIA MINING DIVISION.

REPORT OF GRANVILLE CUPPAGE, MINING RECORDER.

I have the honour to submit the mining statistics for the Victoria Mining Division for the year 1911, as follows:—

| | |
|------------------------------------|-----|
| Free miners' certificates..... | 669 |
| " " (special)..... | 7 |
| Mineral claims recorded..... | 52 |
| Placer claims recorded..... | 19 |
| Certificates of work recorded..... | 55 |
| Certificates of improvement..... | 4 |
| Conveyances recorded..... | 22 |
| Placer leases issued..... | 5 |
| Lay-overs recorded..... | 10 |

Revenue.

| | |
|--------------------------------|------------|
| Free miners' certificates..... | \$5,694.06 |
| Mining receipts, general..... | 1,127.75 |
| Total..... | \$6,821.81 |

NEW WESTMINSTER MINING DIVISION.

REPORT OF J. MAHONY, MINING RECORDER.

I have the honour to submit the following report of mining operations in the New Westminster Mining Division for the year 1911:—

The mineral claims recorded during the year were distributed as follows:—

| | |
|--|----|
| Howe sound and vicinity..... | 37 |
| Bowen and Gambier islands..... | 5 |
| Capilano, Lynn, and Seymour creeks..... | 27 |
| Burrard inlet..... | 6 |
| Squamish..... | 25 |
| Pemberton trail .. | 31 |
| Sechelt peninsula..... | 5 |
| Nelson island..... | 28 |
| Jervis inlet..... | 14 |
| Pitt lake..... | 14 |
| Stave lake and vicinity..... | 82 |
| Whonnock lake..... | 10 |
| Harrison lake and vicinity..... | 38 |
| Agassiz..... | 5 |
| Sumas mountain..... | 32 |
| Chilliwack river, Jones lake and vicinity..... | 59 |

There has been a considerable increase in the mineral claims recorded during the year, owing to increased activity in prospecting in the neighbourhood of Pitt lake, Stave lake, and Jones lake. Very little work has been done in developing claims in the district other than to keep them in good standing. The office statistics show an increase of revenue of \$2,787.10 over those of the preceding year.

OFFICE STATISTICS—NEW WESTMINSTER MINING DIVISION.

| | |
|--|-------|
| Free miners' certificates issued | 2,826 |
| Quartz claims recorded | 418 |
| Certificates of work recorded | 259 |
| Certificates of improvement recorded | 11 |
| Conveyances recorded | 50 |
| Placer claims recorded | 3 |

Revenue.

| | |
|---------------------------------|-------------|
| Free miners' certificates | \$17,721.85 |
| Mining receipts | 4,475.20 |
| Total | \$22,197.05 |

NEW WESTMINSTER MINING DIVISION.

NOTES BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

Little is heard about the *Britannia* mine, and it is realized by but few **Britannia Mine.** how much work has been going on there, very quietly, for a number of years back; the company does not advertise itself, and its stock is not one usually dealt in on the exchanges. Yet the property employed during 1911 an average of about 145 men below ground and 180 men above ground, and mined about 500 tons of ore a working-day, all of which was concentrated and shipped to Tacoma for smelting.

The output of the mine for the past year was about 118,900 tons, which contained, approximately, 46,000 oz. of silver and 8,685,000 lb. of copper. The ore as it is broken in the mine will run about $2\frac{1}{2}$ per cent. copper, with $\frac{1}{10}$ oz. of silver to the per cent. of copper. This is roughly hand-sorted at the mine and sent down an aerial tramway, about three and a half miles long, to the mill at Britannia Beach, on Howe sound. The concentrates, as shipped, run about 14 per cent. in copper and 1.4 oz. silver to the ton, and are shipped on scows direct to the Tacoma smelter.

A long description of the property, as it was first opened up, appeared in the Report of the Minister of Mines for 1900.

The ore-bodies originally exploited were exceedingly large, and were not only very low grade, but would not make a concentrate running over 7 to 8 per cent. copper; consequently, these old ore-bodies would not allow a profit with copper at almost 12 cents a pound.

This was the condition of affairs, continued under different managements, until about 1909; large tonnages of ore were mined and every known kind of concentrator was tried, but the results were never satisfactory commercially, chiefly on account of the difficulties met with in concentration owing to the presence of iron and zinc sulphides accompanying the copper-pyrites, the whole being so intimately mixed as to necessitate fine grinding before a separation could be effected.

The original ore-bodies were contained in a formation which was called, locally, the "Jane schists," as they were best developed at the mine of that name.

About 1909, while the property was under the management of R. H. Leach, one of the lower working-tunnels was driven in to crosscut a vein, the outcrop of which was exposed on the mountain-top; this outcrop was not very promising, but it contained much less iron and zinc than did the deposits then opened up, and it also lay in a formation slightly different in character. This newer formation is known as the "Fairview schists," and is chloritic in character.

The tunnel found the vein sought and also several others upon which for the past two years development has been energetically carried out with a force of from 150 to 200 men. As a result, there was developed in the newly discovered veins approximately 1,000,000 tons of 2.5 to 3 per cent. copper-ore, which was amenable to concentration, and on which an 80-per-cent. extraction is claimed to be made, the concentrates running, as already stated, 14 per cent. copper and 1.4 oz. silver to the ton.

This was the condition of affairs in November, 1911, when R. H. Leach was forced to resign the management, his health having given way under the heavy strain of the work.

Mr. Leach was succeeded in the management in November by J. W. D. Moodie, who had formerly been in charge of the Tintic properties in Utah, controlled by the same financial group as is the *Britannia*.

With the tonnage of ore mentioned as assured, the new management felt justified in an extensive system of improvements, which is now being pushed ahead with energy.

Among the more important improvements under way is a long, deep tunnel starting in 1,200 feet lower than the lowest old tunnel, and which will naturally be the outlet for all the ore; that from the upper workings being dropped down through chutes to this lower tunnel.

This new tunnel starts in from about the "transfer station" on the tram-line, almost half-way up, and will thus cut off the upper half of the tramway, which has been a source of great expense. It was originally intended to retain in service the lower stretch of the aerial tramway, but recent advice from one of the company's officers is to the effect that a surface electric tramway is now under construction from the Beach up to the portal of the new tunnel.

A new and very large storage-dam for water is nearing completion which will store water for power purposes, delivering it at the Beach under a head of 1,900 feet and developing 1,000 horse-power.

The air-compressor for the mine is at the Beach, the compressed air being conveyed to the mine in three miles and a quarter of 8-inch pipe.

The concentrating plant is the largest in the Province, but, as it is now being somewhat revised to meet the new conditions of the recently developed ore-bodies, it will not be advisable to describe it in detail until the changes have been completed.

The plan now in use consists of a first mill, situated on the hill overlooking the flats, to which the ore is delivered directly from the tramway. This first mill building, or "jig-house," is equipped with a picking-belt, from which a first separation is made, the waste and first-class ore being sorted out, the second-class going into the process, which consists mainly of sizing and jigging, on the ordinary type jig, and also on Hancock and Richards jigs.

The middlings and much fine material from this first mill—amounting to about 50 per cent. of the original feed—is carried by flume to the vanner-house located on the dock-mill.

In the vanner-house the material is received by two dewatering-tanks, from which the ore goes to two 6-compartment Richards classifiers, from which it is distributed to 17 Frue vanners, 11 Wilfleys, 13 Overstroms, and 9 Johnson vanners.

Experiments have been in progress for some time with a unit of the Elmore oil process, having a capacity of 35 tons of ore a day. The results obtained are reported as being very satisfactory, and the product is certainly of high grade; the process has, however, not as yet been accepted as a part of the permanent process.

NEW WESTMINSTER MINING DIVISION.

NOTES BY H. CARMICHAEL, PROVINCIAL GOVERNMENT ASSAYER.

LIMESTONE-DEPOSITS OF THE COAST.

The limestone of the coast has, so far, only been found associated with that great area of rocks called by the late Dr. Dawson the "Vancouver series." These rocks are largely made up of ash-beds and lava-flows interbedded with limestones, argillites, and quartzites; these sedimentaries were deposited during the periods of rest from volcanic action; that these periods were of long duration is evidenced by the great thickness of some of the argillite and limestone beds.

The Vancouver series extends over the greater part of Vancouver Island, including some of the adjacent islands to the east, taking in the Queen Charlotte islands and no doubt extending still farther north to the islands of southern Alaska. On the mainland coast, the valley of the Fraser river as far east as the Coast range probably contains rocks of the same series.

To the east of the Vancouver series lies a great mass of granite and granitoid rocks of later origin, and, in many places, this igneous mass has sent spurs, or felsitic dykes, for considerable distances into the limestone, and it is noteworthy that where this has taken place it is frequently accompanied by deposits of copper, in some cases large enough to be economically worked.

Owing to their association with the volcanic series above noted, the limestone-deposits on the coast are found, for the most part, to be crystalline in character, the crystals being large in size; in fact, the rock is so highly altered that very few fossils have been found. In many cases these limestone-deposits have been so fissured and traversed by dykes and volcanic flows as to render their being worked for lime a matter of great difficulty.

A systematic examination of the vast coast-line of British Columbia for all the deposits of limestone would take many years, and all that these notes attempt to do is to draw attention, in an imperfect manner, to a few of the deposits which have come under the notice of the Bureau of Mines. Greater attention has been given to those deposits immediately on navigable water, as those farther inland, owing to the cost of transport, cannot compete.

Some of the limestones are of nearly chemical purity, running 99.8 per cent. calcium-carbonate, but it has been found rather hard to judge the quality of these limestones from their appearance, samples carrying 5 per cent. magnesia and 10 per cent. silica looking much the same as pure limestone. Where reliable samples were obtained, analyses were made and will be found at the end of these notes.

In several instances deposits of calcite of some size have been found, notably associated with the iron-deposits of Barkley sound, calcite being formed by solution of the limestone in water and subsequently recrystallized.

Commencing at the northern end of Vancouver Island and following the east coast, such deposits as are known will be mentioned :—

NIMPKISH LAKE.

On the west coast of Nimpkish lake a grey crystallized limestone extends along the shore for over a mile, and is also reported farther up on the Klaanche river; these deposits are too far inland to be worked at present.

BEAVER COVE.

This cove is nearly opposite Hanson island. About half a mile up the stream which flows into the cove is a fairly extensive deposit of white crystalline limestone which may at a later date prove to be of commercial value, if not for marble, at least for limestone; this deposit has not been prospected to its full extent, so it is impossible to state its size; several samples of good-looking marble have been quarried from it. Beaver cove affords excellent facilities for loading.

HARBLEDOWN ISLAND.

Limestone, much broken and mixed with igneous rocks, has been noted on the southern shore of Harbledown island; the north and west shores of the island are granite.

VALDES ISLAND.

On south Valdes island a bed of limestone extends nearly across the island and comes out on the shore at Open bay, on the south-east coast, but at this point it is so mixed with siliceous matter as to be of no value as a limestone; in places farther inland it is much cleaner and might be worked, if transportation facilities would permit.

The *Great Gold* mineral claim is on the limestone-belt, and the limestone there shows a flow-structure in a most remarkable manner, apparently, in places, enclosing angular fragments of igneous rock.

REDONDA ISLAND.

A limestone-deposit had been reported on this island, but an examination of the island failed to disclose it.

MALASPINA INLET.

In Theodosia arm of Malaspina inlet there is a small deposit of grey and white marble mixed with serpentine rock. South of Hirtuda point, near Dinner rock, on the mainland coast, is a deposit of white marble some 50 feet wide, but the deposit seems small and could not be traced inland.

TEXADA ISLAND.

Texada island contains by far the largest limestone-deposit on the eastern side of Vancouver Island. From the north end of Texada island, following the east shore for a distance of ten miles, limestone is seen, with but few breaks, all the way, and at the northern end extends across the island.

The rock underlying a considerable part of the townsite of Van Anda is limestone, and this extends into Marble bay, where a lime-kiln was in operation for a number of years, but ceased working owing to the inclusion of silica in the lime-rock.

The presence of silica has been a source of annoyance in the Texada limestones and elsewhere on the coast, as it prevents the lime slaking properly, and, though the bulk may be properly slaked, small kernels remain unslaked and are mixed up with the wall-plaster; later on these kernels slake and "blow," making numbers of small holes and spoiling the work; this defect has prevented the extension of the lime-burning business on Texada island, as in several cases where the limestone was tested, it contained these siliceous concretions.

At Blubber bay, at the north end of Texada island, is a large deposit of limestone which is very free from the defects noted above, and one of the largest lime-burning plants in British Columbia is using this as the source of supply.

Blubber Bay Lime-kiln. *Pacific Lime Co., Ltd.*—The Pacific Coast Lime Company, Limited, has its head office in the Pacific Building, Vancouver, and its works at Blubber bay; the present capacity of the plant is 360 barrels (200 lb. net) of lime in twenty-four hours. The three kilns are on the water-front at Blubber bay, and are of the ordinary stone type, calling for no special mention; the drawing-floor and storing-sheds are on the wharf-level and there are good facilities for cheap transportation.

The lime-rock is at present taken from the "Lower quarry," which is some 200 feet to the east of the kilns and considerably lower than the charging-platform, the rock being hauled up in small cars by cable.

This quarry has a working-face 24 feet high by 160 feet long; the limestone-beds are vertical and the quarry is being run in on the strike of the beds. The limestone has been traced back for over a mile—in fact, runs to the west shore of the island. The deposit is much fractured by movement, and is, on that account, easily quarried, although it is traversed by occasional diabase-dykes, which have to be sorted out and thrown over the dump.

What is known as the "Upper quarry" is 40 feet higher than the "Lower quarry" and 300 feet to the south; the working-face is 50 feet high and 120 feet long. The strata at this quarry is horizontal, the seams being about 5 feet thick. These seams vary considerably in their content of magnesia, the top seam running 3 per cent. of magnesium-oxide, the third seam 5 per cent., while the bottom seam contains a trace only.

The presence of magnesia, while detrimental to lime-burning, is of considerable value in the manufacture of sulphite-pulp for paper-making, it yielding a much softer pulp than that made from limestone containing no magnesia. Overtures are being made to supply the Powell River Pulp & Paper Company at Powell River, four miles away, on the mainland coast.

Tacoma Steel Company.—On a continuation of the above deposit the Tacoma Steel Company is operating four small kilns on the water-front at the west side of the island, the company's original plant being at Marble bay, on the east coast of Texada island; these new kilns were erected at the present location on account of the greater freedom from siliceous admixtures. The barrel-making plant still remains at Marble bay.

North of North-east point there are limestone-cliffs 70 feet high, but all more or less mixed with amygdaloidal rocks. From North-east point to nearly the southern end of Texada island the rocks are igneous, with no limestone showing till Henderson bay is reached, where there is a small deposit of red variegated marble; this property has been purchased by the Nootka Marble Company, Limited, which has got out some good-looking samples of marble.

On the southern end of Texada island there is a bed of limestone, but it is too small to be of any commercial value.

NELSON ISLAND.

Limestone has been reported on the northern shore of Nelson island, back of Blind bay, where there is said to be a large body of limestone in sight. Gypsum was also reported to have been found on this island, but the samples examined in the laboratory proved to be calcite.

QUALICUM.

From the northern end of Vancouver Island following the east coast no limestone has been reported, until the Big Qualicum river is reached. This river flows out of Horne lake, at the lower end of which lake large bodies of limestone have been noted; in fact, it is probable that limestone occurs in great quantity along the foot-hills of the Beaufort range, since float and limestone caves are to be seen at different points; streams also disappear into the ground and again flow out from fissures in the rocks.

Limestone has not been reported at any point on the Little Qualicum flowing from Cameron lake. Some confusion is apt to arise in referring to the Big and Little Qualicum rivers, as the Big Qualicum is the smaller stream, the word "Qualicum" in the Indian language meaning pass, not river, and by the Big Qualicum the Indians meant the main pass to Alberni, and the Little Qualicum the small or little-used pass; later, the white people have associated the name of the pass with the river which runs along it.

NANOOSE BAY.

On the promontory forming the north side of Nanoose bay, limestone outcrops on the edge of the salt-water, but it is so mixed with silica as to be entirely valueless.

From Nanoose bay to Chemainus, rocks of Cretaceous age, only, are seen, and limestone is not in evidence until it is found outcropping in the Vancouver series at Raymond's crossing, near Cobble Hill station, on the Esquimalt & Nanaimo Railway. In 1886 this limestone was first burned in a small kiln of Raymond & Sons; this kiln was in continuous operation for ten years, when the firm acquired a lease on the limestone at Esquimalt harbour and transferred their business there.

SAANICH ARM.

The next occurrence of limestone is at Saanich arm, where there are at least four well-known deposits.

Tod Inlet.—The first of these, at Tod inlet, on the east side of the arm, was worked by Wriglesworth years ago, and later sold to the Vancouver Portland Cement Company. This company has an extensive deposit which is used entirely for making cement, the output of the plant being 350 barrels per day.

Elford Lime-quarry.—Across the arm from Tod inlet is what is known as the Elford lime-kiln. The land rises very abruptly from the water, and on the hillside is an extensive deposit of blue limestone, which was burned for some years in a kiln on the water's edge; operations were, however, discontinued owing, it is said, to the siliceous nodules before referred to. This work has exposed a face of limestone of some size which has been further prospected by diamond-drilling. The property has been recently acquired by English capitalists, who propose establishing a cement-making plant. Above the 17-mile post on the Esquimalt & Nanaimo Railway there is a large deposit of limestone which was taken up twenty years ago by J. Wriglesworth.

The deposit lies about one-quarter of a mile back from the Esquimalt & Nanaimo Railway track and 400 feet above it, a total altitude above sea-level of 1,100 feet; the limestone lies in a basin and has been prospected by a number of test-pits. The ultimate extent, however, is still undetermined, as the ground is covered by a heavy growth of timber and drift. This limestone on analysis proved to be exceptionally pure, numerous samples running 99.8 per cent. calcium-carbonate.

A small lake on the property might be used as a source of power, as it has an elevation of 900 feet and is about three-quarters of a mile from Saanich inlet.

WEST COAST, VANCOUVER ISLAND.

From the standpoint of geology and mineralogy, a large part of the west coast of Vancouver Island remains yet unexplored, so it is possible, and, in fact, likely, that there lie undiscovered large deposits of limestone within easy reach of the sea. A number of deposits have been brought to the notice of the Bureau of Mines, and these will be mentioned in their order, following the western shore of Vancouver Island in a southerly direction. Extensive beds of limestone exist at Quatsino sound and are found at Quatsino narrows, on Limestone island, and extend through to the West arm.

Marble creek, on Rupert arm, has cut its way for over half a mile through great beds of blue limestone, forming a canyon having walls 50 to 100 feet high. This limestone is very free from other rock-intrusion, but, in places, carries a considerable amount of magnesia.

Nootka Sound.—From Quatsino sound to Nootka sound the Bureau has practically no information, but on Deserter creek a large deposit has been examined. (See page 184, 1906 report.)

From Nootka sound to Clayoquot sound, and including the latter, very little limestone is to be seen. The only place where any body is reported is on Clayoquot arm of Kennedy lake, and no detailed information is available.

From Clayoquot to Barkley sound there are few rock-exposures, except at one or two points on the beach, and at none of these has limestone been seen.

Barkley Sound and Alberni Canal.—At numerous points on Barkley sound limestone is seen in quantity; no survey has been made of any of these places to determine the extent of the deposits, so their position only can be noted. As a general rule, the limestones of Barkley sound are very pure and free from silica or other rock.

A short distance from the head of Pipestem inlet, on the north side, is a deposit of blue limestone of some size.

Limestone has been reported on Effingham inlet, but the position was not stated.

Good limestone occurs at the northern end of Copper island and also at the south end; it has also been reported in the vicinity of Port Nooke, but the deposit is believed to be of small extent.

On the north side of Uchucklesat harbour, limestone is seen on the water-front in several places, and probably extends back for some distance; it is very free from admixtures of other rocks.

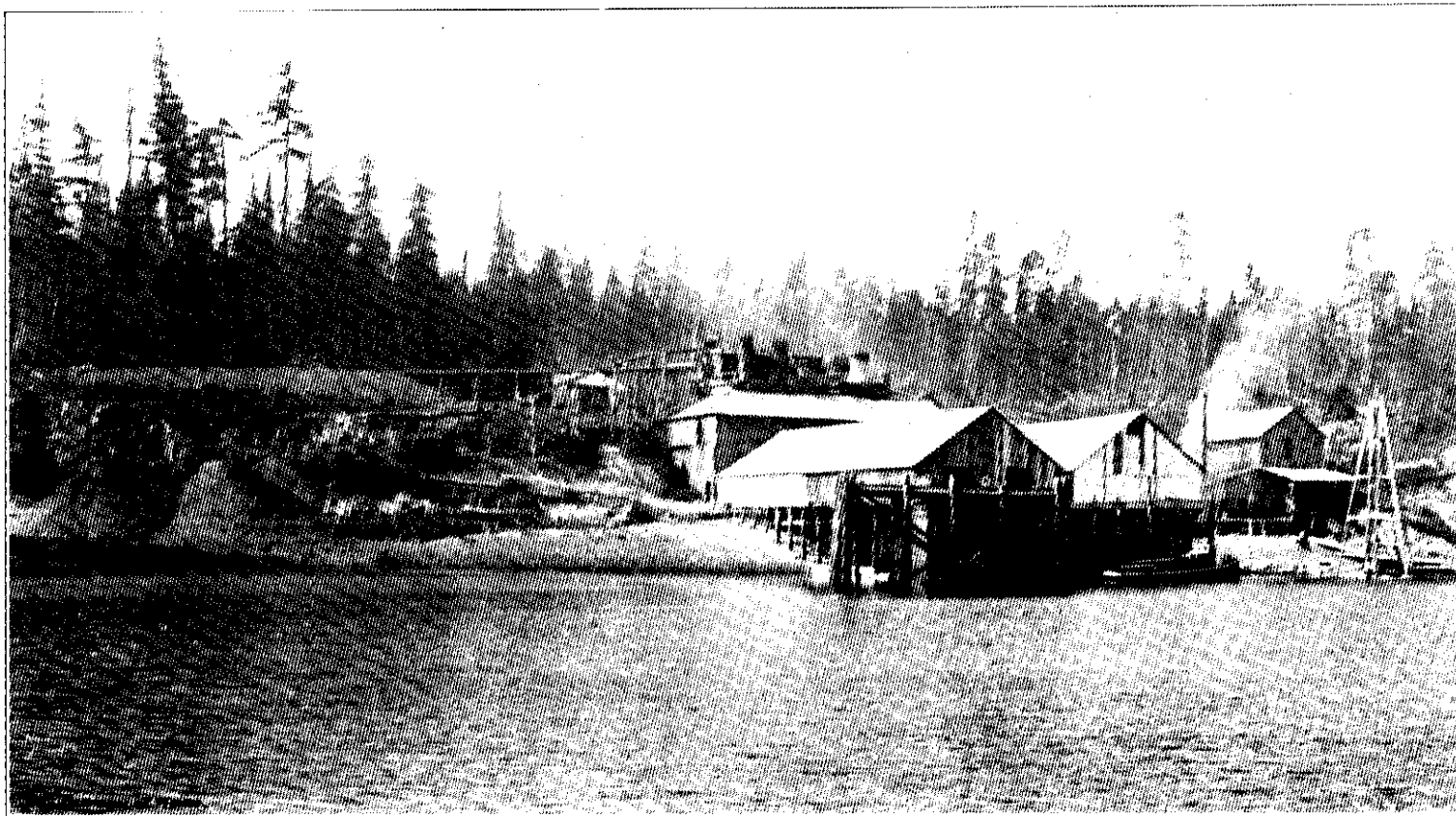
A small deposit of limestone was noted at Smith's landing, Alberni canal, nearly opposite to the mouth of the Nahmint river; from this point to Port Alberni no other deposits are to be seen along the water-front.

From Barkley sound to Port Renfrew the rock-exposures have not been carefully examined, but no limestone has been reported from this section; even if limestone did exist, there are no harbours and the shipping facilities would be bad.

At Port Renfrew limestone has been reported to occur some distance back, on the Gordon river, which flows through Port Renfrew District, but it is too far back to have much value at present.

From Port Renfrew to Esquimalt no limestone has been reported, and from that port to Sooke there are no harbours.

Esquimalt Harbour.—On the west side of Esquimalt harbour the Rosebank Lime Company, Limited, operates three kilns, having a capacity of about 300 barrels per day.



Line Quarry at Blubber Bay—Texada Island.

The kilns are well situated for cheap transportation, the draw-floor being a few feet above high water on a sheltered harbour; the charging-floor is nearly on a level with the bottom of the quarry, from which the lime-rock is brought on cars over a narrow-gauge track.

The quarry is some 500 yards back from the kilns, and the quarry-floor is at such a height that the cars can be easily pushed by hand to the kilns. A semicircular face of limestone 160 feet long by 40 feet high is exposed, intersected in places by diabase-dykes. The lime-rock is of a blue-grey colour and free from silica where it is not intersected by dykes. The limestone-bed appears to extend for a considerable distance back, but nothing more than surface prospecting has been done.

The product of the kilns is shipped in barrels and finds a ready market in Victoria and Vancouver.

ANALYSES OF LIMESTONES.

| Locality. | Calcium-carbonate. | Silica. | Magnesia. | Iron and Alumina |
|-----------------------------|--------------------|---------|-----------|------------------|
| Texada island, Blubber bay— | | | | |
| New quarry | 99.0 | 0.6 | 0.2 | Trace. |
| Old quarry, Lower seam..... | 93.6 | 0.3 | 5.1 | " |
| Saanich inlet— | | | | |
| Wriglesworth | 99.5 | 0.4 | None. | " |
| Lorimer..... | 92.0 | 7.8 | " | " |
| Elford..... | 91.5 | 8.0 | " | " |
| Esquimalt harbour— | | | | |
| Rosebank | 98.0 | 1.5 | Trace. | 0.2 |
| Barkley sound— | | | | |
| Uchucklesat..... | 99.8 | 0.1 | None. | Trace. |
| Elk river..... | 98.0 | 1.7 | Trace. | 0.1 |
| Nootka marble | 99.8 | 0.1 | None. | Trace. |
| Nanoose bay | 85.0 | 14.8 | " | " |

INSPECTION OF METALLIFEROUS MINES.

At the beginning of the year 1909 a change was made in the system of mine inspection, by the appointment of a Chief Inspector of Mines, who has direct charge and control over the District Inspectors, who report to him direct.

Francis H. Shepherd was the first appointed to this office—in January, 1909—and he held office until the fall of 1911, when he resigned.

On January 1st, 1912, Thomas Graham was appointed Chief Inspector, with office in Parliament Buildings, Victoria.

WEST KOOTENAY AND BOUNDARY DISTRICTS.

REPORT OF JAMES MCGREGOR, INSPECTOR.

I have the honour to submit my annual report as Inspector of Mines for West Kootenay District for the year 1911.

NELSON DISTRICT.

The number of shipping mines in the Nelson District has not increased during the year, although many properties have been greatly developed, with every prospect of becoming producers in the near future.

The mines which come under the "Metalliferous Mines Inspection Act" I found, upon inspection, to be operated carefully, with regard to the handling and thawing of powder; I also found the ventilation ample. The provisions of the Act generally are being observed.

YMIR DISTRICT.

The operating mines in the Ymir District have not worked continuously during the year, owing to improvements being carried on in the transportation system. I found, upon inspecting the different mines while they were in operation, that the Act was being complied with in all respects.

SHEEP CREEK DISTRICT.

The Sheep Creek District has been quite active during the year, especially in developing and equipping new properties, and there is every indication of several additional shipping mines being added to the list during the coming year.

Upon inspection of the operating mines of the district, I have invariably found them well timbered and ventilated, care also being exercised in placing ladder and travelling ways. The Act is being complied with in the thawing and handling of powder.

ROSSLAND DISTRICT.

The mines in the Rossland District have worked continuously during the year, making an increased output. An extensive and systematic policy of developing has been vigorously carried on during the year.

At these mines, which are very extensive, there is necessarily a great amount of machinery and equipment, all of which I found, upon inspection, to be in good condition.

The great amount of powder necessarily required to operate these mines is thawed, transported from the thawer into the mines, and carefully handled

The large quantity of timber used in the different mines of this district is framed by machinery on the surface, being well and carefully placed underground.

These mines are closely timbered throughout. I have always found, upon inspection, a safe condition existing and the Act being complied with as near as possible.

BOUNDARY DISTRICT.

Several of the larger mines of the Boundary District have been operated only about half the year, owing to industrial troubles at the source of the coke-supply for the smelters. Those troubles now being ended, the mines are again in operation, with all indications of a steady run for the coming year.

All of the larger mines in this district are worked on the open stope and pillar system, thereby dispensing with the necessity of any timbering in the stopes.

I have always found the travelling-ways and roadways in a safe condition and the ventilation sufficient. At these mines a large quantity of powder is required, all of which I found, upon my rounds of inspection, to be carefully thawed, handled, and distributed. All machinery and other equipments I found in good condition; a desire to comply with the Act always being evident.

SIMILKAMEEN DISTRICT.

The number of mines in operation in the Similkameen District is the same as last year. The output has increased considerably, and a large amount of developing and prospecting has been accomplished during the year. Upon inspection, I have found the mines, trams, and travelling-ways in a safe condition, also that the powder was being carefully thawed and handled.

The open stope and pillar system is in operation at these mines, ventilation being good. I always find a strong inclination on the part of the management to comply with the Act.

LARDEAU DISTRICT.

In the Lardeau District there has not been any increase in the number of shipping mines during the year. Prospecting and developing has been in active progress, with favourable results.

AINSWORTH DISTRICT.

There has not been any increase in the number of shipping mines in the Ainsworth District during the year; yet a very noticeable increase in the number of properties being developed, with promising results, for the present year being evident. Prospecting in all parts of the district was actively carried on. I found the mines which come under the Inspection Act well kept and in a safe condition.

SLOCAN DISTRICT.

The Slocan District has been exceedingly active during the year, several new properties entering on the shipping list and others greatly increasing their output. Many large development schemes have been launched and are progressing favourably, with every appearance of success in the near future.

Those mines which come under the Inspection Act I found to be in a safe condition, the timbering being well and securely placed. It is necessary to timber closely in all of the mines in this district.

All travelling-ways and man-ways I found carefully arranged, and great care exercised in the thawing and handling of powder. In all other respects I found the Act being conformed to.

Appended is the list of accidents for the year 1911.

EAST KOOTENAY DISTRICT.

REPORT OF EVAN EVANS, INSPECTOR.

I have the honour, as Inspector of Metalliferous Mines for the East Kootenay District, to submit my annual report for the year 1911.

The following mines worked continuously during the year: *St. Eugene*, *Aurora*, and *Society Girl* at Moyie, and the *Sullivan* mine at Kimberly.

Upon inspection of the mines which come under the Act, I have always found them to be well timbered and well ventilated by natural or artificial ventilation, and the requirements of the "Inspection of Metalliferous Mines Act" carried out as nearly as reasonably possible.

I have two accidents to report for the year.

COAST INSPECTION DISTRICT.

REPORT OF JOHN NEWTON, INSPECTOR.

I have the honour to submit, as Inspector, the report of my inspection of the metalliferous mines in the Coast District during the year ending 1911.

TEXADA ISLAND.

Marble Bay Mine.—This mine is operated by the Tacoma Steel Co. The shaft is sunk down 1,200 feet, with levels turned off at regular intervals; all the levels are connected by a downcast stope, making a good ventilation. A good supply of fresh air is circulating through this mine, caused by all the stopes being connected from the surface to the bottom of the shaft; this stope has a good ladder-way, protected by handrails.

This mine has eight levels in operation: No. 1, 250 feet; No. 2, 500 feet; No. 4, 325 feet; No. 6, 370 feet; No. 7, 480 feet; No. 8, 520 feet; No. 11, 860 feet; No. 12, 870 feet.

Machinery installed—Two boilers, 100 and 85 horse-power; one Canadian Rand compressor, 10-drill; five Lidgerwood hoists, three below and two on top; one electric dynamo, 7 kw.

Little Billie Mine.—This shaft is down about 170 feet, 102 feet being sunk during the present year. A good ventilation is circulating through this mine; a good ladder-way, well protected; and the mine is in good condition. Two levels are turned off from the bottom of the shaft, east and west; the West level is in a distance of 275 feet, and the East in a distance of 150 feet.

Machinery installed—One 5-drill Canadian Rand compressor; one hoist, 40 horse-power; one rotary pump; one sawmill-engine, 35 horse-power; one boiler, 60 horse-power.

The *Cornell Mine*, the *Rose*, and the *Bell* are shut down.

Malaspina Mine.—This mine is situated about four miles to the south from Van Anda. A tunnel is driven in a distance of 700 feet, but no ore has been struck; this mine was shut down on the 12th of December.

NEW WESTMINSTER DISTRICT.

Britannia Mine.—This mine is situated up Howe sound, twenty-eight miles from Vancouver, four miles up the mountain from Britannia Beach, at an elevation of 4,200 feet. The ore is shipped over an aerial tramway four miles in length, to the crushers at the Beach.

During the year I visited this mine every alternate month, and found the following conditions: The ventilation is very good, caused by all the portals being connected with the open surface. A good ladder-way is connected from the lower level to the *Fairview*, which is the top level; all the ore runs down one large chute from the top level to the bottom, and is hauled out with a 3-ton electric motor to the tramway bins, and from there conveyed to the Beach by the aerial tramway.

The following levels are in operation: No. 1, 1,500 feet; No. 2, 1,900 feet; No. 3, 200 feet; No. 4, 300 feet; No. 5, 400 feet; No. 6, 600 feet.

Machinery installed—One Canadian Rand two-stage compressor, 2,400 cubic feet capacity, driven by a Pelton wheel; two 200-kw. A.C. generators, 6,600 volts, driven by a Pelton wheel; two No. 6 Champion crushers, conveyor-belts, etc., driven by electric motor; one 6 x 6 hoist, double-cylinder, driven by compressed air; five 5 x 5 hoists, double-cylinder, driven by compressed air; one continuous-cable haulage system, driven by electric motor; one timber-elevator, 6 x 6, double-cylinder; also an 8 x 8 air-line conveying the compressed air from the Beach to the mine, a distance of four miles.

LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1911.

REPORT BY JAMES MCGREGOR AND EVAN EVANS, INSPECTORS, EAST AND WEST
KOOTENAY AND BOUNDARY DISTRICTS.

| No. | Mine. | Date. | Name. | Occupation. | Details. |
|-----|-----------------------|----------|---------------------------|---------------|--|
| 1 | Mother Lode..... | Jan. 21 | Charles Heino. | Miner | Fell off bench and severely injured. |
| 2 | Gold Drop | Feb. 1 | Gus Martin ... | " | Fell off bench into chute and killed. |
| 3 | Nickle Plate | " 10 | Harry Sweet.. | " | Slightly injured by explosion of powder while cleaning out a hole. |
| 4 | Richmond-Eureka | " 19 | John Beaton .. | " | Both legs broken by rock falling from hanging-wall. |
| 5 | Centre Star | " 19 | Sobbotino | Labourer ... | Killed by skip in shaft. |
| 6 | Knob Hill | Mar. 20 | [Blozzi] John Evans... | Miner | Killed by loose rock knocking him into a chute at quarry. |
| 7 | Cliff | Apr. 5 | Victor Shore.. | " | Premature explosion of powder at face of tunnel killed these two. |
| 8 | " | " 5 | Harry Howard | " | |
| 9 | Nickle Plate | May 24 | Mike Seditch.. | " | Slightly injured by throwing a drill on to powder, exploding it. |
| 10 | " | " 24 | Vic. Williams. | " | |
| 11 | Mother Lode | " 25 | James Moore.. | Chuteman .. | Killed by premature explosion of shot he was preparing. |
| 12 | Surprise | June 7 | J. W. Peacock. | Miner | Eyes injured by picking into powder, which exploded. |
| 13 | Rawhide | " 13 | Antonio Migias | Shoveller ... | Killed by being knocked into chute by falling rock. |
| 14 | Van-Roi..... | " 20 | J. Oya | " | Fell down chute and sustained fractured jaw. |
| 15 | Nugget..... | " 27 | Henry Larson. | Miner | Struck by a rolling log on hillside and killed. |
| 16 | Josie | July 17 | Alex. Byers... | " | Eyes injured by drilling into missed hole. |
| 17 | " | " 17 | J. Beckman ... | " | Killed by drilling into missed hole. |
| 18 | Queen | Sept. 20 | Richard [Heaketh] | " | Asphyxiated by gas in a prospect tunnel. |
| 19 | Nome (Kaslo) | Oct. 5 | John Riggie .. | " | Found dead in prospect tunnel, where he had been working alone. |
| 20 | Centre Star | " 9 | James Hall ... | Trammer ... | Killed by falling off a ladder. |
| 21 | Hewitt | Dec. 4 | Benj. Kneebone | Timberman . | Fatally injured by falling down chute. |
| 22 | Emma | " 7 | Thomas H. [Williams] | Miner | Killed by drilling in unexploded hole in boulder. |
| 23 | St. Eugene..... | Feb. 20 | Andy Ostrom.. | Machineman | Struck a missed hole with pick and sustained fractured scalp, shattered hand, one eye out, and other injured; died in four days. |
| 24 | Sullivan | June 23 | A. Moro..... | Shoveller ... | Slab of ground slipped and broke his leg below knee. |

REPORTED BY JOHN NEWTON, INSPECTOR, COAST DISTRICT.

| No. | Mine. | Date. | Name. | Occupation. | Details. |
|-----|---------------------|----------|------------------------|----------------------|---|
| 25 | Britannia | Jan. 1 | John Maki | Mucker | Falling rock crushed foot. |
| 26 | " | " 15 | J. Pearce | Timber- [helper] | Piece of lagging fell on his shoulder and bruised him. |
| 27 | " | " 15 | A. McPhee | Timberman .. | Knocked off staging and bruised shoulder. |
| 28 | " | " 27 | Geo. Strath ... | Mucker | Caught between car and rock-chute and injured. |
| 29 | " | Feb. 21 | C. L. Johnson. | Miner | Asphyxiated ; killed. |
| 30 | " | Mar. 4 | Frank Morris .. | " | Struck with shovel and injured thumb. |
| 31 | " | " 10 | T. Kenmatsu .. | Labourer ... | Ankle bruised by a piece of lumber falling on it. |
| 32 | Marble Bay | " 30 | Henry [Patterson] | Carpenter ... | Injured leg with adze (above ground). |
| 33 | Britannia | Apr. 1 | Aubrey [Bradshaw] | Mucker | Left leg cut off by electric motor. |
| 34 | " | " 3 | T. Okaba | Labourer ... | Ankle broken by ore-bucket. |
| 35 | " | " 21 | Neil Forbes ... | Tram- [brakesman] | Hand crushed between car and chute. |
| 36 | " | May 1 | D. Luperina .. | Trammer ... | Fall of rock bruised hand. |
| 37 | Marble Bay | " 10 | John Redstone | Machinist ... | Repairing mine-pump, burned by gas-olene-lamp. |
| 38 | " | " 12 | Alfred Gould .. | Miner | Left leg broken by premature blast. |
| 39 | " | " 12 | John Todd | " | Fell off a scaffold, injuring hip. |
| 40 | " | June 15 | Wm. McGilliv- [ray] | Mucker | Breaking of hoist-rope cut off hand. |
| 41 | Britannia | " 24 | Richard [Brindley] | Millman | Caught in the concentrator machinery and crushed arm and shoulder. |
| 42 | " | July 3 | K. Sugimoto .. | Labourer ... | Surface-elevator belt fell on him and caused internal injury. |
| 43 | Little Billie | " 13 | Gus Simon | Miner ... | Bulk-head fell on him and caused injury of back. |
| 44 | Goose Bay | Sept. 28 | Sam Roulot ... | Mucker | Right eye injured and right foot fractured by picking into missed hole. |
| 45 | " | " 28 | John Evans ... | " | Same accident ; eye and hands injured. |
| 46 | Britannia | Oct. 24 | Jas. Cairns ... | " | Fell into a chute, injuring head and body. |
| 47 | " | Nov. 1 | Alex McDonald | Timber- [helper] | Fall of rock injured leg. |
| 48 | " | " 28 | Henric LeBlac. | Mucker | Fall of rock injured ankle. |
| 49 | " | Dec. 12 | F. Holmberg .. | " | Fall of rock injured ankle. |
| 50 | Marble Bay | " 15 | Jno. Dempsey. | Miner | Fall of rock killed him. |

TABULATED LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1911.

| | CAUSE OF ACCIDENT. | EXTENT OF INJURY. | | | TOTAL. |
|---|--|-------------------|----------|---------|--------|
| | | Fatal. | Serious. | Slight. | |
| A | Blasting | 3 | 1 | .. | 4 |
| B | Defective powder | .. | .. | .. | .. |
| C | Drilling into old holes containing powder | 3 | 2 | 3 | 8 |
| D | Powder in muck | .. | .. | 2 | 2 |
| E | Shafts and cages, accidents connected with | 1 | 1 | .. | 2 |
| F | Falling down shafts or winzes | .. | .. | .. | .. |
| G | Falling down chutes | 5 | .. | 2 | 7 |
| H | Mine-cars | .. | 1 | 2 | 3 |
| I | Rock falling in stopes, levels, etc. | 1 | 2 | .. | 3 |
| J | Rock falling down chutes or openings. | .. | .. | 4 | 4 |
| K | Timbering | .. | .. | 3 | 3 |
| L | Miscellaneous, underground | 3 | 2 | 4 | 9 |
| M | Miscellaneous, surface | 1 | 1 | 3 | 5 |
| | Totals | 17 | 10 | 23 | 50 |
| Accidents for each 100,000 tons ore mined | | 0.96 | 0.56 | 1.24 | 2.59 |
| Accidents for each 1,000 men employed | | 5.24 | 3.08 | 7.09 | 15.42 |

COAL-MINING IN BRITISH COLUMBIA

BY WM. FLEET ROBERTSON, PROVINCIAL MINERALOGIST.

In reviewing the coal-mining industry of the Province, it becomes almost necessary, in order to get a proper understanding of existing conditions, to consider it by districts, since the conditions applying to the Coast are quite different from those appertaining to the East Kootenay field.

There are, however, certain points common to both fields, and one of these is that in both fields, and consequently in the Province as a whole, the output of coal made by the collieries now in operation has been much more than able to provide for the home demand, and has also been able to supply for export a very considerable tonnage of coal.

The total sales of coal by the Province during 1911 amounted to 1,986,475 tons (2,240 lb.), of which 1,373,779 tons, or about 69 per cent. of the total sales, was sold for use in Canada, while 612,696 tons, or 31 per cent., was exported.

In the Coast District the demand for export coal has been so great and constant, particularly on the seaboard, and the prices obtainable so satisfactory to the shippers, that it has permitted of the domestic price being kept at a figure so high as to admit of the importation from California of fuel-oil as a competitive fuel, where conditions permit of its use.

To-day all the large coastwise steamships are now equipped with oil-burning boilers, and the Government has under consideration a Bill requiring the railways to use oil-fuel as a safeguard against forest fires, which does not seem to have brought out any serious protests—as far as being obliged to use oil is concerned—from any of the railways.

As a matter of comparison, California fuel-oil is being sold in British Columbia, delivered in bulk, for 75 cents a barrel; and the experience of the large users is that it takes from $3\frac{1}{2}$ to 4 barrels of such oil to do the work of one ton of local coal, which costs on the coast from \$4 to \$4.50 a ton.

Notwithstanding the heavy consumption of fuel-oil, the coal sales of the Coast District this year show an increase over those of last year of 201,569 tons, or about 13.6 per cent.

The export to the United States remains almost the same as it was last year (only 272 tons greater), the export to "other countries" than the United States shows a decrease of about 35 per cent., while the home consumption of coal sold shows an increase of 222,779 tons, or 21 per cent.; this latter giving some criterion as to the growth of home industries, despite the extended use of fuel-oil already mentioned.

It would appear, therefore, that the present price of coal on the seaboard, of from \$4 to \$4.50 a ton f.o.b., is not liable to decrease for some time.

The East Kootenay collieries, owing to their distance from the seaboard and the costs of transportation, do not enter into competition with the Coast collieries—nor vice versa—each having separate interests.

The East Kootenay collieries are, however, brought into direct competition with the collieries of Alberta just over the Provincial boundary-line, all these collieries being in the same coalfield, with practically the same grade of coal and working under similar conditions.

This competition has kept the price obtainable for coal at from \$2.25 to \$2.50 a ton, with little probability of any material increase in price, owing to the facility with which new collieries can be opened up and the very large reserve areas of coal limits in that district; a description of these reserves was given in the report of this Bureau for the year 1909.

The collieries of the East Kootenay District, and also those of Alberta adjoining, had a very unprofitable year in 1911, inasmuch as they were all closed down for a period of eight months, from April 1st to December 1st, and during which no production was made, so that the output for this year is only about one-third of last year's; for the four months they were operated the output was, however, quite up to that for a corresponding period of 1910.

The cause of this closing-down of these collieries was the failure for that period of the operating companies and the Labour Union to come to an "agreement" as to wages, etc.; the old "agreement" expired on April 1st, 1911, and the new one finally concluded runs until March 31st, 1915.

The gross output of the East Kootenay collieries for 1911 was only 442,057 tons (2,240 lb.), as compared with 1,365,119 tons in 1910, a shortage of 923,062 tons. The sales of coal show a similar shrinkage, being 305,033 in 1911, as compared with 933,665 tons in 1910. Of the coal sold, about 69 per cent. was exported to the United States and 31 per cent. was used in Canada.

The following table shows, for the past five years, the output and the *per capita* production of the various districts:—

| Year. | District. | Gross Tons of Coal mined during Year. | Total No. of Employees at Colliery. | Tons of Coal mined per Employee for Year. | Number of Men employed Underground. | Tons of Coal mined per Underground Employee for Year. |
|-------|------------------------|---------------------------------------|-------------------------------------|---|-------------------------------------|---|
| 1907 | East Kootenay District | 876,731 | 2,290 | 383 | 1,527 | 574 |
| | Coast District..... | 1,342,877 | 3,769 | 356 | 2,862 | 469 |
| | Whole Province | 2,219,608 | 6,059 | 366 | 4,389 | 506 |
| 1908 | East Kootenay District | 883,205 | 2,524 | 350 | 1,746 | 506 |
| | Coast District..... | 1,226,182 | 3,549 | 345 | 2,686 | 456 |
| | Whole Province | 2,109,387 | 6,073 | 347 | 4,432 | 476 |
| 1909 | East Kootenay District | 923,865 | 2,427 | 380 | 1,737 | 532 |
| | Coast District..... | 1,476,735 | 3,991 | 370 | 2,976 | 496 |
| | Whole Province | 2,400,600 | 6,418 | 374 | 4,713 | 509 |
| 1910 | East Kootenay District | 1,365,119 | 3,111 | 439 | 2,374 | 575 |
| | Coast District..... | 1,774,116 | 4,647 | 382 | 3,529 | 502 |
| | Whole Province..... | 3,139,235 | 7,758 | 404 | 5,903 | 532 |
| 1911 | East Kootenay District | 442,057 | 2,197 | 201 | 1,585 | 272 |
| | Coast District..... | 1,855,661 | 4,676 | 397 | 3,627 | 511 |
| | Whole Province | 2,297,718 | 6,873 | 334 | 5,212 | 440 |

The figures given for 1911 are the actual statistics for that year, but they are in a way misleading in comparison with other years, since the collieries of the East Kootenay District only worked for four months of the year.

The number of men given above, as employed in the East Kootenay collieries, is from the pay-rolls at the end of the year, a month or so after the shut-down; during the first three months of the year, while the mines were in operation, before the shut-down, the number of men employed approximated the number shown as employed in 1910; taking an average for these four months, it would make the "total number of employees" 2,882 and the "number employed underground" 2,177.

To properly show the *per capita* production for the year—i.e., the rate of a man's mining-power—it would be necessary to suppose that these collieries worked for the whole year at the same rate as they did for the four months they were in operation. If then, for purposes

of comparison, we insert the average number of men employed, as above, and the amount of coal these mines would have produced if they had been worked for the whole year, the table for 1911 would appear as follows:—

| Year. | District. | Gross Tons of Coal mined. | Total No. of Employees at Colliery. | Tons of Coal mined per Employee. | Number of Men employed Underground. | Tons of Coal mined per Underground Employee. |
|-------|------------------------|---------------------------|-------------------------------------|----------------------------------|-------------------------------------|--|
| 1911 | East Kootenay District | 1,326,171 | 2,882 | 460 | 2,177 | 609 |
| | Coast District..... | 1,855,661 | 4,676 | 397 | 3,627 | 511 |
| | Whole Province | 3,181,832 | 7,558 | 421 | 5,804 | 531 |

While no figures can be given as to the actual cost of mining in the different fields, the *per capita* production of these fields is of interest, as having a bearing upon the working costs, as indicating the mining facilities existing and the improvement made in these conditions from year to year.

It will be seen from the above table that the production "per employee" has steadily and materially increased during the past three years. This increased effectiveness of the labour employed is largely due to better methods, better equipment, and greater volume of output.

In the Coast District in 1911 the effectiveness of the total employees was increased from 382 tons to 397 tons *per capita*, and for underground employees it was increased from 502 to 511 tons *per capita*.

In the East Kootenay field it is not possible this year to give definite figures; but from the supposititious case presented above, it would appear that the effectiveness of the employee in that field has also materially increased, as is also the case with the whole Province.

The year 1911 gave promise of making a coal production greater than even the "banner year" of 1910, and such would undoubtedly have been the case but for the East Kootenay labour troubles already mentioned. As it was, however, the collieries of the Province mined 2,297,718 tons (2,240 lb.) of coal during 1911; of this gross tonnage, 1,986,475 tons was sold as coal, 29,093 tons was lost in washing, etc., 104,656 tons was used in making coke, 178,242 tons was used under the boilers, etc., of the producing companies, while the stock pile was drawn upon to the extent of 748 tons to help out the shipments.

The production of coke fell this year to 66,005 tons, all made in the East Kootenay field; the coke sales amounted to 73,454 tons (2,240 lb.), of which 7,486 tons was drawn from stock.

As in former years, the greater proportion of this product was made by three larger companies—the Crow's Nest Pass Coal Co., with two collieries in East Kootenay, and by the Western Fuel Co., of Nanaimo, and the Canadian Collieries, Ltd. (formerly the Wellington Colliery Co.), these last two operating on Vancouver Island.

In addition to these larger shippers, very appreciable shipments have been made by the Hosmer Mines, Ltd., and the Corbin Coal & Coke Co., in East Kootenay; by the Nicola Valley Coal & Coke Co., the Diamond Vale Collieries, and the Island Coal & Coke Co., all of the Nicola valley; by the Princeton Coal & Land Co., of Princeton; and by the Pacific Coast Coal Mines, Ltd., and Vancouver & Nanaimo Coal Mining Co., both operating on Vancouver Island, near Nanaimo.

The details of the shipments made by each of these companies will be found in reports of the Inspectors of the various districts.

During the year 1911 about 69.15 per cent. of the coal, sold as such, by the collieries of the Province was consumed in British Columbia; about 28.90 per cent. was exported to the United States, including Alaska; and 1.95 per cent. was exported to other countries, chiefly to Mexico. Of the coke sold, about 98 per cent. was consumed in British Columbia, and the remainder was exported to the United States.

The distribution of this output of coal and coke is shown in the following table:—

COAL AND COKE PRODUCED, EXPORTED, ETC., BY PROVINCE DURING YEAR 1911.

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|-----------|-----------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 1,373,779 | ..... | 72,187 | ..... |
| " export to United States | 573,888 | ..... | 1,267 | ..... |
| " " other countries | 38,808 | ..... | ..... | ..... |
| Total sales ..... | ..... | 1,986,475 | ..... | 73,454 |
| Lost in washing | 29,093 | ..... | ..... | ..... |
| Used in making coke | 104,656 | ..... | ..... | ..... |
| Used under colliery boilers, etc. | 178,242 | ..... | 37 | ..... |
| Total for colliery use ..... | ..... | 311,991 | ..... | 37 |
| Stocks on hand first of year | 69,539 | 2,298,466 | 12,998 | 73,461 |
| " last of year | 68,791 | ..... | 5,512 | ..... |
| Difference taken from stock during year ..... | ..... | 748 | ..... | 7,486 |
| Output of collieries for year ..... | ..... | 2,297,718 | ..... | 66,005 |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 172 | ..... | 90 | ..... | 262 | ..... |
| Whites—Miners. | 2,424 | ..... | ..... | ..... | 2,424 | ..... |
| Miners' helpers | 592 | ..... | ..... | ..... | 592 | ..... |
| Labourers | 1,067 | ..... | 448 | ..... | 1,515 | ..... |
| Mechanics and skilled labour | 563 | ..... | 560 | ..... | 1,123 | ..... |
| Boys | 149 | ..... | 81 | ..... | 230 | ..... |
| Japanese | 171 | ..... | 13 | ..... | 184 | ..... |
| Chinese | 71 | ..... | 459 | ..... | 530 | ..... |
| Indians | 3 | ..... | 10 | ..... | 13 | ..... |
| Totals | 5,212 | ..... | 1,661 | ..... | 6,873 | ..... |

COLLIERIES OF THE COAST DISTRICT.

The gross output of the Coast collieries, including the Nicola valley, for the year 1911 was 1,855,661 tons (of 2,240 lb.) of coal actually mined, while some 2,511 tons was added to "stock," making the actual consumption of coal 1,853,150 tons.

Of this gross consumption, 1,681,442 tons was sold as coal, 142,615 tons was consumed by the producing companies as fuel, and 29,093 tons was lost in washing; no coal was used in making coke. Although no coke was produced, 6,153 was taken from stock and sold.

Formerly, in 1902, the Coast collieries exported to the United States 75 per cent. of their coal; in 1910 they exported there only 24.5 per cent. of their product, 71.3 per cent. of the output being consumed in Canada. In 1911, 76.1 per cent. of the coal sold was for consumption in Canada, 21.6 per cent. was exported to the United States, and 2.3 per cent. to other countries.

The following table gives an aggregate summary of the output of the Coast collieries for the year 1911, and shows the dispositions made of such product:—

| SALES AND OUTPUT FOR YEAR. | COAL. | | COKE. | |
|--|-----------|-----------|--------|--------|
| (Tons of 2,240 lb.) | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 1,278,640 | ..... | 6,153 | ..... |
| " export to United States | 363,994 | ..... | ..... | ..... |
| " " other countries..... | 38,808 | ..... | ..... | 6,153 |
| Total sales..... | ..... | 1,681,442 | ..... | ..... |
| Lost in washing | 29,093 | ..... | ..... | ..... |
| Used in making coke..... | 142,615 | ..... | ..... | ..... |
| " under colliery boilers, etc..... | ..... | ..... | ..... | ..... |
| Total for colliery use..... | ..... | 171,708 | ..... | ..... |
| Stocks on hand first of year..... | 64,463 | ..... | 10,789 | ..... |
| " last of year..... | 66,974 | ..... | 4,636 | ..... |
| Difference { * added to + taken from } stock during year..... | ..... | *2,511 | ..... | +6,153 |
| Output of colliery for year..... | ..... | 1,855,661 | ..... | ..... |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 110 | ..... | 57 | ..... | 167 | ..... |
| Whites—Miners | 1,720 | ..... | ..... | ..... | 1,720 | ..... |
| Miners' helpers | 514 | ..... | ..... | ..... | 514 | ..... |
| Labourers | 749 | ..... | 191 | ..... | 940 | ..... |
| Mechanics & skilled labour..... | 159 | ..... | 258 | ..... | 417 | ..... |
| Boys | 130 | ..... | 61 | ..... | 191 | ..... |
| Japanese | 171 | ..... | 13 | ..... | 184 | ..... |
| Chinese..... | 71 | ..... | 459 | ..... | 530 | ..... |
| Indians | 3 | ..... | 10 | ..... | 13 | ..... |
| Totals..... | 3,627 | ..... | 1,049 | ..... | 4,676 | ..... |

COLLIERIES OF THE EAST KOOTENAY DISTRICT.

The gross output of the collieries of the East Kootenay District for the year 1911 was 442,057 tons (2,240 lb.) of coal actually mined, which, with 3,259 tons taken from stock, made the actual consumption of coal 445,316 tons. Of this gross consumption of coal, 305,033 tons was sold as coal, 35,627 tons was consumed as fuel by the producing companies, while 104,656 tons was converted into coke, of which there was produced 66,005 tons, of which 37 tons was used under company's boilers, while 1,333 tons was drawn from stock, making the coke sales for the year 67,301 tons.

The East Kootenay collieries exported to the United States about 68.8 per cent. of the coal they sold and about 1.9 per cent. of the coke.

The following table gives an aggregate summary of the output of the East Kootenay collieries for the year 1911, and shows the dispositions made of such product :—

| SALES AND OUTPUT FOR YEAR. | COAL. | | COKE. | |
|--|---------|---------|--------|--------|
| (Tons of 2,240 lb.) | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 95,139 | ..... | 66,034 | ..... |
| " export to United States | 209,894 | ..... | 1,267 | ..... |
| " " to other countries ..... | ..... | ..... | ..... | ..... |
| Total sales..... | ..... | 305,033 | ..... | 67,301 |
| Used in making coke..... | 104,656 | ..... | ..... | ..... |
| " under colliery boilers, etc. | 35,627 | ..... | 37 | ..... |
| Total for colliery use..... | ..... | 140,283 | ..... | 37 |
| Stocks on hand first of year | 5,076 | ..... | 2,209 | ..... |
| " last of year..... | 1,817 | ..... | 876 | ..... |
| Difference taken from stock during year..... | ..... | 3,259 | ..... | 1,333 |
| Output of colliery for year..... | ..... | 442,057 | ..... | 66,005 |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 62 | ..... | 33 | ..... | 95 | ..... |
| Whites—Miners | 704 | ..... | ..... | ..... | 704 | ..... |
| Miners' helpers | 78 | ..... | ..... | ..... | 78 | ..... |
| Labourers | 318 | ..... | 257 | ..... | 575 | ..... |
| Mechanics and skilled labour..... | 404 | ..... | 302 | ..... | 706 | ..... |
| Boys | 19 | ..... | 20 | ..... | 39 | ..... |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 1,585 | ..... | 612 | ..... | 2,197 | ..... |

COAL POTENTIALITIES OF BRITISH COLUMBIA.

In addition to the coal-mines actually producing and whose outputs are included in the foregoing tables, there are a number of important fields which have not as yet reached the producing stage—some of these partly developed and equipped, and others only prospected.

That these fields contain a large reserve of coal there is absolutely no doubt, and many of them will be developed and producing as soon as the market demands it and the transportation facilities can be provided.

The great undeveloped coal-seams of the Rocky Mountain coalfield were fully described by the writer in the 1909 report, and further need not now be said.

Near Princeton, one colliery has been already opened by the Princeton Coal & Land Co., and has made small shipments of lignitic coal; but the area of this field is great—probably nearly fifty square miles—so that there appears a certainty that several other mines will eventually be opened up.

In the Tulameen valley, near Granite creek, the Columbia Coal & Coke Co. is endeavouring to open up a colliery; there are some very promising outcrops, etc., high up on Granite creek and Collins gulch, but the long tunnel which the company is driving to cut the coal at depth has not, as yet, been successful in cutting workable coal. Mr. Camsell, of the Geological Survey, estimates this basin to have an area of about five square miles.

In the Nicola valley, besides the producing companies, the Pacific Coast Colliery Co. of British Columbia is opening up a working colliery; there is good coal, but it is faulted where opened up, and the company is searching for a better place to locate its working-shaft.

The coal-bearing areas in the Omineca Mining Division near Groundhog mountain and on the Telkwa and Zymoetz rivers are fully dealt with on pages 82 *et seq.* of this Report.

On Vancouver Island, in addition to the areas actually being worked, there is in the Quatsino Mining Division on Quatsino sound a Cretaceous coalfield now being developed by Thos. Pearson and associates, which gives promise of containing extensive beds of coal; prospecting workings have been in progress here for four or five years, with considerable success.

The Suquash area is now being opened up by actual mining by the Pacific Coast Coal Mines, Ltd., and has already made small shipments, and it is expected that the output will be increased rapidly.

On Graham island coal has been known for forty years. Exploratory workings on coal-outcrops have been carried on at Camps Robertson and Wilson; at present systematic boring of the measures to the dip to accurately define the beds is being done at several points, to prove the existence of a commercially workable field; when this is done a railway will be built to convey the coal to tide-water—probably on Skidegate inlet.

To the north of these camps areas have been located and considerable boring done, with results which show the field to continue nearly to Masset. The eastern extension of the field has not, as yet, been satisfactorily established.

In the Peace River valley extensive coalfields are located and partly prospected, but these also are, as yet, far from transportation.

Near Bear lake and river, tributaries of the Fraser river near its most northerly head, and so near the located line of the Grand Trunk Pacific Railway, a coal-area is being developed, which, according to the recent reports of engineers who have examined it, has considerable promise, and being near the railway assumes importance, as it is the only known area near the line in British Columbia.

In the 1910 report (page 176) was reproduced an estimate of the probable coal-content of the various known coal-areas in British Columbia, as given by D. B. Dowling, of the Geological Survey, in a paper read before the Canadian Mining Institute at its meeting in March, 1911.

INSPECTION OF COAL-MINES, 1911.

VANCOUVER ISLAND AND COAST INSPECTION DISTRICT.

The collieries operating and producing coal during the year in this Inspection District, including the new mines that have been started, were:—

NANAIMO: The Western Fuel Company—No. 1 shaft, Protection shaft, and No. 4 shaft. Northfield mine.

Pacific Coast Coal Mines, Limited—Fiddick Colliery, South Wellington, Cranberry District, Nos. 1 and 2 slopes.

Vancouver-Nanaimo Coal Mining Company, Limited—New East Wellington Colliery, Mountain District, Nanaimo, No. 1 slope.

EXTENSION: The Canadian Collieries (Dunsmuir), Limited (formerly the Wellington Colliery Company)—Nos. 1, 2, and 3 mines, all worked from what is known as the No. 1 tunnel, and No. 4 mine, worked by a shaft.

CUMBERLAND: The Canadian Collieries (Dunsmuir), Limited—Nos. 4 and 7 slopes, and Nos. 5 and 6 shafts.

NICOLA VALLEY: The Middlesboro Colliery of the Nicola Valley Coal & Coke Company, Merritt—Nos. 1, 2, 3, 4, and 5 mines.

Diamond Vale Colliery Company—No. 3 mine.

Pacific Coast Colliery Company, Merritt—No. 1 slope and No. 1 shaft, adjoining the Middlesboro Colliery.

Inland Coal & Coke Syndicate, Merritt—One shaft and slopes.

PRINCETON: Princeton Coal & Land Company's Princeton Colliery.

COALMONT: Columbia Coal & Coke Company, Limited.

REPORT OF THOMAS MORGAN, INSPECTOR.

SIR,—I have the honour to herewith submit my annual report for the collieries in my Inspection District for the year ending 31st December, 1911, together with a list of all accidents and the colliery returns.

The Western Fuel Company.

Head Office—San Francisco, Cal.

Capital, \$1,500,000.

Officers.

John L. Howard, President or Chairman,
Jas. B. Smith, Vice-President or Vice-Chairman,
D. C. Norcross, Secretary,
Joseph L. Schmidt, Treasurer,
Thomas R. Stockett, General Manager,
*Thomas Graham, Superintendent,

Address.

San Francisco, Cal.
San Francisco, Cal.
San Francisco, Cal.
San Francisco, Cal.
Nanaimo, B.C.
Nanaimo, B.C.

* Resigned this position upon being appointed Chief Inspector of Mines for Province, January 1st, 1912, and had been succeeded by Thomas McGuckie.

The above company has operated the following collieries at Nanaimo ; during the past year, viz. : No. 1 or Esplanade shaft, Nanaimo ; Protection Island mine, No. 4 Northfield mine, and the Douglas slope.

The following returns show the combined output of the company's mines for the past year :—

RETURNS FROM WESTERN FUEL CO.'S MINES FOR YEAR 1911.

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 276,604 | | | |
| " export to United States | 234,242 | | | |
| " " other countries | 4,026 | | | |
| Total sales | | 514,872 | | |
| Used in making coke | 66,550 | | | |
| " under colliery boilers, etc | | | | |
| Total for colliery use | | 66,550 | | |
| | | 581,422 | | |
| Stocks on hand first of year | 11,656 | | | |
| " last of year | 5,411 | | | |
| Difference taken from stock during year | | 6,245 | | |
| Output of colliery for year | | 575,177 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 24 | | 21 | | 45 | |
| Whites—Miners | 452 | | | | 452 | |
| Miners' helpers | 28 | | | | 28 | |
| Labourers | 430 | | 22 | | 452 | |
| Mechanics and skilled labour | 79 | | 77 | | 156 | |
| Boys | 54 | | 32 | | 86 | |
| Japanese | | | | | | |
| Chinese | | | 148 | | 148 | |
| Indians | 3 | | | | 3 | |
| Totals | 1,070 | | 300 | | 1,370 | |

NO. 1 SHAFT, ESPLANADE, NANAIMO.

Thomas McGuckie, Manager ; John Hunt, Overman.

During the past year I visited this mine every month, and examined every working-place, travelling-place, and all accessible places in the workings. Some of the old workings of No. 1 shaft and Protection mine are practically the same, being connected in several places, ventilated by the same ventilating-fans, under the same ventilating system. Many of the men working in No. 1 mine are lowered to their work and hoisted up again at the Protection shaft. The

underground workings of No. 1 mine are very extensive; from the face of the inside workings in the Diagonal slope to the face of No. 1 North level is from five to six miles. There are two seams of coal being worked in this mine, the Upper and Lower seams; the Lower seam is from 30 to 60 feet below the Upper seam, being separated therefrom by a hard conglomerate rock. Three slopes have been driven from the Upper to the Lower seam (size 7 x 10 feet), off No. 1 North level. The coal in the Lower seam varies from 30 to 40 inches in thickness, is of good quality, is a hard coal, and stands handling well. All the workings in this seam are on the long-wall system, as the floor and roof are well adapted for the method. Compressed-air driven coal-mining machines are extensively used with great success, both as regards cost and production, a greater percentage of lump coal being produced. The general method of mining this coal is undercutting with a compressed-air cutting-machine. Where the coal is a little soft, it is mined by miners with a pick. There are three slopes down from No. 1 North level on the Upper seam. Two of these, Nos. 2 and 3, are connected. No. 2 slope workings are connected with the old long-wall workings of Protection mine. The south side workings of No. 2 slope are ventilated direct from Protection shaft by a passage in the Lower seam.

The coal from these slopes is hauled up to No. 1 North level, on the Upper seam, and then hauled by electric motors to the foot of No. 1 shaft. The Upper seam workings have now reached No. 3 incline district, where extraction of pillars is carried on. This coal comes down No. 3 incline and is hauled away by the motors before mentioned.

No. 1 Slope, or the Old Slope.—This slope branches off No. 1 North level about 70 yards from the bottom of No. 1 shaft to the east, and is down 6,513 feet. At 5,055 feet down, No. 7 East level branches off the slope. This forms the deepest working in the mine, not including the bottom of the slope. This level is 1,200 feet vertically below the mud-flats of Nanaimo river. It has not been worked since the early part of the year. At a point about 1,000 yards down No. 1 Old slope, the Diagonal slope branches off to the east. The coal from these is raised through No. 1 slope, then taken to No. 1 shaft, where it is raised to the surface. I may say that the coal that is raised up No. 1 slope is hauled by endless-rope haulage from the top of the Diagonal slope, and from the face of the rock tunnel to the bottom of the Diagonal slope is hauled by a tail-rope system. Here the coal is taken by another engine and delivered to the endless-rope on the Main slope. This tunnel opens up a seam of thick coal of good quality.

No. 1 North Level.—The ventilation of this mine is very good. The level is the return airway at the present time from No. 2 slope. On my last visit to this mine I found all in good condition, well timbered, and cogged. For the use of fifty men and eight horses on the south side of the slope, there was 15,500 cubic feet of air a minute going through the mine, equal to 209 cubic feet of air a minute for each unit employed; for the use of fifty men and eight mules on the north side, there was 15,000 cubic feet of air a minute going through the district, or 208 cubic feet of air a unit.

No. 3 Slope in No. 1 North Level, No. 1 Shaft, Nanaimo.—On my last visit to this mine in December, I found all in good order, well timbered and cogged, and the ventilation good. For the use of forty-one men and six mules, there was 10,500 cubic feet of air a minute going through the mine, or 180 cubic feet of air a unit.

No. 1 Slope in No. 1 North Level, No. 1 Shaft, Nanaimo.—On my last visit to this mine on December 15th, I found all in good order, well timbered and cogged, and the ventilation good. For the use of thirty-five men and three mules, there was 14,000 cubic feet of air a minute going through the mine, or 361 cubic feet of air a unit. William Johnston, fireman.

All the work in these three slopes is long-wall in the Lower seam.

Lamb's Incline, No. 1 North Level, No. 1 Shaft, Nanaimo.—On my last visit to this district on December 13th, I found all in good order, well timbered and cogged, and the ventilation good. This district is all extraction of pillars. For the use of twenty-three men and five mules, there was 13,000 cubic feet of air a minute going through the district, or 342 cubic feet of air a unit.

David John, James Price, William Neave, James Jemson, Robert Adam, Robert Morton, John Graham, and James Dudley, all firemen for the workings of No. 1 North level.

Diagonal Slope Workings in No. 1 Shaft, Nanaimo.—This slope branches off the No. 1 slope or Old slope. John Hunt, overman. On my last visit, December 4th, I found all in very good order. This part of the mine is working all in the Upper seam, which is a good thick coal. For the use of fifty-one men and seven horses, there was 18,000 cubic feet of air a minute going through the south side, or 250 cubic feet of air a unit. Hygrometric test: Dry, 62; wet, 61; moisture, 93 per cent. Hygrometric test for the east side: Dry, 62; wet, 61; moisture, 93 per cent. For the use of sixty-seven men and eleven mules and horses, there was 22,500 cubic feet a minute going through the east side, or 225 cubic feet of air a unit. The ventilation has improved a great deal during the last year owing to the management having cement stoppings put in all the way down the slope to the workings, so the air cannot be lost through the stoppings into the old workings. Thomas Miles, John Weeks, Harry Carrol, Francis Green, John Wallbank, Jacob Stabbart, and Moses Woodburn, firemen.

The air going up the return shaft at No. 1 air-shaft, on the south side, was 70,000 cubic feet a minute, and the return air on the north side was 156,000 cubic feet, a total of 126,000 cubic feet. In addition to this amount, there was 30,000 cubic feet of air a minute going up the Newcastle shaft, which makes a total of 256,000 cubic feet of air going down the mine. There is a 20- x 7-foot fan erected at the top of Protection shaft, which forces 110,000 cubic feet of air down the shaft. This air supplies the workings of No. 1 North level and the men who take out coal for the boilers of Protection mine in the pillars to the rise of Protection shaft. There is 10,000 cubic feet of air a minute going to ventilate these, and there is 10,000 cubic feet of air a minute going to ventilate old workings at the far end of No. 1 North level. Total air for the working-places is 128,500 cubic feet a minute, leaving 137,500 cubic feet for the old workings to the rise of No. 1 North level, the old workings of Protection shaft, No. 1 Old slope, and the Diagonal slope. The ventilating-fan at No. 1 air-shaft is a Sirocco fan, 90 inches in diameter by 72 inches in width, making 260 revolutions a minute, extracting 226,000 cubic feet a minute with a $4\frac{1}{2}$ -inch water-gauge. The fan at Protection shaft is 20 x 7 feet, forcing 110,000 cubic feet a minute into the mine. The balance of the air comes down No. 1 shaft and ventilates the Diagonal slope workings, the stables, and the old works.

The following are the official returns from the No. 1 shaft and Protection Island mines for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 240,459 | | | |
| " export to United States | 140,162 | | | |
| " " to other countries | 1,726 | | | |
| Total sales | | 382,347 | | |
| Used in making coke | | | | |
| " under colliery boilers, etc. | 34,332 | | | |
| Total for colliery use | | 34,332 | | |
| | | 416,679 | | |
| Stocks on hand first of year | 9,711 | | | |
| " last of year | 4,941 | | | |
| Difference taken from stock during year | | 4,770 | | |
| Output of colliery for year | | 411,909 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| | | \$ | | \$ | | \$ |
| Supervision and clerical assistance | 14 | | 13 | | 27 | |
| Whites—Miners | 266 | 3.30 - 7.00 | | | 266 | |
| Miners' helpers | 22 | 2.86 | | | 22 | |
| Labourers | 273 | 2.86 - 3.30 | 15 | 2.75 | 288 | |
| Mechanics and skilled labour .. | 60 | 2.86 - 3.57 | 52 | 3.00 - 4.50 | 112 | |
| Boys | 37 | 1.10 - 2.45 | 21 | .50 - 1.65 | 58 | |
| Japanese | | | | | | |
| Chinese | | | 100 | 1.50 - 1.75 | 100 | |
| Indians (Natives of British Columbia) .. | 3 | 2.86 | | | 3 | |
| Totals | 675 | | 201 | | 876 | |

Mine worked 295 days during the year.

NORTHFIELD MINE, NANAIMO COLLIERY.

J. W. Montgomery, Manager.

This mine continues to be an important producer, as is shown by returns. The workings are in the Lower seam; there is nothing being done in the Upper seam at present. The Lower seam is worked regularly, and has good coal all over, which is in good demand. The travelling-road into this mine is by a slope from the surface, with an easy grade, which is lighted nearly all the way down to the bottom of the roadway, as is also the slope, by electricity. The hoisting is done through a shaft 60 feet deep, from the bottom of which a slope

extends for about a mile, passing under Exit passage and Newcastle island, to where the coal is being mined. The coal is hauled up the slope by an endless-rope system to the shaft-bottom, whence it is hoisted to the surface. The hoisting and endless-rope engines are on the surface. The workings of this slope are designated Right or Left levels. To the right of this slope are Nos. 2 and 3 levels; to the left are Nos. 3, 4, 5, and 6 level workings. These are all working at the present time. The mining in the Lower seam is all on the long-wall system, to which it is well adapted. A large number of compressed-air mining-machines are in use, giving good results. This seam is from 30 to 40 inches thick and is of very good quality. On my visits to this mine December 18th and 19th, I found all in good order, well timbered and cogged, and the ventilation fairly good. For the use of fifty-six men and four mules in Nos. 5 and 6 Left levels, there was 13,000 cubic feet of air a minute going through the working, equal to 200 cubic feet of air a minute for each unit employed; for the use of fifty-six men and seven mules in Nos. 3 and 4 Left levels, there was 9,750 cubic feet a minute, or 127 cubic feet of air a unit; for the use of fifty men and four horses in No. 3 Right level, there was 9,600 cubic feet a minute, or 155 cubic feet of air a unit; for the use of eighteen men and three mules in No. 2 Right level, there was 5,600 cubic feet of air a minute, or 186 cubic feet of air a unit. Total air for the working-place was 37,950 cubic feet; total air in the return at the fan-shaft was 65,000 cubic feet, leaving 27,050 cubic feet for the old workings and leakage through doors, stoppings, and curtains. John Sullivan, William Roper, George Yarrow, Robert Russell, Edward Devlin, James Richard, Thomas Parkinson, and Thomas Reid, firemen and shotlighters.

The following are the official returns of the Northfield Colliery for the year ending the 31st December, 1911:—

| SALES AND OUTPUT FOR YEAR. | COAL. | | COKE. | |
|---|--------|---------|-------|-------|
| (Tons of 2,240 lb.) | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 36,145 | ..... | ..... | ..... |
| " export to United States | 94,049 | ..... | ..... | ..... |
| " " to other countries | 2,300 | ..... | ..... | ..... |
| Total sales ..... | ..... | 132,494 | ..... | ..... |
| Used in making coke ..... | ..... | ..... | ..... | ..... |
| " under colliery boilers, etc. | 30,833 | ..... | ..... | ..... |
| Total for colliery use ..... | ..... | 30,833 | ..... | ..... |
| Stocks on hand first of year | 1,945 | ..... | ..... | ..... |
| " last of year | 470 | ..... | ..... | ..... |
| Difference taken from stock during year ..... | ..... | 1,475 | ..... | ..... |
| Output of colliery for year ..... | ..... | 161,852 | ..... | ..... |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 8 | \$ | 7 | \$ | 15 | |
| Whites—Miners | 168 | 3.30 - 5.50 | | | 168 | |
| Miners' helpers | 6 | 2.86 | | | 6 | |
| Labourers | 152 | 2.86 - 3.30 | 6 | 2.75 | 158 | |
| Mechanics and skilled labour | 19 | 2.86 - 3.37 | 21 | 3.00 - 4.00 | 40 | |
| Boys | 17 | 1.10 - 2.20 | 11 | 1.00 - 2.25 | 28 | |
| Japanese | | | | | | |
| Chinese | | | 38 | 1.50 - 1.75 | 38 | |
| Indians (natives of B.C.) | | | | | | |
| Totals | 370 | | 33 | | 453 | |

Mine worked 294 days during the year.

DOUGLAS MINE OF THE WESTERN FUEL COMPANY.

George Bradshaw, Manager ; Joseph Thompson, Fireman.

This mine is a slope-opening in the Newcastle seam, and is located on Chase river, just south of the city of Nanaimo. It was started March 1st, 1911. This slope was down 1,700 feet, and the counter-slope was down 1,600 feet; size of the slope is 11 x 6 feet, and the counter-slope is the same. Motive power for ventilation is a fire-grate, but a fan of the Sirocco type has been installed, and is ready to start at any moment if necessary. The roof in this slope is good hard rock. The slopes are well timbered from the top to the bottom with sets. For the use of nine men, there was 11,760 cubic feet of air a minute going down the slope at the time of my inspection.

The following are the official returns from the Douglas mine of the Western Fuel Co. for the year 1911 :—

| SALES AND OUTPUT FOR YEAR. | COAL. | | COKE. | |
|---|-------|-------|-------|-------|
| (Tons of 2,240 lb.) | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | | | | |
| " export to United States | 31 | | | |
| " " other countries | | | | |
| Total sales | | 31 | | |
| Used in making coke | 1,385 | | | |
| " under colliery boilers, etc. | | | | |
| Total for colliery use | | 1,385 | | |
| | | 1,416 | | |
| Stocks on hand first of year | | | | |
| " last of year | | | | |
| Difference { added to } stock during year | | | | |
| Output of colliery for year | | 1,416 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC. .

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance..... | 2 | \$ | 1 | \$ | 3 | \$ |
| Whites—Miners | 18 | 4.50 | | | 18 | |
| Miners' helpers..... | 5 | 2.86 - 3.30 | 1 | 2.75 | 6 | |
| Labourers | | | 4 | 3.00 - 4.00 | 4 | |
| Mechanics and skilled labour | | | | | | |
| Boys | | | | | | |
| Japanese | | | | | | |
| Chinese | | | 10 | 1.50 | 10 | |
| Indians (Natives of B.C.)..... | | | | | | |
| Totals | 25 | | 16 | | 41 | |

Mine worked 256 days during the year.

Canadian Collieries (Dunsmuir), Ltd.

Head Office—Victoria, B.C.

Capital, \$15,000,000.

Officers.

Sir William Mackenzie, President,
A. D. McRae, Vice-President,
R. P. Ormsby, Secretary,
A. J. Mitchell, Treasurer,
C. F. Compton, Asst. Secretary,
W. L. Coulson, General Manager,

Address.

Toronto, Ont.
Toronto, Ont.
Toronto, Ont.
Toronto, Ont.
Victoria, B.C.
Victoria, B.C.

The Canadian Collieries (Dunsmuir), Ltd., during the year 1911 acquired all the holdings of the Wellington Collieries Company, Ltd., and has been operating the following mines during the past year under the general management of W. L. Coulson :—

The Extension Colliery, in the Cranberry District (Extension); Thomas Russell, manager.

The Union Colliery, in Comox District; John Matthews and James Gray, managers at the several mines.

NOTE.—This latter colliery is in the inspection district of Inspector Newton, in whose report will be found a description of the property and the details of production.

The following table shows the combined output of all this company's collieries during the past year:—

RETURNS FROM CANADIAN COLLIERIES MINES FOR YEAR 1911.

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 576,697 | ..... | 6,153 | ..... |
| " export to United States | 105,134 | ..... | ..... | ..... |
| " " other countries | 32,782 | ..... | ..... | ..... |
| Total sales ..... | ..... | 714,613 | ..... | 6,153 |
| Used in making coke ..... | ..... | ..... | ..... | ..... |
| Used under colliery boilers, etc. | 53,841 | ..... | ..... | ..... |
| Total for colliery use ..... | ..... | 53,841 | ..... | ..... |
| Stocks on hand first of year | 24,496 | 768,454 | 10,789 | 6,153 |
| " last of year | 24,953 | ..... | 4,636 | ..... |
| Difference { added to* { taken from† } stock during year ..... | ..... | *457 | ..... | †6,153 |
| Output of collieries for year ..... | ..... | 768,911 | ..... | Nil. |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 46 | ..... | 15 | ..... | 61 | ..... |
| Whites—Miners | 734 | ..... | ..... | ..... | 734 | ..... |
| Miners' helpers | 438 | ..... | ..... | ..... | 438 | ..... |
| Labourers | 130 | ..... | 61 | ..... | 191 | ..... |
| *Mechanics and skilled labour | 58 | ..... | 84 | ..... | 142 | ..... |
| Boys | 62 | ..... | 17 | ..... | 79 | ..... |
| Japanese | 171 | ..... | 13 | ..... | 184 | ..... |
| Chinese | 71 | ..... | 240 | ..... | 311 | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 1,710 | ..... | 430 | ..... | 2,140 | ..... |

EXTENSION COLLIERY.

Thomas Russell, Manager.

The general supervision of all the mines of this colliery are entrusted to Thomas Russell, who has an overman in charge of each separate mine.

No. 1 OR TUNNEL MINE.

William Jones, Overman.

Nearly all the mining done at this colliery is pillar and stall and some extraction of pillars, the work being all to the dip of the tunnel level. There are three levels to the right

and left of the slope. I visited this mine every month, and found all in good order, well timbered and cogged, and the ventilation good. For the use of fifty-six men and six mules, there was 18,280 cubic feet of air a minute going through the workings, equal to 247 cubic feet of air a minute for each unit employed. Total air at the fan-shaft was 25,000 cubic feet a minute, leaving 6,720 cubic feet a minute for leakage through doors, stoppings, and old workings. William Gilchrist, John Davidson, and Evan John, firemen and shotlighters.

NO. 2 MINE, EXTENSION.

No. 1 District, or the Old Slope District.—This mine is entered by a rock tunnel about a mile long. There are two slopes in this mine sunk from the motor-road, by which the coal is gathered together to make up a trip for the motor to take out of the tunnel to the tippie. The old No. 2 slope comes out on the hill above the tunnel, and the men and mules can go out that way if necessary. The ventilating-fan is on the hill near the slope over this airway. This No. 2 slope goes down past the inside end of the tunnel to the basin of the coalfield from which the coal is being taken. The mining is done by pillar and stall and the extraction of pillars. There is also a little long-wall done in this mine. In No. 1 district it is all pillar-work. On my last visit in December, I found all in good order, well timbered and cogged, and the ventilation good. For the use of sixty men and seven mules, there was 16,000 cubic feet of air a minute going through the district, or 200 cubic feet of air a unit.

No. 2 District.—This district, or the Diagonal Slope district, is all the extraction of pillars. I may say that on all my visits I found it clear, well timbered, and the ventilation good. For the use of fifty-five men and five mules, there was 15,000 cubic feet of air a minute going through the mine, or 250 cubic feet of air a unit.

No. 3 District, or the No. 4 Level District.—This is pillar-and-stall and long-wall work. On my visit in December, I found all in good order, well timbered and cogged, and the ventilation good. For the use of sixty-five men and ten mules, there was 16,520 cubic feet of air a minute going through the workings, or 174 cubic feet of air a unit. Total air going around the working-places was 47,520 cubic feet; total air at the fan-shaft was 72,000 cubic feet, leaving 24,480 cubic feet for leakage through doors, stoppings, and old workings. Thomas Jackson, overman; Hugh Fulton, William Bradley, Sam Mottishaw, Pete McMillan, William Cosier, Thomas Strang, William Jones, Thomas Jones, Harry Mitchell, David Davidson, Arthur Smith, William Clifford, Isaac Nash, and William Simpson, firemen and shotlighters.

NO. 3 MINE, EXTENSION.

David McKinnell, Overman.

This mine is the continuation of No. 4 West level from the rock tunnel. The method of mining in this mine is the pillar and stall and the extraction of pillars. All to the rise of No. 4 level is the extraction of pillars; there is a lot of pillar coal in this district, and the coal varies in thickness from 5 to 12 feet. There are two connections upwards from this mine to the surface. From No. 4 North level, the old slope goes right through to the surface and the airway to the fan. The ventilation was good all through the district. For the use of twenty-five men and three mules, there was 14,000 cubic feet of air a minute going through the High Line district; for the use of forty-five men and six mules, there was 15,000 cubic feet of air a minute going through the old slope district, or 300 cubic feet of air a unit. The mine was in good order, well timbered and cogged. Total air going through the workings was 29,000 cubic feet a minute; total air at the fan-shaft was 40,000 cubic feet, leaving 11,000 cubic feet a minute for leakage through doors, stoppings, and old workings. George Smith, John Ross, Dan Campbell, Pat Malone, John Barclay, William Bauld, James Nelson, and Henney, firemen and shotlighters.

No. 1 MINE, EXTENSION.

Thomas Mills, Overman.

This mine or shaft is 290 feet deep; the size is 8 x 16 feet; there is an airtight compartment in the centre, and one part is used as an upcast and the other as a downcast. They have an air-shaft sunk down to the coal, and are going to remove the fan from the hoisting-shaft to the air-shaft. This mine is about one mile and a half from the Extension tunnel to the south. From the face of the East level to the face of the West level is about 4,300 feet. A slope is down off the West level about 1,400 feet, and a slope is down off the East level about 60 feet. This mine is all worked on the pillar-and-stall method. On my visit to this mine, I found all in good order, well timbered and cogged, and the ventilation good. For the use of twenty-eight men and one horse, there was 17,000 cubic feet of air a minute going through the east side, or 548 cubic feet of air a unit; for the use of forty men and one horse on the west side, there was 19,000 cubic feet of air a minute, or 442 cubic feet of air a unit. John McMurtrie, James Perry, William Reid, James Strang, and Thomas Mordy, firemen and shotlighters.

The following are the official returns of the Extension Colliery for the year ending the 31st December, 1911:—

| SALES AND OUTPUT FOR YEAR. | | COAL. | | COKE. | |
|--|--|---------|---------|-------|-------|
| (Tons of 2,240 lb.) | | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | | 255,007 | | | |
| " export to United States..... | | 62,494 | | | |
| " " other countries..... | | | | | |
| Total sales..... | | | 317,501 | | |
| Used in making coke..... | | | | | |
| " under colliery boilers, etc..... | | 14,591 | | | |
| Total for colliery use..... | | | 14,591 | | |
| | | | 332,092 | | |
| Stocks on hand first of year..... | | 1,981 | | | |
| " last of year..... | | 1,465 | | | |
| Difference taken from stock during year..... | | | 516 | | |
| Output of colliery for year..... | | | 331,576 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| | | \$ | | \$ | | |
| Supervision and clerical assistance..... | 4 | | 8 | | 12 | |
| Whites—Miners..... | 360 | 3.50 - 5.00 | | | 360 | |
| Miners' helpers..... | 292 | 2.75 - 3.63 | | | 292 | |
| Labourers..... | | | 14 | 2.75 - 3.02 | 14 | |
| Mechanics and skilled labour..... | 20 | 2.75 - 3.02 | 37 | 2.75 - 4.40 | 57 | |
| Boys..... | 38 | 1.50 - 2.00 | 3 | 1.10 - 2.20 | 41 | |
| Japanese..... | | | 1 | 1.50 | 1 | |
| Chinese..... | | | 104 | 1.50 - 1.75 | 104 | |
| Indians..... | | | | | | |
| Totals..... | 714 | | 167 | | 881 | |

Name of seam—Wellington.

Descriptions of seams, tunnels, levels, shafts, etc., and number of same—One tunnel connecting Nos. 1, 2, and 3 mines; No. 4 shaft situated about one mile to the south of the tunnel.

Pacific Coast Coal Mines, Limited.

Head Office—Victoria, B.C.

Capital, \$3,000,000.

Officers.

C. C. Michener, President,
 Luther D. Wishart, Vice-President,
 J. F. Mowby, Secretary,
 G. R. Hughes, Treasurer,
 George Wilkinson, Superintendent.

Address.

Victoria, B.C.
 New York.
 Victoria.
 Victoria.
 Nanaimo, B.C.

Value of plant, \$424,226.

This is a recently organized company and includes in its holdings the Fiddick Colliery of the former South Wellington Mines, Ltd., and certain property at Suquash, on the east coast of Vancouver Island, near Malcolm island, where the company has, within the past two years, opened up a new colliery, which is now producing coal. The output of coal made by the company from these two collieries combined during the year 1911 is shown in the following table :—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 141,342 | ..... | ..... | ..... |
| " export to United States | 22,709 | ..... | ..... | ..... |
| " " other countries | 2,000 | ..... | ..... | ..... |
| Total sales ..... | ..... | 166,051 | ..... | ..... |
| Lost in washing, etc | 22,603 | ..... | ..... | ..... |
| Used under colliery boilers, etc | 11,819 | ..... | ..... | ..... |
| Total for colliery use ..... | ..... | 34,422 | ..... | ..... |
| ..... | ..... | 200,473 | ..... | ..... |
| Stocks on hand first of year | 27,952 | ..... | ..... | ..... |
| " last of year | 35,595 | ..... | ..... | ..... |
| Difference added to stock during year ..... | ..... | 7,643 | ..... | ..... |
| Output of colliery for year ..... | ..... | 208,116 | ..... | ..... |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | Totals. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 13 | \$ | 6 | \$ | 19 | ..... |
| Whites—Miners | 155 | 3.30 - 6.00 | ..... | ..... | 155 | 3.30 - 6.00 |
| Miners' helpers | 3 | 3.00 | ..... | ..... | 3 | 3.00 |
| Labourers | 62 | 2.25 - 3.30 | 12 | 2.75 | 74 | 2.25 - 3.30 |
| Mechanics and skilled labour | 22 | 2.85 - 3.30 | 56 | 2.75 - 3.50 | 78 | 2.75 - 3.50 |
| Boys | 8 | 1.25 - 2.25 | 6 | 1.25 | 14 | 1.25 - 2.25 |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | 51 | 1.50 - 1.65 | 51 | 1.50 - 1.65 |
| Indians ..... | ..... | ..... | 10 | 1.65 | 10 | 1.65 |
| Totals | 263 | ..... | 141 | ..... | 404 | ..... |

Days worked—South Wellington mine, 285½; Suquash mine, 288.

FIDDICK COLLIERY, SOUTH WELLINGTON.

George Wilkinson, General Manager ; Harry Devlin, Mine Manager.

This mine is called the Fiddick Colliery, of the former South Wellington Mines, Ltd. It is worked from two slopes, No. 2 or Fiddick and No. 1 or Richardson. This mine was not extended during the year, the work being the extraction of pillars in both slopes. The workings extend from the old Southfield mine to the old workings of the Alexandria mine. I have been around these slopes every month and never found any gas in them. All was well timbered and cogged and the ventilation good. For the use of thirty-five men and five mules in No. 1 mine on the south side, there was 15,000 cubic feet a minute, equal to 319 cubic feet of air a minute for each unit employed ; for the use of forty men and four horses on the east side, there was 16,000 cubic feet of air a minute, or 307 cubic feet of air a unit. Total air going in at the mouth of the slope was 40,000 cubic feet a minute, leaving 9,000 cubic feet for leakage for doors and stoppings. For the use of fifty men and eight horses in No. 2 slope, there was 27,000 cubic feet of air a minute, or 365 cubic feet of air a unit. Size of the fan is 9 x 12 feet in diameter, making 160 revolutions a minute, with 1-inch water-gauge ; it is a Sheldon fan. George Wilkinson, general manager ; Harry Devlin, manager ; Albert Manifold, Alexander Bryden, R. Rallison, Matthew Stafford, James Coulthard, Joe Neen, James Black, Fred Hilley, Geo. Moore, and James Martin, firemen and shotlighters.

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 139,661 | | | |
| " export to United States | 22,709 | | | |
| " " other countries | 2,000 | | | |
| Total sales | | 164,370 | | |
| Lost in washing | 22,603 | | | |
| Used under colliery boilers, etc. | 10,719 | | | |
| Total for colliery use | | 33,322 | | |
| | | 197,692 | | |
| Stocks on hand first of year | 25,829 | | | |
| " last of year | 33,185 | | | |
| Difference added to stock during the year | | 7,356 | | |
| Output of colliery for year | | 205,048 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 12 | \$ | 6 | \$ | 18 | \$ |
| Whites—Miners | 145 | 3.30 - 6.00 | ..... | ..... | 145 | 3.30 - 6.00 |
| Miners' helpers | 3 | 3.00 | ..... | ..... | 3 | 3.00 |
| Labourers | 60 | 2.25 - 2.85 | 10 | 2.75 | 70 | 2.25 - 2.85 |
| *Mechanics and skilled labour | 22 | 2.85 - 3.30 | 53 | 2.75 - 3.50 | 75 | 2.75 - 3.50 |
| Boys | 8 | 1.25 - 2.25 | 6 | 1.25 | 14 | 1.25 - 2.25 |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | 51 | 1.50 - 1.65 | 51 | 1.50 - 1.65 |
| Hindoos ..... | ..... | ..... | 10 | 1.65 | 10 | 1.65 |
| Totals | 250 | ..... | 136 | ..... | 386 | ..... |

*NOTE.—Skilled labour underground includes trackmen, timbermen, rockmen, bratticemen, pumpmen, pipemen; above ground, machinists, blacksmiths, engineers, railroad train crew, washery and loading staff, lampmen, stablemen, and surveyors; supervision and clerical assistance includes mine manager, firebosses, shotlighters, and clerical staff; labourers includes drivers, pushers, rope-riders, etc.

Name of seams or pits—Upper Douglas seam; No. 1 slope (Richardson); No. 2 slope (Fiddick).

Name of seams, tunnels, levels, shafts, etc., and number of same—Two slopes and one adit level; one shaft, 10 x 12 feet. Another outlet has been made to surface on northern boundary-line of this property, making four outlets to surface. In No. 1 slope coal is being produced in Nos. 3 and 4 East levels and Nos. 3 and 4 West levels, seam averaging from 3½ to 26 feet in thickness. In No. 2 slope Nos. 4, 5, and 6 Right levels and No. 3 Left level seam averages 3 to 30 feet in thickness.

Description and length of tramway, plant, etc.—Seven miles of standard-gauge railway and about four miles of sidings. Two locomotives and thirty Hart-Otis dump-cars, capacity 40 tons each; bunkers with a capacity of 4,000 tons, with loading-conveyor and wharves. The washery consists of one Jeffrey-Robinson washer, capacity 400 tons per day of nine hours, and attachments for loading washed product by conveyor to boats or by elevators to railroad-cars for inland shipments. Power plant at loading-station consists of two return tubular boilers, 120 horse-power each, and dynamo and engine for lighting purposes. At the mine the power-house contains three return-tubular boilers, 100 horse-power each; one Ingersoll air-compressor, capacity 300 feet a minute; one Canadian Rand air-compressor, capacity 500 feet a minute; one Norwalk compound air-compressor, capacity 707 feet a minute; and one 50-kw. generator, with 25-horse-power exciter attached and engine for driving same. Electric power is used now for driving screening arrangements and machinery in machine-shops and pumping water from the mine. One thoroughly equipped machine-shop containing lathe, shaper, drilling-machine, and other modern machinery; also blacksmith-shop and carpenter-shop. One thoroughly equipped tippie, capacity 1,500 tons a day of nine hours, containing Phillips crossover dump, car-hauls, and other modern arrangements. Extensive additions have been made in the screening arrangements and preparation of coal. One double-drum hoisting-engine, 200 horse-power; one Sheldon fan and engine, fan-engine 9 x 12 inches, fan 9 feet in diameter and 4 feet 6 inches wide, running 160 revolutions, producing 65,000 cubic feet of air a minute, with a water-gauge

of $\frac{3}{4}$ inch; one mine-rescue station containing two two-hour apparatus and one half-hour apparatus; one Sullivan diamond-drill, Class C. Underground plant consists of two winches $6\frac{1}{2} \times 8$ inches, two 5×7 inches, one 5×8 inches, one 9×11 inches. Pumps, two Cameron No. 5, 100 gallons each; one duplex, $4\frac{1}{2} \times 2\frac{3}{4} \times 4$, one $5\frac{1}{4} \times 3\frac{1}{2} \times 5$, two $7 \times 5 \times 7$, one $3 \times 2 \times 5$, three 4×6 ; one 300-gallon electric turbine pump; 250 mine-cars, and approximately ten miles of narrow-gauge track in the mine.

The Vancouver-Nanaimo Coal Mining Co., Ltd.

Head Office—Vancouver, B.C.

Capital, \$1,000,000.

Officers.

Address.

| | |
|--|--------------------------------------|
| Alvo. V. Alvensleben, President, | 744 Hastings Street, Vancouver, B.C. |
| H. W. Maynard, Vice-President, | 98 Powell Street, Vancouver, B.C. |
| Willibald Imhoff, Secretary-Treasurer, | 744 Hastings Street, Vancouver, B.C. |
| H. N. Freeman, Superintendent, | P.O. Box 283, Nanaimo, B.C. |

Value of plant, \$500,000.

NEW EAST WELLINGTON COLLIERY.

Harry Freeman, Manager.

This mine is opened by a slope and counter-slope from the surface to the dip at a distance of about 1,200 feet, pitching about 27 degrees. The main level branches off at the bottom of the slope at an angle of 65 degrees to the left. There are two counter-levels also running parallel with the main level. This level is about 1,800 feet in at the present time and is not working. Most of the work is to the dip of the slope, or straight along from the bottom. This mine is worked on the pillar-and-stall method, but there is a little long-wall being done also. This is a fine mine; it is the Wellington seam of the very best quality. The coal is from 5 to 12 feet thick. I visited this mine every month in the year and never found any gas in the mine. It is ventilated by a Sheldon fan, 9 feet in diameter, with a capacity of 80,000 cubic feet a minute. On my visit to this mine in December, I found all in good order, well timbered, and the ventilation good. For the use of fifty men and three horses on the west side, there was 18,000 cubic feet of air a minute going through the district, equal to 305 cubic feet of air a minute for each unit employed; for the use of eight men and one horse on the east side, there was 13,400 cubic feet of air a minute, or 1,218 cubic feet of air a unit. Total air at the slope was 38,000, leaving 6,600 cubic feet a minute for leakage for doors, stoppings, and old workings. Luther Saville, overman; Arthur Challoner, Robert Reid, William Moore, and Nat Bavis, freemen and shotlighters.

The following are the official returns from the New East Wellington Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|--------|--------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 67,549 | | | |
| " export to United States | | | | |
| " " to other countries | | | | |
| Total sales | | 67,549 | | |
| Lost, various causes | 2,069 | | | |
| Used under colliery boilers, etc. | 3,000 | | | |
| Total for colliery use | | 5,069 | | |
| | | 72,618 | | |
| Stocks on hand first of year | 100 | | | |
| " last of year | 400 | | | |
| Difference added to stock during year | | 300 | | |
| Output of colliery for year | | 72,918 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 1 | \$ | 3 | \$ | 4 | |
| Whites—Miners | 88 | 4.50 | | | 88 | |
| Miners' helpers | | | | | | |
| Labourers | 43 | 3.02 | | | 43 | |
| Mechanics and skilled labour | | | 8 | 3.30 | 8 | |
| Boys | 6 | 1.50 | 2 | 2.75 | 8 | |
| Japanese | | | | | | |
| Chinese | | | 20 | 1.75 | 20 | |
| Indians | | | | | | |
| Total | 138 | | 33 | | 191 | |

Name of seams or pits—New East Wellington mine, Nanaimo, B.C., working the Old Wellington seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—The mine is entered by a slope, the bottom of which touches the seam, and from here the workings start. There are two haulage-roads, one running almost due east and one west from the slope-bottom.

Description and length of tramway, plant, etc.—Tramways run down the length of the slope and in and about the various crosscuts and haulage-roads in the mine. The mine is operated by steam, and there is one small dynamo used for lighting the surface works, down the slope, and about the vicinity of the slope-bottom. The mine is ventilated mechanically.

Nicola Valley Coal & Coke Co., Ltd.

Head Office—Vancouver, B.C.

Capital, \$1,107,700.

Officers.

| | |
|---|-------------------|
| John Hendry, President, | Vancouver, B.C. |
| Alexander McLaren, Vice-President, | Vancouver, B.C. |
| W. H. Armstrong, Managing Director and General Manager, | Vancouver, B.C. |
| J. J. Plommer, Secretary-Treasurer, | Vancouver, B.C. |
| Charles Graham, Mine Manager, | Middlesboro, B.C. |

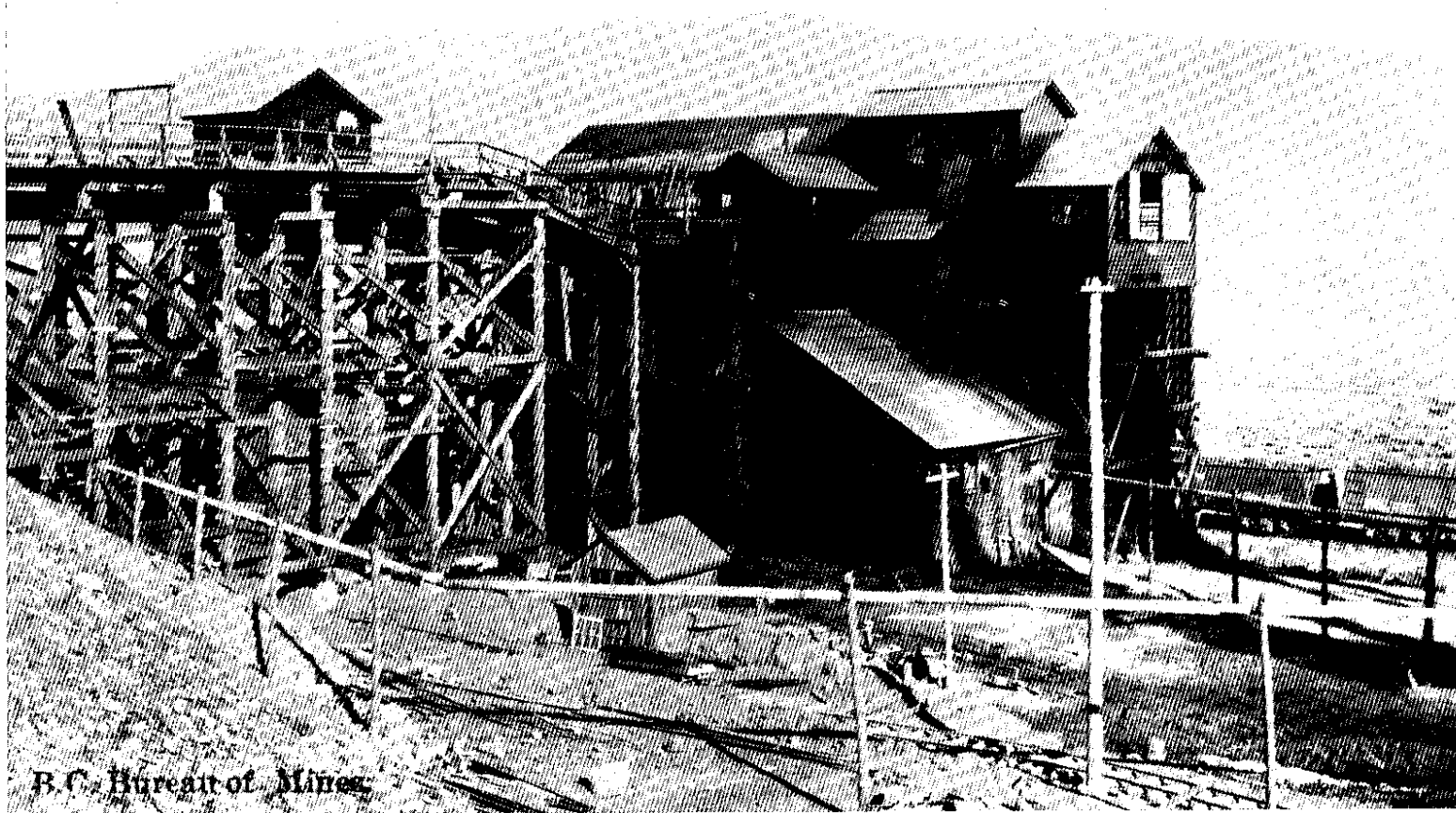
Address.

Value of plant, \$170,000

MIDDLESBORO COLLIERY.

Charles Graham, Manager.

During the last year the output was increased 50,000 tons. The principal operations have been in Nos. 1, 2, and 4 mines. Some notable improvements have been made in the surface arrangements during the past year. A new tippie was erected at No. 1 mine by the Roberts & Schaefer Co., of Chicago, with a capacity of 100 tons an hour. The coal from all the mines is now handled over the tippie; the coal from No. 2 mine is brought by a small steam-locomotive, 9 x 14 inches, and is dumped by a Phillips crossover dump on to a pair of shaker screens with $2\frac{1}{2}$ -inch round perforations. This screen discharges on to a picking-table 42 feet long, which discharges on to a scraper conveyor, which distributes the coal into any required bin in the bunkers. The slack coal is gathered into a hopper underneath the shaker screens, and is supplied by a reciprocating feeder to a Stewart jig washer, with a capacity of 50 tons of raw coal an hour. The washed coal passes into a revolving draining-screen with $\frac{3}{8}$ -inch perforations. The fine slack passes into a settling-tank. The washed coal is then elevated by a bucket to a revolving screen at the top of the building, where it is screened into nut, pea, and slack. The slack from the settling-tank is elevated by a bucket elevator to the slack-bunker. The scraper conveyor passes along the top of the bunkers, and the discharges from the revolving screen are so arranged that any mixture from the various grades of coal can be obtained. All the washed coal may be discharged direct on to the scraper conveyor without passing through the revolving screen, if desired. A Christy box-car loader was installed also. A Sheldon fan with a capacity of 100,000 cubic feet a minute and a rope driven by a 15- x 14-inch Ideal engine was installed at No. 1 mine; a $27\frac{1}{2}$ -kw. electric generator was also installed for lighting purposes. Two Goldie-McCulloch return-tubular boilers, 150 horse-power, was also installed at No. 1 power plant, and additional machine-shop equipment was added. At No. 2 mine one Goldie-McCulloch return-tubular boiler, 150 horse-power, was installed; also a Canadian Rand compound straight-line 14- x 18-inch compressor, capacity 570 cubic feet a minute; one Canada Foundry Co. Underwriters duplex pump to supply the plant with water, capacity 750 gallons a minute. A tunnel 800 feet long was driven from the main level of No. 5 mine to the top of No. 4 mine. This tunnel is on a grade of $\frac{1}{2}$ per cent. in favour of the loads; this permits the mine-cars being brought from No. 4 mine direct to the tippie, doing away with the dumping of the coal down the chute on the hillside.



B.C. Bureau of Mines

Nicola Valley Coal Co.'s Tippie.

No. 1 MINE.

David Brown, Overman.

This mine was worked nearly all the year, and I visited it nearly every month. It is worked on the extraction of pillars. The seam of coal is about 18 feet in thickness and is of very good quality, but they only worked about 8 feet of the coal; the pitch of the seam is about 20 degrees. I examined the mine every visit and found the workings in fairly good order, considering the nature of the roof, which is so heavy on the timbers. The ventilation was fairly good all the time. For the use of thirty-nine men and one horse, there was 26,400 cubic feet a minute, equal to 628 cubic feet of air a minute for each unit employed.

No. 4 MINE.

David Brown, Overman.

This mine has been tapped by a tunnel driven from No. 5 mine, and the coal is hauled out of this mine through No. 5 mine. A tunnel has been driven through the main level of No. 5 mine, across the strata to No. 4 mine. On my visit to this mine in December, I found all in good order, well timbered and cogged, and the ventilation good. For the use of fifty men and two mules, there was 19,600 cubic feet of air a minute, or 350 cubic feet of air a unit. The seam of coal is 9 feet thick and of very good quality; the seam pitches about 20 degrees to the south.

No. 2 MINE.

Robert Manifold, Overman.

This mine is opened by a slope and the coal is very good. On every visit I found it well timbered and clear from gas. For the use of eight men and one horse in No. 1 district, there was 4,000 cubic feet of air a minute, or 363 cubic feet of air a unit; for the use of sixty-five men and two horses in No. 2 district, there was 24,000 cubic feet of air a minute, or 387 cubic feet of air a unit. The fan was 56 x 36 inches, making 280 revolutions a minute; size of No. 4 fan is 56 x 36 inches. Thomas Bullman, William Halliman, John Mowson, John Hughes, John McDonald, James Fairfold, Louis Shearer, and David Evans, firemen and shotlighters; firemen for Nos. 1 and 4 mines are Andrew McKendrick, Robert Brown, Thomas Skelton, William Austin, Dan McMillan, Ab. Horrocks, and William Harris.

The following are the official returns from the Middlesboro Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 184,892 | | | |
| " export to United States | | | | |
| " " other countries | | | | |
| Total sales | | 184,892 | | |
| Used in making coke | | | | |
| Used under colliery boilers, etc | 6,042 | | | |
| Total for colliery use | | 6,042 | | |
| | | 190,934 | | |
| Stocks on hand first of year | 259 | | | |
| " last of year | 615 | | | |
| Difference added to stock during year | | 356 | | |
| Output of colliery for year | | 191,290 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 20 | \$ 3.50 - 4.00 | 8 | \$ | 28 | ..... |
| Whites—Miners | 250 | 3.30 - 5.50 | ..... | ..... | 250 | 4.30 |
| Miners' helpers | 40 | 2.75 - 3.30 | ..... | ..... | 40 | 3.00 |
| Labourers | 80 | 2.75 - 3.30 | 60 | 2.75 - 3.00 | 140 | 3.00 |
| Mechanics and skilled labour ..... | ..... | ..... | 25 | 3.30 - 4.00 | 25 | 3.50 |
| Boys ..... | ..... | ..... | 4 | 1.00 - 2.00 | 4 | 1.50 |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 390 | ..... | 97 | ..... | 487 | ..... |

Diamond Vale Collieries, Limited.

Head Office—Vancouver, B.C.

Capital, \$750,000.

Officers.

T. J. Smith, President,
 F. J. Lumsden, Secretary-Treasurer,
 Benjamin Browitt, Mine Manager,

Address.

Pacific Building, Vancouver, B.C.
 Vancouver, B.C.
 Merritt, B.C.

Value of plant, \$50,000.

DIAMOND VALE COLLIERY.

Benjamin Browitt, Manager.

This company's property lies immediately to the south of the Middlesboro Colliery, the Coldwater river being the boundary between them. The two shafts mentioned in the previous reports are not being continued, and the machinery has been removed.

No. 3 MINE.

This mine is about one mile and a half east of Merritt, and about two miles from the two shafts that the company sunk on their property to the east. This is a slope driven to the dip of the coal about 460 feet. There is one level to the left and one to the right of the slope.

No. 3 slope is the mine which is working this year. Thickness of the seam is from 4 feet 6 inches to 5 feet, separated by two bands of rock 6 inches thick. The Main slope is down 460 feet, with a dip of 45 degrees. East level is in a distance of 820 feet; West level, 400 feet. There is one 30-horse-power boiler; one small hoist, double-acting cylinder, 8 by 12, geared 4 to 1; and a small blow-fan 22 x 46 inches, belt-driven, used for ventilation. On my inspection of this mine on the 7th December, I found all well timbered and a good roof. For the use of sixteen men, there was 8,000 cubic feet of air a minute going through the mine. Harry Grimes, fireman.

The following are the official returns from the Diamond Vale Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|-------|-------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 4,820 | | | |
| " export to United States | | | | |
| " " other countries | | | | |
| Total sales | | 4,820 | | |
| Used in making coke | | | | |
| Used under colliery boilers, etc | 150 | | | |
| Total for colliery use | | 150 | | |
| | | 4,970 | | |
| Stocks on hand first of year | | | | |
| " last of year | | | | |
| Difference added to stock during year | | | | |
| Output of colliery for year | | 4,970 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 1 | \$ 3.75 | | \$ | 1 | \$ 3.75 |
| Whites—Miners | 10 | 4.00 | | | 10 | 4.00 |
| Miners' helpers | | | | | | |
| Labourers | 4 | 3.00 | 2 | 3.00 | 6 | 3.00 |
| Mechanics and skilled labour | | | 1 | 3.50 | 1 | 3.50 |
| Boys | | | | | | |
| Japanese | | | | | | |
| Chinese | | | | | | |
| Indians | | | | | | |
| Totals | 15 | | 3 | | 18 | |

Name of seams or pit—No. 3 slope.

Description of seams, tunnels, levels, shafts, etc., and number of same—Thickness of seam 4 feet 6 inches to 5 feet, separated by two bands of rock 6 inches thick. Main slope down 460 feet, with a dip at the present time of 45 degrees. East level in a distance of 820 feet; West level, 400 feet.

Description and length of tramway, plant, etc.—One 30-horse-power boiler; one small hoist, double-acting, cylinders 8 x 12, geared 4 to 1; small blow-fan, belt-driven, used for ventilation.

Inland Coal & Coke Company, Ltd.

(FORMERLY THE COAL HILL SYNDICATE.)

Head Office—Merritt, B.C.

| <i>Officers.</i> | <i>Address.</i> |
|--|------------------------------------|
| Geo. I. Wilson, President, | Vancouver, B.C. |
| W. L. Nicol, Vice-President, | 1200 Comox Street, Vancouver, B.C. |
| K. C. Smith, Secretary-Treasurer, | Pacific Block, Vancouver, B.C. |
| Joseph Graham, Vice-Pres. and Gen. Man., | Merritt, B.C. |
| Andrew Bryden, Mine Manager, | Merritt, B.C. |

Value of plant, \$3,000.

This is a new company that has just started in to develop a new colliery, and has not been at work a year as yet.

This property is up on the hill above the Middlesboro Colliery. There are three slopes. No. 1 slope is down 300 feet, No. 2 is down 600 feet, and No. 3 is down 200 feet. The seam of coal is 10 feet thick, and the roof is good hard sandstone. The coal is hauled down the hill to the Middlesboro mines and is loaded into the railroad-cars.

There is a small shaft to a depth of 30 feet, then drifted 80 feet to the surface and continued down the slope 200 feet. The coal is of very high quality, with a clay roof. No work has been done on this seam during this year. No. 2 seam is 8 feet thick; it was cut by the prospecting shaft about 100 feet, then driven to the surface and continued on below the shaft for 300 feet, a total of 500 feet. The coal is of high quality and makes a dense coke. The roof is excellent. Below the 300-foot it required no timbering. No work has been done on this seam during the year. No. 3 seam is a splendid seam, with a good sandstone roof and floor, and operation has been exclusively confined to this seam; the tonnage obtained being entirely from prospecting and development-work, leaving a large body of coal blocked out and ready for mining. There has been no gas in any of the workings during the year, and no caves or accidents have taken place.

No. 4 seam is a large seam of fine coal, but it has only been exposed by surface trenching in various places. The hoist for the slope is a double-drum 24-horse-power, Beatty type. It hoists the coal out of the mine, and lowers it on a 3-per-cent. grade 1,300 feet to the head of the self-acting incline. The men walk down the counter-slope to their work. The self-acting incline is 1,750 feet long, of three-rail tracks, and connects with the trestle 400 feet long. Bunkers of 400 tons capacity are built on the railway spur from Merritt to Middlesboro mine connecting it with the Canadian Pacific Railway line. The coal is still being hauled by wagons to Middlesboro Siding, a distance of half a mile, as the Canadian Pacific Railway has so far failed to put down the ties and rails agreed upon.

The coal is much in demand, and when the track is completed it is expected the output will be greatly increased. A railway-track scale is on the ground, ready to be installed, as the cement foundation is ready. The ventilation of the mine has been very good, considering that it was natural ventilation. On my last inspection of this mine on December 8th, I found 7,000 cubic feet of air a minute going through the slope, for the use of eight men, equal to 875 cubic feet of air a minute for each unit employed. A fan with a capacity of 30,000 cubic feet a minute and an engine of 50-horse-power boiler have been ordered and is expected to be installed in January. William Hogan, fireman.

Name of seams—No. 1, 2 feet 6 inches thick; No. 2, 8 feet thick; No. 3, 12 feet thick; No. 4, 14 feet thick.

The following are the official returns of the Inland Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|--------|--------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 10,400 | | | |
| " export to United States..... | | | | |
| " " other countries..... | | | | |
| Total sales..... | | 10,400 | | |
| Used in making coke..... | 483 | | | |
| " under colliery boilers, etc..... | | | | |
| Total for colliery use..... | | 483 | | |
| | | 10,883 | | |
| Stocks on hand first of year..... | | | | |
| " last of year..... | | | | |
| Difference added to stock during year..... | | | | |
| Output of colliery for year..... | | 10,883 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance..... | 2 | \$ 4.00 | 2 | \$ 6.00 | 4 | \$ 5.00 |
| Whites—Miners..... | 6 | 3.50 | | | 6 | 3.50 |
| Miners' helpers..... | 3 | 3.00 | | | 3 | 3.00 |
| Labourers..... | | | 4 | 3.00 | 4 | 3.00 |
| Mechanics and skilled labour..... | | | 2 | 4.00 | 2 | 4.00 |
| Boys..... | | | | | | |
| Japanese..... | | | | | | |
| Chinese..... | | | | | | |
| Indians..... | | | | | | |
| Totals..... | 11 | | 8 | | 19 | |

Pacific Coast Colliery Co. of B.C.

Head Office—Minneapolis, Minn.

Capital, \$500,000.

Officers.

Jas. C. Andrews, President, 215 N.Y. Life Building,
G. B. Norris, Vice-President,
J. S. Sherril, Secretary-Treasurer,
W. E. Duncan, Consulting Engineer,

Address.

Minneapolis, Minn.
Minneapolis, Minn.
Minneapolis, Minn.
Merritt, B.C.

This company's property is situated in the Nicola valley, and adjoins the Middlesboro Collieries to the north. Development-work was started in the early part of 1910, the work being confined to the lower measures, which indicates a large amount of coal on the property.

No. 1 SLOPE.

Howell John, Overman.

This slope has not been worked during the past year, but will be operated as soon as connection is made with No. 2 shaft, main entry.

No. 2 SLOPE.

The further proving and developing of this shaft has been principally done the past year. This consisted of driving the main entry on the dip of the seam—that is, to the basin of the coalfields—in addition to driving three crosscut entries. The Main slope starts 90 feet from the shaft-bottom, and has been driven a total distance of 525 feet. No. 2 crosscut entry has been driven 85 feet; No. 3 has been driven 40 feet; No. 4 has been driven 75 feet.

From development-work a small tonnage has been shipped, the results being very satisfactory. Steam plant is installed at both mines, and a spur track is adjacent to No. 2 shaft, where a small screen and bunker is erected.

There were only four men at work on this mine on my visit in December. The ventilation is natural ventilation, but they have a small force-fan at the top of the shaft, which can be started at any time if needed; this fan is connected to a column of 6-inch pipes, and can force the air down the mine.

The development has proved the coal-measures within the holdings, from which only a few car-loads were shipped out, the coal proving of good quality, but, due to the faulting of the coal-measures on the outcrop, where the development is located, no commercial success can be anticipated until further development is carried out, and which is now planned to be concentrated on the basin of the coalfield.

Princeton Coal and Land Company, Ltd.

Head Office—15 Great St. Helens, London, E.C.

Capital, \$200,000.

| <i>Officers.</i> | <i>Address.</i> |
|------------------------------------|-----------------|
| A. St. George Hamersley, Chairman, | London, Eng. |
| Sheffield Neave, Director, | London, Eng. |
| Alex. Crerar, Director, | London, Eng. |
| Arthur Hicklin, Director, | London, Eng. |
| Oswald J. Bambridge, Director, | London, Eng. |
| E. S. Neave, Secretary, | London, Eng. |
| Ernest Waterman, Local Director, | Princeton, B.C. |
| Jas. Holden, Mine Manager, | Princeton, B.C. |

Value of plant, \$77,000.

This company began operations in December, 1909, and was formerly the Vermilion Forks Mining and Development Company.

The development-work in this mine has been steadily carried on without interruption during the year. A new tippie was erected with a capacity of 700 tons a day; this tippie is modern and up to date, with shaking screens and picking-tables, the coal being separated into the various sizes the market demands. A box-car loader of the Victor type has also been installed, reducing the breakage in loading to a minimum. The development-work in the

mine is well in advance of the demands, and the entire output is produced by machines, the type used being the "Little Hardy" post machine. With a demand for coal, the output can be brought to the tippie's capacity at any time. The seam worked is 9 feet thick and worked on the pillar-and-stall system. The ventilation is good; the roadways are large and well kept, the general mine conditions comparing favourably with the best practice in the Province.

The following are the official returns from the Princeton Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|--------|--------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 16,336 | | | |
| " export to United States..... | 1,909 | | | |
| " " other countries..... | | | | |
| Total sales..... | | 18,245 | | |
| Lost as slack..... | 4,421 | | | |
| Used under colliery boilers, etc..... | 730 | | | |
| Total for colliery use..... | | 5,151 | | |
| | | 23,396 | | |
| Stock on hand first of year..... | | | | |
| " last of year..... | | | | |
| Difference added to stock during year..... | | | | |
| Output of collieries for year..... | | 23,396 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance..... | 3 | \$ 4.00 | 2 | 3.50 | 5 | 3.80 |
| Whites—Miners..... | 25 | 5.00 | | | 25 | 5.00 |
| Miners' helpers..... | 2 | 3.00 | | | 2 | 3.00 |
| Labourers..... | | | 30 | 3.00 | 30 | 3.00 |
| Mechanics and skilled labour..... | | | 5 | 4.00 | 5 | 4.00 |
| Boys..... | | | | | | |
| Japanese..... | | | | | | |
| Chinese..... | | | | | | |
| Indians..... | | | | | | |
| Totals..... | 30 | \$4.00 | 37 | \$3.20 | 67 | \$3.88 |

Name of seam or pits—Princeton Colliery.

Description of seams, tunnels, levels, shafts, etc., and number of same—The seam is 9 feet thick and has a southerly dip of 11 degrees. This seam is opened by a slope driven on full pitch of seam and is down 700 feet, and is still being driven. No. 1 East level is driven to a distance of 351 feet; No. 2 East level is driven to a distance of 958 feet; No. 3 East level is driven to a distance of 948 feet; No. 1 West level is driven to a distance of 498 feet. All levels are still being driven, all 9 x 12 feet, and are turned at right angles to

slope on strike of seam. From levels a pair of headings are turned on full pitch of seam and rooms opened at right angles to heading. The inclines and headings are to be operated by small 25-horse-power hoists (of which we have at present four). The mine is being opened up to maintain an output of 500 tons a day, and we have as yet only done development-work. Coal is now being mined with post puncher machines (of which we have at present four).

Description and length of tramway, plant, etc.—Two 75-horse-power Goldie-McCulloch and one 50-horse-power Grey boiler, making 200 horse-power; one Rand compressor, Class C2, capacity 744 cubic feet a minute; machine-shop containing 24-inch lathe, 26-inch drill press, shaper, pipe-threader, bolt-cutter, hack-saw, emery-grinder, etc., and one 25-horse-power engine; blacksmith-shop containing 350-lb. steam-hammer; one 50-horse-power Jenckes hoist; fan, 26,400 cubic feet a minute; one 25-horse-power engine; tippie, 250 feet long, and contains shaking screen, giving nut under 2-inch, egg under 4-inch, and lump over 4-inch screens; two picking-tables and bunkers having a capacity of 300 tons; two tippie-engines, one 20 horse-power and one 35 horse-power; Victor box-car loader and Fairbanks track-scales; one electric generator, 100-light capacity; one fire-pump; one supply-pump. The plant is designed with a view to handling 700 tons a day, and is now very near completion, and should be running to full capacity by the end of February.

COLUMBIA COAL & COKE COMPANY, LTD.

Officers.

Hon. C. H. Campbell, President,
J. L. Johnston, Vice-President,
W. L. Parrish, Secretary-Treasurer,
G. L. Fraser, General Manager,
J. W. Powell, Mine Manager,

Address.

Winnipeg, Man.
Coalmont, B.C.
Winnipeg, Man.
Coalmont, B.C.
Coalmont, B.C.

This company is endeavouring to open up a colliery in the Tulameen valley near Granite creek, where a townsite known as Coalmont has been laid out.

On the company's property, high up on the hill near the headwaters of Granite creek and Collins gulch, exposures of coal of very good quality were developed, to develop which a long crosscut working-tunnel was started at a much lower level in the expectation of cutting, at this depth, the coal seen at the outcrops. This tunnel is now in about 2,080 feet, and from the face a drill-hole has been put in for a further distance of 900 feet. From the inner end of the tunnel drifts have been run to the right and left on what was supposed to be the downward extension of one of the outcrops, but these, so far, have not encountered workable coal. No production has yet been made.

The following are the official returns for the year 1911 :—

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| | | \$ | | \$ | | \$ |
| Supervision and clerical assistance | 5 | ..... | ..... | ..... | 5 | 6.50 |
| Whites—Miners | 15 | 3.50 | ..... | ..... | 15 | ..... |
| Miners' helpers | 15 | 3.00 | ..... | ..... | 15 | ..... |
| Labourers | 5 | 3.00 | 15 | 3.00 | 20 | ..... |
| Mechanics and skilled labour ..... | ..... | ..... | 15 | 4.00 | 15 | ..... |
| Boys ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | 10 | 2.25 | 10 | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 40 | ..... | 40 | ..... | 80 | ..... |

NORTHERN DISTRICT OF VANCOUVER ISLAND.

REPORT OF JOHN NEWTON, INSPECTOR.

I beg to submit my report as Inspector of Mines for the Northern District of Vancouver Island for the year 1911.

Canadian Collieries (Dunsmuir), Ltd.*

These mines were formerly operated by the Wellington Colliery Company, but were taken over by the Canadian Collieries (Dunsmuir), Ltd., in the middle of 1910.

The mines are situate in the Comox District, about sixty miles from Nanaimo. A railway about twelve miles in length connects the different mines to a shipping point at Union Bay, over which the whole coal output is conveyed in 25-ton cars.

Since this company took possession of these mines, a large outlay of capital has been invested to bring them up to a higher standard of efficiency.

The railway from Union Bay to the mines is being relaid with 80-lb. steel rails to meet the requirements of a heavier rolling-stock; about half of the distance has been laid with this steel. The company is installing new 50-ton steel cars, to handle the larger output from the different mines; about a hundred of these cars are in operation at the present time. In addition, Nos. 4 and 7 mines have been equipped with 2-ton mine-cars, fitted with the Hadfield wheels, which will materially increase the output of these mines. A new tippie is in course of construction at No. 7 mine, being equipped with an improved Phillips crossover dump, which will facilitate the handling of the output of this mine. A new shaft is under construction, about a mile north of No. 7 mine.

The company has decided upon development, and addition to plants, etc., involving a large outlay of capital. One important change is that of harnessing the Puntledge river for hydro-electric power as a substitute for the existing steam-power plants at the different mines; it is the intention of the company to electrify all the mines when this power is installed. The output of these mines is about 2,300 tons a day, which will be increased when the electric-power plant is installed.

*See also page 231.

The company has a small rescue-station, equipped with four 2-hour rescue apparatus, and a trained corps from the different mines. The Government has a fully equipped mine-rescue apparatus, and is ready in case of emergency.

The following mines are in operation : Nos. 4, 5, 6, and 7, in the close vicinity of the city of Cumberland.

UNION COLLIERY.

NO. 4 MINE.

Robert Henderson, Manager (*vice* Jno. Matthews, resigned); C. Parnham, Overman (*vice* D. Nellist, resigned); J. Brown, J. Biggs, S. Horwood, J. Combs, T. Richards, W. McLellan, J. Bennie, L. Cawthorne, H. Sloan, J. Reid, J. C. Gillespie, and R. Brown, Firemen.

This mine is situated about one mile and a half from Cumberland and about twelve miles from the shipping point at Union Bay. The coal-seams are reached by two slopes, Nos. 1 and 2.

No. 1 Slope.

No. 1 slope is down a distance of 7,000 feet, running due north, and it has not been advanced any during this year. About 4,000 feet from the entrance of No. 1 slope a diagonal slope branches off, running N. 45° E. a distance of 1,000 feet, where No. 15 West level branches off at the bottom of this diagonal slope; this level is in a distance of 1,700 feet, and has been in good coal for a considerable distance, ranging from 4½ to 5 feet of hard coal, but it is standing in a 20-foot down-throw fault.

No. 2 Diagonal slope branches off about 500 feet from the bottom of No. 1 slope, running N. 45° E., and is down 750 feet in good hard coal, from 5 to 6 feet in thickness. Nos. 16, 17, and 18 East and West levels are turned off this slope, and all are in good coal, with a band of rock running through the centre, ranging from 10 to 15 inches in thickness. All the levels are worked on the pillar-and-stall system. Pillars are being extracted in what is called the Japs and Chinaman's levels. The ventilation is produced by an exhaust-fan of the Murphy type, running 125 revolutions, with 1½-inch water-gauge, driven by 120-horse-power engine, producing 42,000 cubic feet of fresh air a minute.

During my inspection in December, there was 42,000 cubic feet of fresh air a minute passing into this section of the mine, divided into two splits, as follows:—

No. 1 Split.—For the use of fifty-two men and nine mules, there was 16,000 cubic feet of fresh air a minute passing, or an average of 202 cubic feet of fresh air for each unit employed. I found explosive gas in the Japs and Chinaman's pillars, all the other places being clear; the timbering and roadways were in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|--------------------------|-----------|-----------|-----------|
| Japs pillars | 61 | 60 | 93 % |
| Chinaman's pillars | 61 | 60 | 93 " |
| No. 15 West level | 60 | 60 | 100 " |
| " 16 " | 63 | 62 | 93 " |

No. 2 Split.—For the use of forty men and five mules, there was 10,000 cubic feet of fresh air a minute passing, or an average of 181 cubic feet for each unit employed. No explosive gas was found; timbering and roadways were in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|-------------------------|-----------|-----------|-----------|
| No. 16 East level | 62 | 60 | 88 % |
| " 17 " | 60 | 58 | 88 " |
| " 18 " | 59 | 57 | 87 " |

No. 2 Slope.

This slope branches off No. 1 slope a short distance from the mouth of the tunnel, running N. 45° E., and is down 8,000 feet, forming the deep workings of this No. 4 mine. Levels are turned off to the east and west of this slope; Nos. 12, 13, 14, 15, 16, 17, and 18 levels are turned off on the west side, and Nos. 13, 14, 15, 16, 17, 18, and 19 on the east side. Nos. 13 and 14 on the east side and Nos. 12, 13, 14, and 15 on the west side are extracting pillars; all the other levels and slopes are in good coal, ranging from 4 to 5 feet in thickness, with a band of rock running through the centre, from 10 to 12 inches in thickness. The lower levels of this slope have a very friable fireclay roof, which, coming down with the coal, makes it very dangerous for the miners and hard to keep the coal clean; 60 per cent. of the accidents are caused by this overlying strata. All the levels are worked on the pillar-and-stall system; 30-per-cent. giant powder, fired with a battery, is used; the black powder was taken out of the mine in October. It is the intention of the company to install the new 2-ton cars in this mine.

During my inspection in December, I examined all parts of this slope, and found the following conditions: there was 54,000 cubic feet of fresh air a minute passing into this section of the mine, divided into two splits, as follows:—

East Side Split.—For the use of forty-five men and eight mules, there was 10,000 cubic feet of fresh air a minute passing, or an average of 145 cubic feet for each unit employed. Explosive gas was found in Nos. 13 and 14 pillars, showing the cap on the flame of a safety-lamp. No shots are fired, and only the Wolf safety-lamps are used; all the other places clear of gas; timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|----------------------|-----------|-----------|-----------|
| No. 13 pillars | 64 | 64 | 100 % |
| " 14 " | 64 | 64 | 100 " |
| " 15 level | 59 | 59 | 100 " |
| " 16 " | 61 | 59 | 88 " |
| " 17 " | 62 | 60 | 88 " |
| " 18 " | 61 | 60 | 93 " |

West Side Split.—There was 16,000 cubic feet of fresh air a minute passing into this split, for the use of fifty-four men and eight mules, or an average of 205 cubic feet for each unit employed. I found explosive gas in Nos. 12, 13, and 14 pillars, showing a cap on the flame of a safety-lamp; also a little gas in No. 7 stall, No. 18 West level; all the other places

clear of gas. No shots are fired, and only the Wolf safety-lamps are used; the timbering and roadways were only fair. The ventilation of this mine is produced by a Guibal fan, running sixty-three revolutions, with a 2-inch water-gauge, producing 54,000 cubic feet a minute.

There are 97,000 cubic feet of air a minute passing into this mine, 42,000 into No. 1 slope and 54,000 into No. 2 slope. In No. 1 Main return there was 36,000 cubic feet passing a minute, and in No. 2 Main return there was 102,000 cubic feet, a total of 138,000 cubic feet a minute. A portion of the return air from No. 1 slope returns by way of No. 2 fan.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|----------------------|-----------|-----------|-----------|
| No. 12 pillars | 66 | 65 | 94 % |
| " 13 " | 65 | 64 | 94 " |
| " 14 " | 65 | 64 | 94 " |
| " 15 level | 61 | 59 | 93 " |
| " 16 " | 61 | 58 | 82 " |
| " 17 " | 63 | 60 | 82 " |

All my examinations were made with a Wolf safety-lamp. I examined all the main return airways and could not find a trace of explosive gas.

NOS. 5 AND 6 MINES.

J. H. McMillan, Manager (*vice* J. Matthews, resigned); J. Gillespie, Overman; T. Lewis, B. Farmer, R. McNeil, J. Williams, and James Brown, Firemen.

This shaft is down 600 feet to the bottom seam, but only the Upper seam is working. This mine is connected to No. 6 mine by a good travelling-road, having double doors, allowing separate intake and return airways. The shaft acts as intake and return airway, having strong midwall dividing the hoisting and upcast shaft, 8 x 12 area. Nos. 1 and 2 inclines are in operation, as well as the main lower levels. These levels are in a distance of 6,000 feet, in good coal, ranging from 3½ to 4 feet. Owing to the impurities between the coal, this is a very hard-shooting coal, making it very hard to keep clean, owing to the rock breaking up in the coal when shooting. Nos. 1 and 2 inclines are splitting pillars; no solid work is in operation in this district; 30-per-cent. giant powder is used, fired with a battery. The ventilation of this mine is by a Guibal exhaust-fan, making 120 revolutions, with a water-gauge of 1 inch, engine 14 x 18, producing 32,000 cubic feet of air a minute.

In December, when I made my inspection, there was 32,000 cubic feet of fresh air a minute passing into the mine, divided into two splits, as follows:—

No. 1 Split.—There was 16,000 cubic feet of fresh air a minute passing, for the use of forty-three men and six mules, or an average of 252 cubic feet for each unit employed. No explosive gas found; timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|-------------------|-----------|-----------|-----------|
| Main level | 54 | 52 | 86 % |
| No. 4 stall | 56 | 54 | 87 " |
| " 2 " | 56 | 54 | 87 " |

No. 2 Split.—There was 12,000 cubic feet of fresh air a minute passing into this split, for the use of thirty-five men and four mules, or an average of 255 cubic feet of fresh air for each unit employed. No explosive gas found; timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|------------------|-----------|-----------|-----------|
| Lower level..... | 54 | 52 | 86 % |
| No. 8 stall..... | 54 | 53 | 93 " |
| " 7 "..... | 54 | 52 | 86 " |
| " 6 "..... | 53 | 51 | 86 " |

No. 6 MINE.

D. Walker, Overman (*vice* C. Parnham, resigned); H. King, F. Crawford, W. Beveredge, Jas. Brown, J. Oswald, T. Leeman, and J. Calverley, Firemen.

This shaft, like No. 5, is sunk to the Lower seam, about 600 feet, but only the Upper seam is working, and practically the same as No. 5 shaft, operating on both sides of the shaft. No. 1 incline, on the west side, are splitting pillars; only the main level is in solid coal. On the east side all operations are in solid coal; in the main level a small section is worked on the long-wall system; the coal is about 3 feet high, making it suitable for this kind of work; all the other work is done on the pillar-and-stall system. About 1,000 feet from the shaft a slope is down about 500 feet; the coal in this section is the same height as the level, of a very hard nature, and full of impurities, running through the coal, making it very difficult to keep clean and hard to shoot; 30-per-cent. giant is used, fired with batteries. The ventilation of this mine is produced by an exhaust-fan of the Guibal type, making 106 revolutions a minute, with 1-inch water-gauge, engine 14 x 18, producing 20,000 cubic feet a minute. The upcast shaft is separated by a midwall between the hoisting-shaft and the upcast shaft, 5 x 6 = 30 feet.

During my inspection in December, there was 20,000 cubic feet of fresh air a minute passing into this shaft, divided into two splits, as follows:—

No. 1 Split.—There was 12,000 cubic feet of air a minute passing into this split, for the use of forty-three men and eight mules, or an average of 108 cubic feet of fresh air for each unit employed. No explosive gas found; timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|------------------|-----------|-----------|-----------|
| Main level..... | 54 | 53 | 93 % |
| No. 3 stall..... | 50 | 48 | 86 " |
| " 8 "..... | 50 | 48 | 86 " |

No. 2 Split.—There was 7,000 cubic feet of fresh air a minute passing into this split, for the use of twenty men and two mules, or an average of 270 cubic feet of fresh air for each unit employed. No explosive gas found; timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|-------------------|-----------|-----------|-----------|
| Long-wall | 52 | 51 | 93 % |
| Main level | 52 | 50 | 86 " |
| No. 5 stall | 54 | 52 | 86 " |
| Dips | 53 | 51 | 86 " |

All examinations were made with a Wolf safety-lamp.

No. 7 MINE.

This mine is situated about five miles from Cumberland and seventeen miles from the shipping point at Union Bay. The men are taken out from town in cars provided for that purpose. About seventy-five houses, with from six to ten rooms, have been built at this mine for the workmen. Many improvements are being made at this mine; a new Phillips crossover tipple is near completion, and is expected to be in operation in two months; 300 new 2-ton mine-cars are ready for use as soon as this tipple is ready, which will greatly increase the output of this mine; a new tunnel 700 feet long has been put through at a large expense, to take off the tail-rope that was in operation, and has made this one of the best slopes in this district.

This mine is entered by two slopes running N. 45° E., and is down a distance of 5,000 feet; it was not advanced any during the present year, being standing at a fault. Levels are turned off to the east and west of this slope; Nos. 4½, 5, 6, 7, and 8 levels on the west side, and Nos. 3, 5, 6, 7, and 8 on the east side. The levels are nearly all in good coal, ranging from 2½ to 3 feet, of a very hard nature; 40-per-cent. giant powder is used, fired with batteries; large quantities of this powder are used, which, owing to its hardness, breaks the coal up. This mine is well adapted to the long-wall system, which seems to be the only system to mine this coal successfully. The mine is ventilated by a Guibal exhaust-fan, making forty-four revolutions a minute, with a water-gauge of 1¼ inches, producing 40,000 cubic feet of fresh air a minute.

During my examination in December, there was 40,000 cubic feet of fresh air a minute passing into this mine, divided into three splits, as follows:—

No. 1 Split.—There was 2,000 cubic feet of fresh air a minute passing into this split, for the use of fourteen men and one mule, or an average of 118 cubic feet for each unit employed. No explosive gas found in this mine; timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|-------------------|-----------|-----------|-----------|
| West level | 50 | 50 | 100 % |
| No. 6 stall | 52 | 50 | 86 " |
| " 2 " | 52 | 50 | 86 " |

No. 2 Split.—There was 21,000 cubic feet of fresh air a minute passing into this split, for the use of fifty-six men and five mules, or an average of 295 cubic feet of fresh air for each unit employed. Timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|------------------|-----------|-----------|-----------|
| East level | 52 | 51 | 93 % |
| No. 8 stall..... | 54 | 52 | 86 " |
| " 7 " | 56 | 54 | 87 " |

No. 3 Split.—For the use of fifty men and five mules, there was 14,000 cubic feet of fresh air a minute passing into this split, or an average of 215 cubic feet of fresh air for each unit employed. Timbering and roadways in good condition.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|------------------|-----------|-----------|-----------|
| West level | 56 | 54 | 86 % |
| No. 3 stall..... | 54 | 52 | 86 " |
| " 6 " | 54 | 52 | 86 " |

I examined all the main return airways, and found no trace of explosive gas. All examinations were made with a Wolf safety-lamp.

LIST OF CERTIFICATED OFFICIALS.

Thos. Spruston, Manager (*vice* James Gray, resigned); F. Jarritt, Overman; G. Harvie, W. Williams, J. Barker, J. Monks, J. Miles, Jno Brown, F. Peacock, W. Keenan, D. Thompson, F. Jaynes, F. Horwood, J. Liddle, and J. Emerson, Firemen.

The following are the official returns from the Union Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. | COAL. | | COKE. | |
|---|---------|---------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| (Tons of 2,240 lb.) | | | | |
| Sold for consumption in Canada | 321,690 | ..... | 6,153 | ..... |
| " export to United States..... | 42,640 | ..... |  | ..... |
| " " to other countries..... | 32,782 | ..... |  | ..... |
| Total sales | | 397,112 | | 6,153 |
| Used in making coke | | | | |
| " under colliery boilers, etc..... | 39,250 | ..... |  | ..... |
| Total for colliery use..... | | 39,250 |  | ..... |
| | | 436,362 | | 6,153 |
| Stocks on hand first of year | 22,515 | ..... | 10,789 | ..... |
| " last of year | 23,488 | ..... | 4,636 | ..... |
| Difference { *added to } stock during year..... | | *973 | | +6,153 |
| | | | | |
| Output of colliery for year..... | | 437,335 | | Nil. |

By-products—Fireclay, 5,543 tons; \$2.50 per ton.

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance..... | 42 | \$ 9.00 - 3.57 | 7 | \$ 6.00 - 4.00 | 49 | ..... |
| Whites—Miners..... | 374 | 5.50 - 3.30 | ..... | ..... | 374 | ..... |
| Miners' helpers..... | 2 | 3.00 | ..... | ..... | 2 | ..... |
| " Japs, 47; Chinese, 97 | 144 | 2.25 - 1.75 | ..... | ..... | 144 | ..... |
| Labourers..... | 130 | 3.30 - 2.47 | 47 | 3.02 - 2.47 | 177 | ..... |
| Mechanics and skilled labour.... | 38 | 3.85 - 3.30 | 47 | 3.85 - 3.30 | 85 | ..... |
| Boys..... | 24 | 2.47 - 1.37 | 14 | 1.65 - 1.10 | 38 | ..... |
| Miners—Japs, 67; Chinese, 98 | 165 | 3.50 - 2.90 | ..... | ..... | 165 | ..... |
| Japanese..... | 6 | 1.76 | 12 | 1.60 - 1.10 | 18 | ..... |
| Chinese..... | 71 | 1.76 - 1.60 | 136 | 1.65 - 1.10 | 207 | ..... |
| Indians..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals..... | 996 | ..... | 263 | ..... | 1,259 | ..... |

Name of seams or pits—Comox Nos. 4, 5, 6, and 7.

Description of seams, tunnels, levels, shafts, etc., and number of same—No. 4 Comox slope, No. 5 shaft, No. 6 shaft, No. 7 slope; Lower and Upper seams.

Pacific Coast Coal Mines, Limited.*

SUQUASH COLLIERY.

John White, Overman.

This colliery is owned by the Pacific Coast Coal Mines, Ltd., and is situated on the north-eastern part of Vancouver Island.

A shaft 6 x 10 in the clear is down 170 feet, with a midwall between the hoisting-shaft and the upcast shaft. Two levels are turned off from the shaft-bottom, N. 45° W. and S. 45° E. respectively. The North-west level was not advanced during the present year. The South-east level is in a distance of 1,400 feet, and is still advancing; long-wall has been opened out in this level, the coal ranging from 4 to 5 feet in thickness, with small bands of rock running through the coal; this seam is well adapted for the long-wall system, and should make an ideal mine for that system. Two slopes are turned off 500 feet from the shaft-bottom on this level, running N. 45° E., and are down 1,700 feet, but are not working at the present time; all the work is in opening out this mine into a long-wall system.

Only development-work is being done; a few shipments of coal have been made to passing steamers, and Alert Bay is supplied with coal from this mine, to which it is taken in scows. A loading apparatus has been installed for loading these scows. The ventilation of this mine is produced by a Sheldon fan 10 x 4 inches, making eighty revolutions a minute, with a water-gauge of 1½ inches, producing 10,000 cubic feet of fresh air a minute.

When I made my inspection, there was 10,000 cubic feet of fresh air a minute passing into this mine, for the use of ten men and two horses. Timbering and roadways in good condition. All my inspections were made with a Wolf safety-lamp.

*See also page 235.

The following are the official returns from the Suquash Colliery for the year 1911 :—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|-------|-------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 1,681 | ..... | ..... | ..... |
| " export to United States ..... | ..... | ..... | ..... | ..... |
| " " to other countries ..... | ..... | ..... | ..... | ..... |
| Total sales ..... | ..... | 1,681 | ..... | ..... |
| Used in making coke ..... | ..... | ..... | ..... | ..... |
| " under colliery boilers, etc. | 1,100 | ..... | ..... | ..... |
| Total for colliery use ..... | ..... | 1,100 | ..... | ..... |
| Stocks on hand first of year | 2,123 | ..... | ..... | ..... |
| " last of year | 2,410 | ..... | ..... | ..... |
| Difference added to stock during year ..... | ..... | 287 | ..... | ..... |
| Output of colliery for year ..... | ..... | 3,068 | ..... | ..... |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance..... | 1 | ..... | ..... | ..... | 1 | ..... |
| Whites—Miners | 10 | 4.00 | ..... | ..... | 10 | 4.00 |
| Miners' helpers..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Labourers..... | 2 | 3.00 | 2 | 2.00 - 3.00 | 4 | 2.00 - 3.00 |
| Mechanics and skilled labourers.. | ..... | ..... | 3 | 3.50 | 3 | 3.50 |
| Boys ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Total..... | 13 | ..... | 5 | ..... | 18 | ..... |

Mine worked 288 days.

Name of seams or pits—Suquash No. 1 mine (Upper seam).

Description of seams, tunnels, levels, shafts, etc., and number of same—One shaft 6 x 10 feet, with midwall one side for hoisting and the other for ventilation. Seam from 5 to 6 feet in thickness and of good quality, being practically smokeless and giving off a great heat.

Description and length of tramway, plant, etc.—One donkey-engine with boiler attached for hoisting; one small fan for ventilation, producing 10,000 cubic feet a minute; one pump for pumping water from mine; a small pit-head and screening arrangements capable of handling 200 tons daily. A narrow-gauge tramway runs from pit-head to wharf, a distance of about 400 feet. The loading arrangements are suitable for loading scows and small craft. Underground there is about one mile of narrow-gauge mine-track and twelve mine-cars.

EAST KOOTENAY DISTRICT.

Until within the year 1909 there was only one company actually producing coal in the East Kootenay District—that is, the Crow's Nest Pass Coal Co., although this company operated three separate collieries; but during that year two new companies began to produce—namely, the Hosmer Mines, Limited, at Hosmer, and the Corbin Coal & Coke Co., at Corbin. These new companies only began to ship coal towards the latter part of 1908, and, consequently, their outputs have not been large, but they have extensive and fully equipped collieries, and in the future will be important factors in the production of the district.

The district is divided into two separate inspection districts. The Southern East Kootenay District, under Inspector Evan Evans, with headquarters at Cranbrook, includes the Coal Creek Collieries and the Carbonado Collieries of the Crow's Nest Pass Coal Co., although this latter colliery has not been worked this past year. The Northern East Kootenay District, under Inspector Robert Strachan, with headquarters at Hosmer, includes the Hosmer Colliery of the Hosmer Mines, Limited, the Michel Collieries of the Crow's Nest Pass Coal Co., and the Corbin Colliery of the Corbin Coal & Coke Co.

SOUTHERN EAST KOOTENAY INSPECTION DISTRICT.

REPORT OF EVAN EVANS, INSPECTOR.

I have the honour, as Inspector of Coal-mines for the Southern East Kootenay District, to submit my annual report for the year 1911.

Crow's Nest Pass Coal Co., Ltd.

Capital, \$3,500,000.

Officers.

Elias Rogers, President,
E. C. Whitney, Vice-President,
R. M. Young, Secretary,
Elias Rogers, Treasurer,
John Shanks, Colliery Manager,

Address.

Toronto, Ont.
Ottawa, Ont.
Ferne, B.C.
Toronto, Ont.
Ferne, B.C.

The above company is now operating the following extensive collieries on the western slope of the Rocky mountains in the East Kootenay District, viz:—

COAL CREEK COLLIERIES, situated on Coal creek, about five miles from the town of Fernie, on a branch railway to the mines, connecting at Fernie with the tracks of the Canadian Pacific Railway and also those of the Great Northern Railway.

CARBONADO COLLIERIES, situated on Morrissey creek and connected by a branch railway with the Canadian Pacific Railway and the Great Northern Railway at Morrissey. The colliery is about fourteen miles from Fernie by rail, in a south-easterly direction. This colliery has been shut down for more than a year.

MICHEL COLLIERIES, situated on both sides of Michel creek, on the line of the Canadian Pacific Railway, being twenty-three miles in a north-easterly direction from Fernie. This last colliery is in the Northern Inspection District.

The total gross output of the company's collieries for the past year was 320,940 tons. Of this, 84,991 tons was used in the manufacture of coke, yielding 54,160 tons, which, with 954 tons of coke taken from stock, made the amount of the coke sold 55,114 tons, of

which 53,847 tons was sold for consumption in Canada, and 1,267 tons was exported to the United States. The coal exported to the United States amounted to 174,896 tons, while 39,705 tons was sold for consumption in Canada.

The amount and disposition of this combined output of the company's collieries is more fully shown in the following table:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|---------|---------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 39,705 | ..... | 53,847 | ..... |
| " export to United States | 174,896 | ..... | 1,267 | ..... |
| " " other countries ..... | ..... | ..... | ..... | ..... |
| Total sales ..... | ..... | 214,601 | ..... | 55,114 |
| Used in making coke | 84,991 | ..... | ..... | ..... |
| " under colliery boilers, etc. | 22,907 | ..... | ..... | ..... |
| Total for colliery use ..... | ..... | 107,898 | ..... | ..... |
| Stocks on hand first of year | 1,688 | 322,499 | 1,562 | 55,114 |
| " last of year | 129 | ..... | 608 | ..... |
| Difference taken from stock during year ..... | ..... | 1,559 | ..... | 954 |
| Output of colliery for year ..... | ..... | 320,940 | ..... | 54,160 |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 46 | ..... | 17 | ..... | 63 | ..... |
| Whites—Miners | 589 | ..... | ..... | ..... | 589 | ..... |
| Miners' helpers ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Labourers | 237 | ..... | 140 | ..... | 377 | ..... |
| Mechanics and skilled labour | 366 | ..... | 259 | ..... | 625 | ..... |
| Boys | 18 | ..... | 10 | ..... | 28 | ..... |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 1,256 | ..... | 426 | ..... | 1,682 | ..... |

CARBONADO COLLIERY.

The Carbonado Colliery was not operated during the year 1911, except that during part of the year a force of men was employed to determine the extent of the coal-measures, by tracing and sampling the individual seams for a distance of 3,000 feet south-west of the old workings.

The following is from the official returns of this colliery: This colliery was not operated during 1911, but, in order to determine the extent of dynamical action, also the character and magnitude of the coal-measures, prospecting at Morrissey consisted in tracing the individual seams south-westerly from the old workings to a gulch some 3,000 feet distant. In this gulch, which runs north-westerly from the old slack-bins, the individual seams were opened up and sampled. Stripping was also continued above these measures as high as the capping conglomerate, and all seams encountered correlated and examined. The same policy was in progress for the lower areas when interrupted by the inclemency of the weather. This work will be finished in the near future.

COAL CREEK COLLIERY.

John Shanks, Manager.

The colliery is five miles east of Fernie. Transportation is afforded by a branch railway making connection with both the Canadian Pacific Railway and the Great Northern Railway at Fernie.

The colliery only operated part of the year; operations were suspended for nearly eight months, caused by disagreement with the men. The stoppage was general throughout the coalfield.

There were eight accidents reported, two fatal and six serious; one of the fatal accidents occurred on the surface; of the six serious accidents, two occurred on the surface.

The mines operating for the year are: No. 5 mine, No. 1 North mine, and No. 9 mine, on the north side of the valley; No. 1 East mine, No. 2 mine, No. 3 mine, and No. 1 South mine, on the south side of the valley. Old No. 1 North operated until March 31st. The general strike of the seams is approximately north and south, the seams dipping towards the east with an average dip of from 14 to 18 degrees; where the strata is not normal, there is a variation in the dip.

No. 5 MINE.

Jas. Stewart, Overman; Harry Miard, Harry Dunlap, Thos. Wakelam, Jos. Lane,
Jas. McPherson, and Robt. Adamson, Firebosses.

This mine is 3,800 feet north-west of the tippie; the coal is conveyed by a steam-locomotive to the tippie, over a side-hill tramway of 3-foot gauge. Entrance to the mine is by means of three tunnels; the main tunnel is 16 x 7 feet and 4,200 feet in length, driven on the strike of the seam; the 1st and 2nd slopes are driven from points 1,550 and 2,450 feet respectively from the entrance of the tunnel; No. 2 slope is 1,100 feet in length. The second tunnel is parallel with the main tunnel for a short distance and continued to No. 19 district; this tunnel serves for both ventilation and a separate travelling-road to and from No. 19 district. The third tunnel, No. 4 South, is at an elevation 350 feet higher and is 1,040 feet in length; at this point No. 19 incline is driven to the rise. The coal from No. 19 incline workings is conveyed through No. 4 South tunnel to the surface, and lowered over a gravity-plane 1,100 feet in length, about one mile from the tippie. Inside the mine a new diagonal slope is at present being driven. The slope is 1,300 feet in length, and is to make connection with the surface near the entrance of the main tunnel, and is to be the main haulage-road from the dips.

The thickness of the seam varies from 7 to 16 feet; the mode of working is pillar and stall; the levels off the inclines and slopes are 250 feet apart; rooms 14 feet wide are driven up the rise; the width of pillars between rooms varies between 30 and 65 feet, according to

thickness of coal and nature of the roof. The cars are lowered from the rooms to the levels with small jigs, and are hoisted and lowered over the slopes and inclines by the direct and tail-rope system of haulage, and hauled through the tunnels with compressed-air motors.

During my inspection on the 13th and 14th of December, I found both No. 19 district and slopes district clear of gas and the ventilation good; all the working-places and roadways were in good condition, except a portion of the return airway from the right side of No. 19 district which was undergoing repair. For the right side of No. 19 district I observed 17,000 cubic feet of air a minute passing, for thirty men and two horses; for the left side of No. 19 district I found 12,000 cubic feet of air a minute, for forty men and four horses; for the slopes district I found 40,000 cubic feet of air a minute, for sixty men and four horses. Total ventilation at the fan-drift I obtained 129,600 cubic feet a minute, fan running 130 revolutions a minute. The ventilation is produced by a Chandler fan, 16 feet diameter by 4 feet 8 inches wide, driven by 16- x 18-inch engine.

Hygrometer Readings.

| Place. | Dry Bulb. | Wet Bulb. | Moisture. |
|---|-----------|-----------|-----------|
| Return air from right of No. 19 district..... | 66° | 64° | 88 % |
| In return airway from slopes | 56° | 54° | 87 " |

Wolf safety-lamps are exclusively used throughout the mine. Shot-firing is confined to a few places along the outcrop in No. 5 incline in No. 19 district; the shots are fired with battery; the explosive used is Monobel.

No. 1 NORTH MINE.

Wm. Wilson, Overman; James Baggle, Peter Millar, Walter Joyce, Chas. O'Brien, and Wm. Wesnadge, Firebosses.

This mine is located on the north side of the valley; the seam is the continuation of the Old No. 1 North seam. Entrance is by means of an adit tunnel 1,800 feet in length, driven on the strike of the seam; the tunnel is 300 feet vertical above the tippie; for ventilation purposes another level is driven part of the distance. About 350 feet from the entrance of the main tunnel, No. 2 incline, which is 1,500 feet in length, is driven to the rise; about 1,000 feet farther in off the level, No. 3 incline has been driven to the rise. The coal is 7 to 12 feet thick; the mode of working is pillar and stall. The coal is conveyed to the inclines by horse-haulage and lowered over the incline with the direct and tail-rope system of haulage, whence it is conveyed to the mouth of the tunnel by horse-haulage and lowered over a gravity-plane 900 feet in length and 2,500 feet from the tippie.

During my inspection on December 15th, I found the mine clear of gas and ventilation good; both the roadways and timbering in good condition, except a portion of the return airway from No. 3 incline which had caved during the strike, but at that time this part was undergoing repair. The ventilation is produced by a blowing-fan 6 feet in diameter by 2½ feet wide, running 400 revolutions a minute, making 42,600 cubic feet of air a minute. For the Main level district I obtained 20,300 cubic feet of air a minute, for thirty men and two horses; for the 2nd incline district I obtained 21,000 cubic of air a minute, for forty-five men and three horses. Shot-firing is confined to the 2nd incline district; shots are fired with battery; the explosive used is Monobel.

No. 9 MINE.

David Martin, Overman ; John Caufield and Adam Watson, Firebosses.

This mine is located 400 feet west of the tippie and at the same level. Entrance is by means of two tunnels ; the main tunnel is $14\frac{1}{2}$ x 7 feet and 3,350 feet in length, driven on the strike of the seam ; the second tunnel is driven part of the distance and serves for ventilation. The seam averages about 6 feet thick ; at present only extraction of pillars is being done on the long-wall system in the 2nd incline. Recently the main level has been explored nearly to the face, where a third incline is to be driven. Over the inclines the haulage is by the tail-rope system ; from the foot of the inclines to the tippie the coal is conveyed with compressed-air motors.

During my inspection on December 20th, I obtained 22,500 cubic feet of air a minute, for thirty-eight men and three horses. I found the district clear of gas and the ventilation good ; the working-places are well timbered. At the fan-drift I measured 62,400 cubic feet of air a minute, the fan running eighty-eight revolutions a minute, water-gauge 1.2 inch ; size of fan 16 feet in diameter by 8 feet wide, driven by 16- x 18-inch engine, belted at the ratio of 4 to 7. Wolf safety-lamps are used exclusively. Shot-firing is confined to rock-work, and is fired on the night-shift by battery ; the explosive used is Saxonite.

No. 2 MINE, HIGHLINE.

Wm. Lancaster, Overman ; Frank Landers, James Bushell, and H. Landfear, Firebosses ; Ed. Bridge, Shotlighter.

This mine is located on the south side of the valley ; entrance is by an adit tunnel in line with the tippie. At a distance of 1,440 feet from the entrance a rock tunnel 250 feet in length has been driven to win the seam ; inside the rock tunnel and 400 feet to the south an incline has been driven to the rise. The coal on the north side of the incline averages 7 to 8 feet thick ; on the south side of the incline the seam of coal varies from 8 feet upwards. On the south side extraction of pillars only is being done ; on the north side of the incline the seam is worked on the long-wall system. Horse-haulage is used for bringing the coal to the incline, which is lowered over the incline by direct haulage by means of a compressed-air hoist placed on top of the incline ; from the foot of the incline to the tippie the cars are hauled with compressed-air motors. Since the new fan has been running the ventilation in this district has greatly improved.

On December 19th, when I made my last inspection, I found the workings clear of gas and the ventilation good ; the working-places and roadways were in good condition. For the south side of the incline I obtained 21,600 cubic feet of air a minute, for eighteen men and three horses ; for the north side of the incline I obtained 30,000 cubic feet of air a minute, for forty men and four horses. Total quantity at the Highline fan-drift I obtained 70,000 cubic feet of air a minute, fan running 116 revolutions a minute, water-gauge $2\frac{1}{2}$ inches ; size of fan (Wilson type) 16 feet diameter by 8 feet wide, driven direct by 16- x 18-inch cylinder engine. There is little shot-firing in the part of the long-wall face on the north side ; the shots are fired with battery. Wolf safety-lamps are exclusively used.

No. 3 MINE.

George Obrien, Overman ; John Biggs, Joseph Worthington, and W. R. Puckey, Firebosses.

This seam is the continuation of No. 2 seam, and the workings are all to the dip. Entrance to this mine is from underneath the tippie by means of a slope 2,250 feet in length, driven on the full dip of the seam. At a distance of 1,450 feet from the entrance, the South

level, 1,950 feet in length, has been turned off the level. No. 2 and 3 slopes have been driven to the dip; No. 3 slope is 650 feet long. The seam varies 3 to 4 feet thick and is of good quality. The mode of working is long-wall; stall-roads are turned off the slopes 50 feet apart; cogs are set 6 feet apart on each side of the road; the waste is packed with brushings from the floor of the roadways. The cars are hoisted to the level with air-hoists, and to the main slope with horse-haulage, whence the coal is hauled over the slope to the surface with an electric hoist placed on the surface.

On my last inspection, December 18th, I found gas in a cavity in the roof in the upper part of the 2nd slope long-wall; in this place the roof had been weighting; the remainder of the mine was well ventilated and the roadways and timbering were in good condition. In the return airway I obtained 30,000 cubic feet of air a minute, for forty-five men and two horses. Hygrometer reading taken in the return airway: Dry bulb, 52 degrees; wet bulb, 50 degrees; moisture, 86 per cent. Surface barometer, 26.4 inches. Wolf safety-lamps are exclusively used. Shot-firing is confined to rock-work and fired with battery during night-shift; the explosive used is Saxonite.

No. 3 mine is ventilated with Old No. 2 fan; at the fan-drift I obtained 98,000 cubic feet of air a minute, fan running 116 revolutions a minute, water-gauge 1.9 inches; size of fan (Wilson type) is 16 feet diameter by 8 feet wide.

NO. 1 EAST MINE.

The same Overman and Firebosses as in No. 3 mine; Thos. Wilson and George Dingsdale, Shotlighters.

This is a new mine; the main entrance is by a rock tunnel 450 feet in length. For a distance of 215 feet the tunnel is in rock; the remainder of the tunnel is partly in rock and partly in coal. The tunnel is located 90 feet above and 800 feet east of the tippie. Size of tunnel is $12\frac{1}{2}$ feet wide at the floor and $11\frac{1}{2}$ feet wide at the roof; the timbers are square, 12 x 10 inches for collars and 10 x 8 inches for supports. The return airway for this mine is a rock tunnel, rising 1 in 4, turned from a point 550 feet from the entrance of No. 2 tunnel. The seam is 8 to 9 feet thick; at present main roads are driven to the east; at the same time a few rooms have been worked towards the outcrop. The cars are lowered over a gravity-plane to the tippie.

During my last inspection on December 18th, I found the mine clear of gas and ventilation good; both timbering and roadways were in good condition. For twenty-one men and one horse, I obtained 24,000 cubic feet of air a minute. Wolf safety-lamps are used exclusively. Shots are fired with battery; the explosive used is Monobel.

This mine is ventilated with No. 2 fan; the return air from No. 1 East is coursed through No. 2 dips. At the bottom of the rock tunnel in No. 2 mine the return air from No. 1 East is increased with a further supply of air through No. 2 tunnel. I obtained 33,000 cubic feet of air going down the No. 2 dips.

NO. 1 SOUTH MINE.

W. J. Mazey, Overman; Thos. Redcliff, Wm. Stockwell, and Wm. Commons, Firemen.

Entrance to this mine is by means of two adit tunnels 1,800 feet in length, driven on the strike of the seam. The mine is located 2,500 feet south-west of the tippie and 250 feet vertically above the tippie. The seam varies to about 25 feet thick; about 8 feet of the upper

portion of the seam is worked on the long-wall system; cogs are set parallel with the face; the mine-track is laid parallel with the face and moved forward as the face advances. The coal is hauled to the tunnel-mouth with horse-haulage and lowered over a gravity-plane, where an electric motor takes the cars to the tippie. The mine is ventilated by a blowing-fan 6 feet diameter by $2\frac{1}{2}$ feet wide, running 350 revolutions a minute, driven by an electric motor and belted.

On my last inspection, December 16th, I found gas in face of main incline; in the remainder of the working-places the ventilation was good. The working-places were in good condition; also the roadways were in good condition, except short portions of the main intake and haulage-road had crushed and caved during the strike at the time they were undergoing repair. I obtained 13,000 cubic feet of air a minute, for thirty-one men and four horses. Wolf safety-lamps are exclusively used. There is no shot-firing in this mine.

The general and special rules are posted up near the entrance of each mine.

The coal from the different mines is hauled to the same tippie, a steel structure of 840 feet in length bridging the valley; the tippie is well equipped with the necessary appliances for picking and screening, the machinery being operated with electric power.

The permanent power plant consists of sixteen boilers, developing about 2,400 horse-power. A four-stage compressor (Canadian Rand), compressing to 1,000 lb. to the square inch; capacity, 1,350 cubic feet of free air a minute; high-pressure cylinder, 17 x 36; low-pressure cylinder, 34 x 36. A Walker compressor, 100 lb. to the square inch; capacity, 3,500 cubic feet of free air a minute. A duplex compressor, 100 lb. to the square inch; capacity, 1,700 cubic feet of free air a minute. Four Eddy generators, 100 kw. each, driven with Robb-Armstrong simple side-crank engines; also another electric generator of 55 kw. used for giving No. 1 South and No. 1 North mines separate lines for the fans.

The following are the official returns for the Coal Creek Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. | COAL. | | COKE. | |
|---|---------|---------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| (Tons of 2,240 lb.) | | | | |
| Sold for consumption in Canada | 26,200 | ..... | 27,563 | ..... |
| " export to United States | 123,377 | ..... | 1,267 | ..... |
| " " other countries ..... | ..... | ..... | ..... | ..... |
| Total sales ..... | ..... | 149,577 | ..... | 28,830 |
| Used in making coke | 44,688 | ..... | ..... | ..... |
| " under colliery boilers, etc. | 13,709 | ..... | ..... | ..... |
| Total for colliery use ..... | ..... | 58,397 | ..... | ..... |
| Stocks on hand first of year | 1,529 | 207,974 | 758 | 28,830 |
| " last of year | 111 | ..... | 447 | ..... |
| Difference taken from stock during year ..... | ..... | 1,418 | ..... | 311 |
| Output of colliery for year ..... | ..... | 206,556 | ..... | 28,519 |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---------------------------------------|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance . | 32 | ..... | 8 | ..... | 40 | ..... |
| Whites—Miners | 463 | ..... |  | ..... | 463 | ..... |
| Miners' helpers |  | ..... |  | ..... |  | ..... |
| Labourers | 191 | ..... | 99 | ..... | 290 | ..... |
| * Mechanics & skilled labour. | 288 | ..... | 194 | ..... | 482 | ..... |
| Boys | 17 | ..... | 10 | ..... | 27 | ..... |
| Japanese |  | ..... |  | ..... |  | ..... |
| Chinese |  | ..... |  | ..... |  | ..... |
| Indians |  | ..... |  | ..... |  | ..... |
| Totals | 991 | ..... | 311 | ..... | 1,302 | ..... |

*NOTE.—Mechanics and skilled labour include: Underground—Drivers, motormen, rope-riders, hoistmen, trackmen, bratticemen, timbermen, pumpmen, fanmen, and carpenters. Above ground—Lampmen, weighmaster, tippemen, firemen, machinists, carpenters, blacksmiths, engineers, and electric-plant firemen.

Name of seams or pits—The following mines are working: No. 1 North, No. 1 South, No. 1 East, No. 2, No. 3, No. 5 North, No. 9. Old No. 1 has not been reopened since the resumption of work on November 20th, 1911. No. 0 South and No. 5 South are not working.

Description of seams, tunnels, levels, shafts, etc., and number of same—The same as last year.

Description and length of tramway, plant, etc.—The same as last year. The new slack-bins at Fernie have been rebuilt after fire of October 6th, 1910, and were placed in operation last spring. Mines shut down from April 1st to November 19th by labour troubles, which were general throughout this district. This caused a loss of output to this company of 100,000 tons per month.

NORTHERN EAST KOOTENAY INSPECTION DISTRICT.

REPORT OF ROBERT STRACHAN, INSPECTOR.

I have the honour to submit my second annual report as Inspector of Coal-mines for the Northern East Kootenay Inspection District.

This district, which was created a separate division with headquarters at Hosmer, includes all the mines from Hosmer to the eastern boundary of British Columbia.

The mines at present being operated are as follows: Hosmer Colliery, by the Hosmer Mines, Ltd.; Michel Colliery, by the Crow's Nest Pass Coal Co., Ltd.; and Corbin Colliery, by the Corbin Coal & Coke Co., Ltd.

I regret that, owing to the failure of the operators and workmen to agree as to a renewal of the contract that expired 31st March, 1911, the mines were idle for seven months and a half, resuming work on the 20th November; the basis of renewal being an agreement that is expected to last till 31st March, 1915, when both parties are expected to meet in conference thirty days prior to the expiration of the agreement to discuss a renewal thereof. Unfortunately, owing to the long stoppage, falls of roof and sides, damaged roadways, and accumulations of water, it will take some time before the mines are running to their full capacity.

Hosmer Mines, Ltd.

Head Office—Montreal.

Capital, \$1,500,000.

| <i>Officers.</i> | <i>Address.</i> |
|----------------------------------|-----------------|
| W. D. Matthews, President, | Toronto, Ont. |
| A. R. G. Howard, Secretary. | Montreal. |
| B. T. Coon, Treasurer, | Bankhead, Alta. |
| Lewis Stockett, General Manager, | Hosmer, B.C. |
| David G. Wilson, Mine Manager, | Hosmer, B.C. |

Value of plant, \$1,000,000.

HOSMER COLLIERY.

David G. Wilson, Manager ; John Musgrave, Overman, A Level ; Jas. McKelvie, Overman, B Level.

No. 2 MINE, A LEVEL.

This mine, the only one operated since work was resumed, is situated about 1,600 feet from the main entrance ; the coal averages 12 feet thick and has an inclination of about 60 degrees. Method of work is pillar and stall ; the raises in the outer portion being driven up at an angle, while inside they are driven up full pitch, the breasts being driven off the raises at right angles. On the north side, the level has been driven in from the main tunnel 1,500 feet ; on the south side, 2,700 feet. The ventilation is by three splits : North side split, 13,000 cubic feet a minute, for the use of eight men ; Centre split, 34,000 cubic feet a minute, for the use of seventeen men ; Inside split, 10,920 cubic feet a minute, for the use of twenty-seven men.

At the time of my last inspection I found all the roads, airways, and places in good condition, free from gas and well timbered.

In addition to the above quantities of air travelling through No. 2, I found 64,800 cubic feet of air circulating through the inside seams, which have not yet been restarted.

The ventilation for all the seams on this level is produced by a Walker fan of the reversible type, 20 x 7½ feet, driven by a pair of 38- x 46-inch coupled engines connected to the fan by a continuous-rope drive. This fan was forcing the air in at the time of my last inspection, and I found passing into the intake 173,000 cubic feet a minute ; speed of fan, 105 revolutions a minute ; water-gauge, 2½ inches. The ratio of the speed of the engine to that of the fan is as 1 is to 1.5.

As mentioned in my last annual report, another level has been made along the outcrop of the coal-seams, about 500 feet higher than the main tunnel ; this level is termed B level, to distinguish it from the main level, now termed A level. A great deal of work in the shape of grading and prospecting has been done on this level during the past summer, and, although the most of this has been devoted to No. 2 seam, Nos. 8, 9, and 10 have also been uncovered.

On the south side a main level with a counter has been driven in for a distance of 700 feet, and several raises started off from the level. During my inspections I have never found any gas in this mine, and the roads and places were in good condition. The ventilation for this mine is by a small 6-foot fan (Guibal type) driven by a 20-horse-power electric motor. This fan was producing 16,000 cubic feet a minute, for the use of twenty men and one horse.

On the north side another mine has been driven in on this No. 2 seam for a distance of 375 feet ; both the main level and counter are well timbered and there was no trace of gas.

A fan similar to that described for the mine on the south side is producing ventilation, and at the time of my inspection there was 20,160 cubic feet a minute, for the use of fifteen men and one horse.

The coal in both these mines on the B level is mined by machines of the puncher type fixed on a bar or post, and is blasted down by Monobel, fired by electric detonator and cable. The haulage on the B level is by means of horse to the mine-mouth, when a steam-locomotive takes the cars to the top of the B level incline. A 14- x 16-inch engine is used to lower the loads down and pull up the empty cars in trips of five; this engine is situated at the A level; from this point they are transferred to the A level incline. From the foot of the raises in the A level tunnel the coal is hauled to the top of the A level incline by compressed-air locomotives, from which point it is lowered by a pair of 28- x 44-inch first-motion engines, in trips of ten, to the tippie level. In the A level seam there is no blasting in the coal, and any blasting in rock is done with Monobel and electric detonator with cable.

The lamps in use at these mines are of the Wolf type, and are cleaned and examined, as required by section 87, General Rules 9 and 10, "Coal-mines Regulation Act," in a fireproof building situated near the entrance to the A level tunnel.

During the past year, in addition to the work done on the B level, considerable improvements were made at the A level to facilitate the transfer of the cars from the foot of B level incline to top of the A level incline; the latter incline also being double-tracked. At the tippie a settling-tank has also been built of concrete, allowing of the using of the water for coal-washing purposes continuously, and also saving the fine slack.

The rescue apparatus installed last year has been augmented by the addition of an inhalation oxygen device, other two tanks of oxygen, and some electric lamps of another type. During the year, owing to the stoppage of work, the only practice with the apparatus has been done in the mine by the officials, and no progress has been made with the erection of a proper station, the apparatus being stored in a portion of the lamp-room boarded off. The ambulance class started in the latter part of 1910 was abandoned during the time of the stoppage of work and has not since been restarted.

The following are the official returns of the Hosmer Colliery for the year ending 31st December, 1911 :—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|--------|--------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 11,000 | ..... | 12,187 | ..... |
| " export to United States ..... | ..... | ..... | ..... | ..... |
| " " to other countries ..... | ..... | ..... | ..... | ..... |
| Total sales ..... | ..... | 11,000 | ..... | 12,187 |
| Used in making coke | 19,665 | ..... | ..... | ..... |
| " under colliery boilers, etc. | 10,434 | ..... | 37 | ..... |
| Total for colliery use ..... | ..... | 30,099 | ..... | 37 |
| Stocks on hand first of year | 3,388 | 41,099 | ..... | 12,224 |
| " last of year | 1,688 | ..... | 647 | 268 |
| Difference taken from stock during year. .... | ..... | 1,700 | ..... | 379 |
| Output of colliery for year ..... | ..... | 39,399 | ..... | 11,845 |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|---|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| | | \$ | | \$ | | \$ |
| Supervision and clerical assistance | 11 | 6.00 - 3.75 | 9 | 13.00 - 3.00 | 20 | ..... |
| Whites—Miners..... | 65 | 7.00 - 3.00 | ..... | ..... | 65 | ..... |
| Miners' helpers..... | 78 | 2.75 | ..... | ..... | 78 | ..... |
| Labourers | 60 | 2.75 | 85 | 3.00 - 2.47 | 145 | ..... |
| Mechanics and skilled labour | 24 | 3.85 - 3.00 | 40 | 3.85 - 3.00 | 63 | ..... |
| Boys | 1 | 1.65 | 9 | 1.37 | 10 | ..... |
| Japanese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indians ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 239 | ..... | 143 | ..... | 382 | ..... |

Name of seams or pits—A level, Nos. 2, 6, 9, and 10; B level, Nos. 2, 6, 8, and 9.

Description of seams, tunnels, levels, shafts, etc., and number of same—A level, main tunnel; B level, tramway, 500 feet above main tunnel.

Description and length of tramway, plant, etc.—Washer for nut coal, 500 tons daily capacity, has been added to former description.

Crow's Nest Pass Coal Company.*

MICHEL COLLIERY.

B. Caufield, Manager.

This colliery, operated by the Crow's Nest Pass Coal Co., Ltd., is situated on both sides of Michel creek, and comprises Nos. 3, 4, 5, and 3 East on the south side of the creek, and Nos. 7 and 8 on the north side.

These mines suffered from the stoppage of work on the 31st March, and when the new agreement was effected only Nos. 3 and 8 South were restarted. No. 4 seam has for the present been abandoned, while the No. 5, which was stopped last January, owing to being unable to cope with the water, is practically flooded.

On the north side a fire was discovered in No. 8 mine on the 15th May, by the presence of smoke issuing from fan-chimney; this fire was finally discovered to have occurred in an abandoned working (No. 3 East level); in five days it had either travelled almost 600 feet or the explosion which had followed the fire must have ignited some inflammable material in No. 19 room on the No. 17 Chute level, but the fire was practically beyond control. This, with the undoubted presence of large accumulations of gas due largely to the fact that the fan had been stopped for forty-eight hours previous to the discovery of the fire, influenced the decision that the only safe method was to seal off this mine at the entrance. This also affects No. 7 mine, as it is operated by means of a tunnel driven from No. 8 mine at a point about 2,000 feet from the entrance to No. 8. The Chief Inspector of Mines, who came up and made a personal investigation, suggested that the mine remain sealed for at least three months; this time elapsed in August, but, owing to the labour trouble, it was decided not to attempt to reopen the mine, and at present I have no information when the mine will be reopened.

*See also page 258.

This fire, with the accompanying explosion, seems to confirm what had hitherto been a suspicion—namely, that No. 8 mine at points where the seam is troubled is liable to spontaneous combustion—and would suggest that energetic steps are necessary to see that a sufficient patrol of all old workings be made where accessible, that sufficient ventilation be circulated through these, and, where the works are not accessible, these must be hermetically sealed off, only such openings left as shall prevent any undue pressure on the stoppings. These openings should be so controlled that the excess of gas shall be drained into the return airway without coming in contact with the places in operation. This is the second time a fire has occurred in this mine without any other evidence than it was due to spontaneous combustion; these fires have occurred at points so far apart as to preclude the suggestion that the second fire was a recurrence of the first, the explosion in the second case being due, in my opinion, to the presence of gas which had accumulated while the fan had been stopped. Fortunately there was no person in the mine when this explosion occurred, or we might have to record a large death-roll, as, although the explosion was local, from the evidence of caves, the amount of timber blown out, and of cars smashed, it must have been very violent. The amount of flame was shown by the coked coal-dust deposited on the caves, timber, etc.; that this flame was unable to travel farther was due to the damp nature of the No. 3 incline. In view of the above, great precautions should be taken in reopening this mine, and the above suggestions as to the old workings should be vigorously enforced. Considering that the danger is so apparent, energetic measures to cope with the situation is much better than any amount of rescue-work afterwards, with its attendant loss of life, loss of property, and other horrors that usually follow explosions.

No. 3 MINE.

Wm. Robinson, Overman.

This mine, which is the third seam at present operated from the crosscut tunnel, which successively cuts Nos. 5, 4, and 3 on the south side of Michel creek, has previously been worked pillar and stall, but has gradually been changed to long-wall. While it will take some time to demonstrate whether this method will be successful, present indications seem to point out this as the future method of working seams under heavy cover, both as to safety and profit.

At the time of my inspection, only some parts of the mine had been reopened, the remainder being under repairs. The parts accessible were in good condition, free from gas, and well timbered. The ventilation is effected by two separate splits respectively: West side split, 12,675 cubic feet a minute, for the use of eighteen men and one horse; East side split, 23,600 cubic feet a minute, for the use of thirty-three men and four horses. This represents an average of 540 cubic feet a unit. (A horse equals 3 units.) The No. 4 fan which ventilates this and No. 4 mine is of the Guibal type, 16 x 8 feet, driven by an Erie City engine, 16 x 24 inches, by means of a rope-drive. The quantity of air produced was 107,520 cubic feet a minute, with a water-gauge of 2 inches, speed of fan and engine being 115 revolutions a minute. This quantity allows of 71,845 cubic feet to ventilate the abandoned No. 4 mine.

As all the Michel seams dip at an angle of about 15 degrees to the south, the coal on the south side has to be hauled up by hoist. The method of haulage is to lower cars down from face by a balance arrangement; they are then taken to the slope by horse; the hoist takes them to top of slope, from where they are taken to tippie by horse. Steps were taken to replace the horse at top of slope by an endless-rope arrangement, but this has not yet been done.

No. 8 SOUTH (SOMETIMES CALLED No. 3 EAST).

Wm. Robinson, Overman.

This mine, also situated on the south side of Michel creek, about half a mile from the tippie, is generally regarded as the same seam as No. 8 mine on the north side. The seam is 12 feet thick and is worked by pillar-and-stall method. A slope has been driven down for about 250 feet and a hoist installed. During this last year a new entrance has been made to this mine, giving better access and facilitating the haulage, and a large engine has been installed to run the fan.

At the time of my inspection, I found all the parts of the mine in good condition, well timbered, and free from gas. Ventilation is by means of a small 2- x 4-foot fan of the Guibal type, driven by belt from a 12- x 14-inch steam-engine, and was producing 11,520 cubic feet a minute, for the use of thirty-five men and two horses, representing an average of 280 cubic feet a minute for each unit (a horse equals 3 units); speed of engine, sixty revolutions a minute; ratio of speed of engine to fan, 1 to 2.5. The blasting of coal in this mine is done with Monobel, fired with electric detonator and cable, and the haulage to the tippie is by horse.

During the year the improvements at this colliery consist of erecting the fan formerly at No. 8 mine in place of the one at the No. 5 mine, and the forming of a new entrance to No. 8 South. The outside arrangements remain as formerly, and consist of a Green self-dumping car-haul on the south side. This car-haul consists of a double endless chain, which travels between sprocket-wheels on car-wheels with axles that act as spreader-bars, as pushers, and as retarders of the mine-cars when on the plane. Tracks for the mine-car are inside the tracks for the cross-bar wheels. When a car is delivered to the haul, the cross-bar moves up to the back car-wheels and pushes the car in front up the incline, then on to the dump. The dump, which is simply a continuation of the track, increases from about 20 to 60 degrees, and by opening the door the coal is discharged into the dump. The cross-bars, continuing to travel, push the car on to a swing-lift transfer, and the bar following the sprocket-wheel carries the rear end of the car with it over the sprocket and on to the upper or return track. The car then returns to the foot of the incline, the cross-bar acting as a retarder. On the No. 8 or north side an automatic dump handles the car, the car on being dumped returning underneath the loaded track to where it is picked up by the compressed-air locomotive. The tippie is fully equipped with efficient screens, picking-tables, and belt-conveyor to take the slack to the storage-bins, from which it is drawn as required for the coke-ovens. All the machinery about the tippie is driven by electric motors. Two Smith's gravity box-car loaders allow of the loading of box cars, while open cars are loaded from picking-tables, an apron being arranged so that it can be lowered to prevent breakages of coal in loading.

In the power-house is a high-pressure Rand compressor with a capacity of 1,450 cubic feet of free air a minute, compressed to 1,200 lb. to the square inch; also another Rand machine, capacity 4,500 cubic feet of free air, pressure 100 lb. to the square inch, and a Walker compressor equal to 3,500 cubic feet free air, with a pressure of 100 lb. to the square inch. The last two supply the air for driving pumps, air-hoists, etc. Two generators of 250 kw. each supply the power for the tippie, lighting, etc. Steam is provided by eleven high-pressure boilers, each of 105-horse-power capacity, and three low-pressure boilers, each 130 horse-power, British Columbia rating. In addition to the above, there is a large machine-shop, fireproof lamp-room, where the Wolf safety-lamps are cleaned, tested, and repaired, car repair-shop, etc., in addition to a large wash and change room for the workmen. The only lamp in use in the Michel mines is the Wolf safety-lamp.

As required by the "Coal-mines Regulation Act," rescue apparatus has been installed at this colliery, and now consists of five No. $\frac{1}{2}$ type Draeger apparatus, with a large quantity of

spare oxygen cylinders and potash regenerators. The spare cylinders allow of these being recharged at the Coal Creek mines; an inhalation device and pulmotor have been added to the equipment. A considerable number of the workmen and officials qualified themselves and passed the examination for the Canadian St. John's Ambulance Association.

The following are the official returns from the Michel Colliery for the year 1911:—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|--------|---------|--------|--------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada | 13,505 | | 26,284 | |
| " export to United States | 51,519 | | | |
| " " other countries | | | | |
| Total sales | | 65,024 | | 26,284 |
| Used in making coke | 40,303 | | | |
| Used under colliery boilers, etc. | 9,198 | | | |
| Total for colliery use | | 49,501 | | |
| | | 114,525 | | 26,284 |
| Stocks on hand first of year | 159 | | 804 | |
| " last of year | 18 | | 161 | |
| Difference taken from stock during year | | 141 | | 643 |
| Output of collieries for year | | 114,384 | | 25,641 |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC., INCLUDING COKE-OVENS.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance | 14 | | 9 | | 23 | |
| Whites—Miners | 126 | | | | 126 | |
| Miners' helpers | | | | | | |
| Labourers | 46 | | 41 | | 87 | |
| Mechanics and skilled labour | 78 | | 65 | | 143 | |
| Boys | 1 | | | | 1 | |
| Japanese | | | | | | |
| Chinese | | | | | | |
| Indians | | | | | | |
| Totals | 265 | | 115 | | 380 | |

Number of seams or pits—No. 3 East, Nos. 3, 4, 5, 7, and 8 mines worked to March 31st, 1911. No. 3 East and No. 3 only reopened after resumption of work, November 20th, 1911.

Description of seams, tunnels, levels, shafts, etc., and number of same—Same as last year.

Description and length of tramway, plant, etc.—Same as last year. The fan, which in 1908 was replaced at No. 8 mine, Michel, by a larger fan made by Walker Bros., of Wigan, England, was during 1911 installed to ventilate No. 5 mine, Michel. This is a double-inlet Sullivan 12 feet diameter, 6 feet face, capacity 100,000 cubic feet of air a minute,

against a 2-inch water-gauge. Mines shut down from April 1st to November 19th by labour troubles, which were general throughout this district. This caused a loss of output to this company of 100,000 tons a month.

Corbin Coal & Coke Company, Limited.

Head Office—Spokane, Wash.

Capital, \$2,000,000.

Officers.

D. C. Corbin, President,
Austin Corbin, 2nd Vice-President,
A. T. Herrick, Secretary-Treasurer,
E. J. Roberts, Superintendent,
T. H. Williams, Mine Manager,

Address.

Spokane, Wash.
New York, N.Y.
Spokane, Wash.
Spokane, Wash.
Corbin, B.C.

Value of plant, \$293,803.

CORBIN COLLIERY.

T. H. Williams, Manager ; R. T. Stewart, Overman.

This colliery, which is situated on the East fork of the south branch of Michel creek, is reached by a spur, called the British Columbia Eastern Railway, connecting at McGillvray with the Canadian Pacific Railway's Crowsnest Pass branch line.

During the past year operations have been mostly confined to the No. 1 mine ; in this mine the vein varies from 10 feet to almost 250 feet. The main tunnel has not been developed any during the year, most of the operations having been confined to raising and to the extraction of pillars. The face of the main tunnel is in about 2,000 feet ; the method of work is pillar and stall, rooms being worked across the pitch ; after the pillars have been formed to the outcrop, they are gradually reduced in size until as much of the coal is obtained as possible in safety, consequently a large amount of coal is lost. During the past year an attempt has been made to obtain a greater percentage of this coal by coggling the roof while the pillars are being extracted ; it will take some time to demonstrate whether this will be successful.

During my inspection of this mine I found all the parts of the mine in good condition, well timbered, and free from gas. The fan, which is of the Guibal type, was producing 36,000 cubic feet a minute, with a $\frac{3}{16}$ -inch water-gauge ; the fan is driven direct by a 8- x 12-inch steam-engine. There is no person in immediate attendance on this fan, the power-house engineer being in charge, but an automatic alarm has been installed to warn the engineer should it stop or decrease in speed.

In the mine there are 105 men and two horses, therefore the above quantity allows 324 cubic feet a minute for each unit (a horse equal 3 units). This ventilation is divided into four splits : A split, 2,040 cubic feet a minute, for the use of six men ; A Prim split, 3,400 cubic feet a minute, for the use of ten men ; D split, 18,740 cubic feet a minute, for the use of fifty-five men ; E split, 10,560 cubic feet a minute, for the use of thirty-four men.

The haulage in the rooms is by hand with dump-cars ; these dump into the chutes ; the coal is taken from the chutes by large cars holding 3 tons, and taken to the tipple by compressed-air locomotives of the compound type. Here the coal is screened in a very primitive method and stored in large bins holding about 1,000 tons.

The power-house contains a four-stage Rand compressor for generating power for the locomotives, and an alternator of 120-kw. capacity, for lighting the works and the village. Boiler-house contains two return-tubular boilers of 105 horse-power each, and two 45-horse-

power locomotive-type boilers, the two return-tubular boilers with the assistance of one locomotive boiler being sufficient to generate power, the other being held in reserve.

Blasting in this mine is by means of electric detonator and cable, firing Monobel. The lamps used are the Wolf safety; they are cleaned and examined, as required by section 87, General Rules 9 and 10, "Coal-mines Regulation Act," in a lamp-room situated near the mine entrance.

During the early summer steps were taken to wash the surface off what is supposed to be a continuation of this vein, at a point about two miles from camp. The seam here exposed has been proved by drill to be over 300 feet thick, and has been found for over 2,000 feet in length. A bunk-house and cook-house are in process of being erected to accommodate the men, while bunkers to hold the coal have been erected. Some open-work has been done and several crosscuts have been driven. The railway which has been surveyed leading to the Flathead will pass at a convenient point to this seam, but until such time as this is built it is intended to handle this coal with teams.

The rescue apparatus at this colliery remains as last year: Two No. 2 type Draeger, one No. $\frac{1}{2}$ type pump for recharging cylinders, two lamps of the electric type, a good supply of potash regenerators, and I understand that other four tanks of oxygen have been ordered, to augment the present stock. During the year I demonstrated the use of the pulmotor to the ambulance class here, but regret that, up to the present, the management has not deemed the matter of sufficient importance to acquire one. In this respect, Corbin is the only colliery in this district without a pulmotor, and at a time when resuscitating apparatus is receiving as much, if not more, attention than rescue apparatus, I think it is very desirable that such appliances be at every mine. The ambulance class formed was abandoned owing to the stoppage of work and has not yet been resumed.

The Draeger rescue-station established by the Department of Mines at Hosmer is still in temporary quarters, the outfit, which consists of four No. 2 type Draeger apparatus, two No. $\frac{1}{2}$ type, pulmotor, four Draeger electric lamps, recharging-pump, with a good supply of oxygen and potash regenerators, is in good condition. During the present year the apparatus was taken to Michel to assist the outfit there during the fire in May last, a report of which I have already sent to the Department.

The following are the official returns from the Corbin Colliery for the year 1911 :—

| SALES AND OUTPUT FOR YEAR. (Tons of 2,240 lb.) | COAL. | | COKE. | |
|---|--------|--------|-------|-------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 44,434 | | | |
| " export to United States..... | 34,998 | | | |
| " " other countries..... | | | | |
| Total sales..... | | 79,432 | | |
| Used in making coke..... | | | | |
| " under colliery boilers, etc..... | 2,286 | | | |
| Total for colliery use..... | | 2,286 | | |
| | | 81,718 | | |
| Stocks on hand first of year..... | | | | |
| " last of year..... | | | | |
| Difference taken from stock during year..... | | | | |
| Output of colliery for year..... | | 81,718 | | |

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

| CHARACTER OF LABOUR. | UNDERGROUND. | | ABOVE GROUND. | | TOTALS. | |
|--|---------------|---------------------|---------------|---------------------|---------------|---------------------|
| | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. | No. employed. | Average Daily Wage. |
| Supervision and clerical assistance..... | 5 | ..... | 7 | ..... | 12 | ..... |
| Whites—Miners..... | 50 | ..... | ..... | ..... | 50 | ..... |
| Miners' helpers..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Labourers..... | 21 | ..... | 32 | ..... | 53 | ..... |
| *Mechanics and skilled labour..... | 14 | ..... | 3 | ..... | 17 | ..... |
| Boys..... | ..... | ..... | 1 | ..... | 1 | ..... |
| Japanese..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indians..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals..... | 90 | ..... | 43 | ..... | 133 | ..... |

* Includes motormen, trackmen, bratticemen, mine carpenters.

Name of seams or pits—A and A1.

Description of seams, tunnels, levels, shafts, etc., and number of same—Strike of seam is S. 18° W., and dip 70 degrees east to vertical. Outcrop along crest of ridge running south, width 4 to 150 feet. There are four main tunnels, A, B, D, and E. A is the lower and main haulage tunnel, 9 x 14 feet in the clear and 2,200 feet long; B, D, and E are 9 x 10 feet in the clear. There are five levels, about 40 feet apart, between B and D tunnels, and six levels, 40 feet apart, above E tunnel. There are no shafts, the tunnels and levels being connected by 6- x 10-foot raises.

Description and length of tramway, plant, etc.—Tramway is 950 feet long; 360 feet of this on trestle leading to coal-bins, having 1,000 tons capacity. Power plant—Two 50-horse-power boilers, locomotive type; two 120-horse-power boilers, tubular type; one 80-horse-power engine and dynamo; one Rand high-pressure air-compressor; two Porter air-locomotives; one fan-engine and 4- x 12-foot ventilating-fan.

The attached list of accidents in this district is short, as the mines only worked for four months out of the year. Corbin mines reported no accidents during the year, and such a gratifying result is worthy of notice. Michel mines reported two fatal and five serious; Hosmer five serious and seven slight, a total of nineteen.

Haulage, as usual, accounted for almost 50 per cent. of these accidents, and fourteen out of the nineteen occurred to foreigners. A large proportion of these accidents is due to carelessness on the part of the workmen, especially in regard to the non-observance of the special and general rules. The lack of discipline is also very much in evidence, due, in a great measure, to the number of foreign-speaking workmen employed. In some cases this lack of discipline is due to the reluctance of the management to antagonize the relationship with the workmen, and in other cases, I regret to state, to carelessness of the management in enforcing the general and special rules.

A list of prosecutions is also attached; these consist of two cases, one for having matches in the mine contrary to Special Rule 67; the other is the case of a fireboss allowing two workmen to proceed to their working-place, which had been fenced off on account of the presence of fire-damp, Special Rule 10. In the first case a fine of \$10 and costs was imposed; in the second the accused pleaded guilty and a fine of \$5 and costs was imposed. In neither of the cases was the penalty imposed commensurate with the danger involved due to the breach of the rules.

SUMMARY—TABLE SHOWING ACCIDENTS OCCURRING IN B.C. COLLIERIES IN TEN YEARS—1902 TO 1911.

| For the year | 1902. | | | | 1903. | | | | 1904. | | | | 1905. | | | | 1906. | | | | 1907. | | | | 1908. | | | | 1909. | | | | 1910. | | | | 1911. | | | | Total for 10 years. | | | |
|----------------------------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|-----------|----------|---------|--------|---------------------|-----|-----|------|
| Output of coal—tons. | 1,641,626 | | | | 1,481,913 | | | | 1,685,698 | | | | 1,825,832 | | | | 1,899,076 | | | | 2,219,608 | | | | 2,109,387 | | | | 2,400,600 | | | | 3,139,235 | | | | 2,193,062 | | | | 20,596,037 | | | |
| No. persons employ'd | 4,011 | | | | 4,264 | | | | 4,453 | | | | 4,407 | | | | 4,805 | | | | 6,059 | | | | 6,095 | | | | 6,418 | | | | 7,758 | | | | 6,873 | | | | 55,143 | | | |
| Nature of Injury. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cause of Accident. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. | | | | |
| Explosion (cause unknown). | 125 | ... | ... | 125 | ... | ... | ... | ... | 14 | ... | ... | 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 139 | ... | ... | 139 | | |
| Gas explosions | 1 | ... | 8 | 9 | 21 | ... | 16 | 37 | 7 | ... | 8 | 15 | ... | 9 | 9 | ... | 1 | 1 | 1 | 1 | 18 | 20 | 1 | ... | 8 | 9 | 32 | ... | 7 | 39 | ... | 6 | 6 | ... | ... | 10 | 10 | 63 | 1 | 91 | 155 | | | |
| Falls of coal | 1 | 4 | 1 | 6 | 4 | 5 | 2 | 11 | 5 | 12 | 1 | 18 | 2 | 8 | 3 | 13 | 5 | 6 | 3 | 14 | 8 | 15 | 7 | 30 | 3 | 6 | 10 | 19 | 7 | 7 | 4 | 18 | 5 | 16 | 5 | 26 | 3 | 5 | 6 | 14 | 43 | 84 | 42 | 169 |
| " rock | 7 | 6 | 2 | 15 | 8 | 8 | 4 | 20 | 4 | 7 | 1 | 12 | 4 | 6 | 1 | 11 | 7 | 8 | 7 | 22 | 2 | 7 | 8 | 17 | 5 | 10 | 7 | 22 | 6 | 13 | 9 | 28 | 8 | 15 | 12 | 35 | ... | 5 | 24 | 29 | 51 | 85 | 75 | 211 |
| Mine cars and horses | 3 | 6 | 5 | 14 | 5 | 7 | 2 | 14 | 3 | 15 | 5 | 23 | 3 | 9 | 8 | 20 | 2 | 13 | 13 | 28 | 8 | 22 | 15 | 45 | 1 | 19 | 15 | 35 | 6 | 17 | 24 | 47 | 11 | 49 | 23 | 83 | 5 | 7 | 18 | 30 | 47 | 164 | 128 | 339 |
| " timber | 2 | ... | ... | 2 | 1 | 2 | ... | 3 | ... | 2 | ... | 2 | 1 | 2 | ... | 3 | ... | 1 | 1 | 2 | ... | 4 | 1 | 5 | 1 | 3 | ... | 4 | ... | 2 | 3 | 5 | 1 | 4 | 2 | 7 | ... | ... | 5 | 5 | 6 | 20 | 12 | 38 |
| Hoisting, ropes, &c. | ... | 2 | ... | 2 | ... | 4 | 1 | 5 | ... | 2 | ... | 2 | ... | 1 | 1 | ... | 2 | 1 | 3 | ... | ... | 3 | 3 | 1 | 4 | ... | 5 | ... | ... | 3 | 3 | ... | 2 | 4 | 6 | ... | 1 | 1 | 2 | 1 | 17 | 14 | 32 | |
| Powder, &c., explo'n | ... | ... | 1 | 1 | 1 | 7 | ... | 8 | 1 | ... | 1 | 2 | 1 | 1 | 3 | 5 | ... | 1 | 1 | 2 | 1 | 2 | 4 | 7 | ... | 2 | 4 | 6 | 1 | 1 | 3 | 5 | 1 | 1 | 3 | 5 | ... | 1 | 2 | 3 | 6 | 16 | 22 | 44 |
| Underground—Miscellaneous. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2 | 1 | 3 | ... | 2 | 3 | 5 | 1 | 1 | 4 | 6 | 4 | 2 | 5 | 11 | 2 | 2 | 2 | 6 | 1 | 4 | 4 | 9 | 4 | ... | 5 | 9 | 12 | 13 | 24 | 49 | |
| On surface—miscellaneous. | ... | 3 | 1 | 4 | 2 | ... | 1 | 3 | 3 | 3 | ... | 6 | 1 | 2 | ... | 3 | 1 | 3 | 2 | 6 | 10 | 9 | 2 | 21 | 2 | 4 | 3 | 9 | 3 | 5 | 4 | 12 | 1 | 4 | 7 | 12 | 4 | 4 | 11 | 19 | 27 | 37 | 31 | 95 |
| Fire in Mine | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 139 | 21 | 18 | 178 | 42 | 33 | 26 | 101 | 37 | 41 | 16 | 94 | 12 | 30 | 26 | 68 | 15 | 36 | 32 | 83 | 31 | 61 | 62 | 154 | 18 | 50 | 52 | 120 | 57 | 47 | 59 | 163 | 28 | 95 | 66 | 189 | 16 | 23 | 82 | 121 | 395 | 437 | 439 | 1271 |

ACCIDENTS IN BRITISH COLUMBIA COLLIERIES DURING 1911.

| CAUSES OF ACCIDENT AND NATURE OF INJURY. | NAME OF COLLIERY. | | | | | | | | | | | | | | | | TOTAL FOR 1911. | | | | | | | | | | |
|--|-------------------|----------|---------|------------|---------|--------|----------|----------------|--------|----------------|---------|-------------|----------|------------|--------|-------------------|-----------------|--------------|----------|---------|--------|----------|---------|--------|----------|---------|--------|
| | Nanaimo. | | | Extension. | | Union. | | S. Wellington. | | E. Wellington. | | Middleboro. | | Princeton. | | Other Collieries. | | Crow's Nest. | | Hosmer. | | Oorbin. | | Fatal. | Serious. | Slight. | Total. |
| | Fatal. | Serious. | Slight. | Fatal. | Slight. | Fatal. | Serious. | Slight. | Fatal. | Serious. | Slight. | Fatal. | Serious. | Slight. | Fatal. | Serious. | Slight. | Fatal. | Serious. | Slight. | Fatal. | Serious. | Slight. | | | | |
| Gas—Explosion of..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Falls of Coal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 14 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Falls of Rock..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 29 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mine Cars and Horses..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 30 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shots or Powder..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ropes, Hoisting or Haulage..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Post or Timber..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous—Underground..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous—Surface..... | | | | | | | | | | | | | | | | | | | | | | | | | | | 19 |
| Fatal..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serious..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Slight..... | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total..... | 5 | 2 | 5 | 2 | 6 | 2 | 11 | 11 | 1 | 1 | 2 | 27 | 3 | 2 | 10 | 1 | 3 | 4 | 4 | 7 | 1 | 11 | | 16 | 25 | 82 | 121 |
| Number of men employed..... | 1,370 | | | 881 | | 1,250 | | 404 | | 171 | | 487 | | 67 | | 37 | | 1,682 | | 382 | | 133 | | 6,873 | | | |

ANALYSES OF ACCIDENTS DURING YEAR 1911.

| | NO. OF ACCIDENTS PER 1,000 MEN EMPLOYED. | | | | TONS OF COAL MINED PER ACCIDENT. | | | |
|-------------------------------|--|----------|---------|--------|----------------------------------|----------|---------|--------|
| | Fatal. | Serious. | Slight. | Total. | Fatal. | Serious. | Slight. | Total. |
| East Kootenay District *..... | 1.81 | 2.27 | 8.19 | 12.26 | 110,514 | 88,411 | 24,558 | 16,372 |
| Coast District..... | 2.56 | 3.84 | 13.69 | 20.09 | 154,638 | 103,092 | 28,963 | 19,741 |
| Total Province..... | 2.32 | 3.34 | 11.93 | 17.59 | 143,807 | 99,900 | 28,020 | 18,989 |

PER CAPITA PRODUCTION OF COLLIERIES.

| | Gross tons of coal mined in 1911. | Total number of men employed by colliery. | Tons of coal mined per man employed at colliery. | Number of men employed underground in collieries. | Tons of coal mined per man employed underground. |
|------------------------------|-----------------------------------|---|--|---|--|
| East Kootenay District*..... | 442,057 | 2,197 | 201 | 1,585 | 272 |
| Coast District..... | 1,855,661 | 4,676 | 397 | 3,627 | 511 |
| Total for Province..... | 2,297,718 | 6,873 | 334 | 5,212 | 448 |

*The mines of East Kootenay District were idle for eight months of the year owing to labour troubles.

DETAILED STATEMENT OF ACCIDENTS IN B.C. COLLIERIES DURING 1911.

COAST COLLIERIES.

REPORTED BY THOMAS MORGAN AND JOHN NEWTON, INSPECTORS.

| No. | Colliery. | Date. | Name. | Occupation. | Details. |
|-----|------------------|--------|---------------------|-----------------|--|
| 1 | East Wellington. | Jan. 5 | Wm. Milne | Miner | Finger caught between cars and cutoff. |
| 2 | " | " 6 | Wm. Angell | Sinker | Fall of rock cut and bruised his head. |
| 3 | South Wellington | " 10 | John Hillier | Brakeman ... | Fell into bunker and dislocated his shoulder and sustained concussion of the brain. |
| 4 | No. 1 Nanaimo .. | " 16 | Charles Wright.... | Electrician.... | Killed by being crushed between motor and rib. |
| 5 | East Wellington. | " 23 | Stephan Melricht .. | Miner | Fall of coal bruised his hip. |
| 6 | " | " 24 | James Langham ... | " | Fall of rock sprained his ankle. |
| 7 | " " | Feb. 2 | L. Lloyd | " | Fall of rock caused small cut on head. |
| 8 | No. 1 Nanaimo .. | " 14 | Sam Brown | Rope-rider ... | Forearm caught between cars and broken. |
| 9 | " " | " 23 | Jno. Aitken | Miner | Hand caught between car and timbers, causing loss of one finger and two lacerated. |
| 10 | Middlesboro..... | " 24 | David Layonby.... | " | Fall of rock caused bruising of hip. |
| 11 | Nanaimo..... | " 25 | Amos Salmond | Labourer | Run over by car and sustained dislocated collar-bone. |
| 12 | Middlesboro..... | Mar. 4 | Stuart Loutitt.... | Machinist.... | Slightly burnt on both hands by explosion of black powder in an old empty can lying outside No. 1 tippie. He threw a pipe-match into it. |
| 13 | East Wellington. | " 9 | Hugh Thompson... | Miner | Fall of rock slightly injured knee. |
| 14 | Middlesboro..... | " 31 | Wm. Liddle..... | " | Fall of rock broke finger. |
| 15 | Douglas..... | Apr. 2 | Ching Kong..... | Labourer | Was working at the placing of bridge stringers when he was struck by the tail-rope and killed. |
| 16 | Extension..... | " 3 | John Young | Timberman ... | Slightly burned by gas at the slant of the Diagonal slope. |
| 17 | Nanaimo | " 5 | John Jones..... | Engineer..... | Killed by explosion of powder in store-room, Protection island. |
| 18 | East Wellington. | " 15 | Sam | Dumper | Toe injured while he was working at screens, by a bolt falling on it. |
| 19 | " | " 19 | Jno. Thompson... | Miner | While setting machine it slipped and crushed a finger. |
| 20 | Middlesboro..... | " 27 | Ed. Chambers.... | Chute-builder . | While sliding down a chute a piece of coal overtook him and bruised his back. |
| 21 | Middlesboro..... | May 11 | Wm. Cumberland . | Miner | Fall of rock bruised left ankle. |
| 22 | East Wellington. | " 16 | Angelo Servanti .. | " | Was setting a prop in a place when the prop fell and injured his back. |
| 23 | Extension..... | " 20 | M. Celle | " | Fall of coal caused broken leg. |

ACCIDENTS IN COAST COLLIERIES.—*Continued.*

| No. | Colliery. | Date. | Name. | Occupation. | Details. |
|-----|-------------------|----------|---------------------|-----------------|--|
| 24 | East Wellington. | May 20 | Jas. Doran | Miner | Was setting timbers when a prop fell and bruised his shoulder. |
| 25 | Northfield | " 23 | Jas. Turner | " | Burned by some gas in a travelling-way. |
| 26 | Middlesboro. | June 3 | Eli Hunt | " | Fall of coal bruised his ankle. |
| 27 | " | " 14 | Jas. McNally | Teamster | Thrown from a wagon on the surface and sustained broken right arm and scalp-wound. |
| 28 | South Wellington | July 10 | Sam. Wardle | Miner | Fall of rock broke his rib and caused bruised chest and face. |
| 29 | Northfield | " 15 | Wm. Timmins | " | Fall of rock bruised him in the back and right foot. |
| 30 | " | " 17 | Wm. Gregory | " | Fall of rock bruised his ribs. |
| 31 | No. 1 Nanaimo.. | " 18 | Wm. Wheatty | Machine-run'n'r | Fall of coal broke his leg. |
| 32 | Middlesboro. | " 19 | Arthur Stevenson.. | Miner | Fall of rock caused compound fracture of leg. |
| 33 | " | Aug. 1 | Wm. L. Bradley... | Pusher | Caught between car and a post, bruised hips. |
| 34 | Extension | " 5 | John Jones | Miner | Fall of dirt at face broke fibula. |
| 35 | Middlesboro. | " 18 | Pete Wisquith | " | Burned by gas. |
| 36 | Douglas | " 21 | Jno. Polkinhorne .. | Rope-rider.... | An empty trip going down knocked out a light stringer, and while the injured man was trying to replace it, the trip moved, caused by the electric signal-wires forming contact and ringing the bell. |
| 37 | Extension | " 21 | B. Guisepeze | Pusher | Runaway car jammed him against another car. |
| 38 | Nanaimo | " 25 | Joseph Atkinson... | Shaft-sinker .. | Fell through a staging in the shaft and was killed. |
| 39 | East Wellington. | " 28 | James Dotan | Miner | Fall of rock fractured rib. |
| 40 | " | " 30 | David Drake | Boss driver.... | Killed at the bottom of slope by trip running away. |
| 41 | " | " 30 | Friend Campsell... | Rope-rider | Same accident; died from injuries. |
| 42 | Middlesboro | Sept. 11 | Jno. Warren | Miner | Burned about the face and hands by gas in place. |
| 43 | No. 1 Nanaimo.. | " 11 | Ernest Kelly | Brusher | Sustained broken leg by returning to place before shot went off. |
| 44 | Extension | " 18 | Morris Daye | Motorman | Trolley-pole struck a post and, swinging round, broke two ribs. |
| 45 | " | Oct. 3 | Wm. Burt | Boss runner... | Knocked against cog by haulage-rope and sustained broken leg. |
| 46 | East Wellington. | " 6 | James Lewis | Miner | Slipped on a piece of coal and got a twisted ankle. |

ACCIDENTS IN COAST COLLIERIES.—*Continued.*

| No. | Colliery. | Date. | Name. | Occupation. | Details. |
|-----|------------------|--------|---------------------|-------------------------------|--|
| 47 | East Wellington. | Oct. 9 | Jos. Martin | Miner | Was lifting a lump of coal, which broke in his hand and injured his toe. |
| 48 | No. 1 Nanaimo.. | " 12 | J. C. Leaman | Brusher | Jammed between cars on which he was riding and crushed about pelvis. |
| 49 | East Wellington. | " 23 | Esa Kalsson | Pusher | Jammed between car and prop; sprained wrist. |
| 50 | " | " 27 | Duncan Clarkson .. | Miner | Struck by a post which was knocked out by the coal his partner was taking down. |
| 51 | " | Nov. 2 | P. Byron | " | Fall of coal injured his back. |
| 52 | Princeton..... | " 3 | Paul Knatka | " | Finger cut off by a stringer while he was timbering. |
| 53 | East Wellington. | " 20 | Malcom Ross | Rope-rider | Thrown off trip of cars and punctured his thigh on switch. |
| 54 | " | " 22 | Harry Wall. | Helper in ma- chine-stall. | Fall of rock sprained ankle. |
| 55 | " | " 24 | Loui Manzini | Miner | In lowering a loaded car with a rope and tackle, a hook caught his ankle and bruised it. |
| 56 | " | " 24 | Angelo Servanti ... | " | Fall of rock struck him on kidney. |
| 57 | " | " 28 | Jos. Martin | " | Fall of rock bruised back and cut head. |
| 58 | Extension | " 29 | Oscar Daye | " | Fall of coal caused spinal injury. |
| 59 | East Wellington. | " 30 | Tom Collins | Pusher | Elbow caught between car and post, and sprained. |
| 60 | Middlesboro | Dec. 3 | Alex. Thompson ... | Fan-boy | Killed while working in the inside crosscut. Same as No. 62. |
| 61 | " | " 3 | Dusian Vukmirovich | Miner | Killed in main tunnel. Same as No. 62. |
| 62 | " | " 3 | Robert Dishart | " | Killed by returning to place after a defective shot. |
| 63 | East Wellington. | " 6 | Munsha Singh | Labourer | Jumped off moving car and injured knee-cap. |
| 64 | " | " 4 | Geo. Ashford | Miner | Lowering car and sprained his knee. |
| 65 | Middlesboro | " 5 | Jno. S. Walker | " | Fell from a staging in mine and bruised stomach and strained back. |
| 66 | East Wellington. | " 7 | Thos. Davies | " | Fall of rock bruised his back. |
| 67 | No. 1 Nanaimo.. | " 15 | Jno. Slabbard | Mule-driver ... | Caught by an empty trip, sustaining a fractured skull; died later. |
| 68 | Extension..... | " 19 | Chas. Hirkin | Loader | Slipped and fell, breaking his leg. |
| 69 | East Wellington. | " 19 | Thos. Fiddler | Miner | Fall of rock injured head. |
| 70 | " | " 28 | Wm. Newbury | " | Fall of rock injured head. |
| 71 | No. 4 Cumberland | Feb. 2 | R. Marrochie | " | Burned by gas, went over barricade. |

ACCIDENTS IN COAST COLLIERIES.—*Concluded.*

| No. | Colliery. | Date. | Name. | Occupation. | Details. |
|-----|------------------|----------|----------------------|-----------------|---|
| 72 | No. 4 Cumberland | Mar. 2 | — Kenn. | Miner | Fall of fireclay broke his leg. |
| 73 | No. 4 " | " 3 | Wm. Fulton | " | Fall of coal broke his leg. |
| 74 | No. 4 " | " 14 | D. Phillips | " | Burned after firing a shot. |
| 75 | No. 4 " | " 14 | Jno. Caseela | " | Burned after firing a shot. Same as No. 74. |
| 76 | No. 4 " | " 25 | A. Morello | " | Fall of fireclay injured knee. |
| 77 | No. 5 " | Apr. 9 | Hop Lee | Runner | Fall of coal broke leg. |
| 78 | No. 5 " | May 20 | A. Williams. | Miner | Injured by explosion of a box of caps. |
| 79 | No. 4 " | " 22 | Evan Hundon | Driver boss ... | Caught by car, collar-bone broken and hip dislocated. |
| 80 | No. 7 " | June 9 | A. Cook | Rope-rider | Fall of rock cut off finger. |
| 81 | No. 7 " | July 7 | H. Merner | Miner | Fall of rock bruised hip. |
| 82 | No. 4 " | " 14 | Barrie Cossella | " | Burned by a slight feeder of gas. |
| 83 | No. 4 " | Nov. 15 | Jno. Kursa | Driver | Caught between car and prop; fractured pelvis. |
| 84 | No. 4 " | July 24 | V. Dori | Miner | Fall of fireclay broke leg. |
| 85 | No. 6 " | Aug. 21 | On Sing. | " | Fall of rock broke leg. |
| 86 | No. 6 " | " 19 | Sing Foy | " | Fall of rock broke leg. |
| 87 | No. 4 " | Sept. 7 | R. Marochie | Driver | Leg caught in rope while lowering car; broken ankle. |
| 88 | No. 6 " | " 17 | Jos. Lanze | Miner | Fall of coal killed him. |
| 89 | No. 4 " | " 20 | Chas. Irish | Driver | Mule kicked him, breaking his arm. |
| 90 | No. 5 " | " 30 | R. Adam | " | Caught between two cars and was injured in knee and pelvis. |
| 91 | No. 7 " | Oct. 5 | Kacogieni | Miner | Fall of coal caused bruises about neck. |
| 92 | No. 6 " | Sept. 25 | J. Asam | " | Caught by car and sustained fracture of thigh. |
| 93 | No. 4 " | Nov. 13 | Biffo Rosatti | " | Fall of coal killed him. |
| 94 | No. 6 " | Dec. 12 | Sing Foy | " | Fall of rock crushed foot. |

EAST KOOTENAY COLLIERIES.

REPORTED BY ROBERT STRACHAN AND EVAN EVANS, INSPECTORS.

| | | | | | |
|----|-------------------|---------|-------------------|-----------------|---|
| 95 | Hosmer No. 2... | Jan. 16 | D. Figun | Miner | Fall of coal broke his leg. |
| 96 | Hosmer (outside). | " 26 | Y. Wynyozuka | Labourer | Knee crushed between two cars on the surface. |
| 97 | Michel No. 3.... | Feb. 6 | A. Allen | Rope-rider | Slipped while jumping off car and fractured his foot. |
| 98 | Hosmer No. 2... | " 7 | C. Hanson | Switchman | Slipped while jumping on motor; lacerated his leg. |

ACCIDENTS IN EAST KOOTENAY COLLIERIES.—*Concluded.*

| No. | Colliery. | Date. | Name. | Occupation. | Details. |
|-----|------------------|----------|---------------------|----------------|---|
| 99 | Hosmer No. 9... | Feb. 15 | P. Lemacha..... | Miner..... | Was cutting a fuse with an axe when he struck the detonator and exploded it; face and eyes injured. |
| 100 | Michel No. 3.... | " 15 | M. Osack..... | "..... | Fall of coal injured back. |
| 101 | " No. 3.... | " 15 | M. Hozunsky..... | "..... | Fall of coal caused internal hemorrhage, resulting fatally three days later. |
| 102 | Hosmer..... | " 24 | D. McLellan..... | Switchman.... | Slipped while jumping on trip, cutting and bruising his foot. (On surface.) |
| 103 | Michel No. 3.... | Mar. 7 | J. Cyadzik..... | Miner..... | Fall of rock injured back. |
| 104 | " No. 4.... | " 9 | M. Halko..... | "..... | (Crushed by runaway car. |
| 105 | Hosmer..... | July 26 | C. Anthony..... | Labourer..... | Eye cut by rock from blast. (On surface.) |
| 106 | Michel..... | " 30 | S. Verte..... | Ashman..... | Fell off dump-car and dislocated his neck; died 7th Aug. (On surface.) |
| 107 | Hosmer..... | Sept. 29 | S. Paolo..... | Labourer..... | Bruised and cut by runaway trip; bull-wheel on incline broke. (On surface.) |
| 108 | "..... | " 29 | C. Milnik..... | "..... | Same accident; same result. |
| 109 | "..... | " 29 | M. Schapka..... | "..... | Same accident; same result. |
| 110 | Michel No. 3.... | Nov. 21 | R. Micelli..... | "..... | Fall of coal injured back. |
| 111 | Hosmer..... | Dec. 6 | E. Lepere..... | Carpenter..... | Hand cut by planer in machine-shop. (On surface.) |
| 112 | " No. 2.... | " 4 | T. J. Fitzpatrick.. | Miner..... | Fall of coal injured head. |
| 113 | "..... | " 13 | J. McKinley..... | Ashman..... | Finger injured in crank of small hoist. |
| 114 | Coal Creek..... | Jan. 19 | Ernest Morris..... | Car-handler... | Four fingers taken off by getting caught in snatch-block on tippie. |
| 115 | " No. 2.... | " 28 | John Patterson.... | Driver..... | Having been kicked by a horse, was found lying on car-track and was struck by motor. |
| 116 | " No. 5.... | Feb. 10 | Daniel Beddard.... | "..... | Caught between car and roof; arm broken. |
| 117 | " No. 1.... | " 15 | Jan Nowakowski.. | "..... | Leg caught between car and horse; fibula broken. |
| 118 | "..... | Mar. 9 | Frederick Shaw... | Tally-boy..... | Killed while attempting to pass between railway freight-cars. (On surface.) |
| 119 | "..... | Nov. 25 | Lasse Tampenezuk. | Labourer..... | Rolling a coil of wire rope which fell over on to his leg, breaking it. (On surface.) |
| 120 | " No. 2.... | " 27 | Wm. Griffith..... | Timberman... | Fall of rock broke a leg, some ribs, and dislocated an ankle. |
| 121 | " No. 5.... | Dec. 9 | James Smith..... | Driver..... | Caught between two cars; compound fracture of thigh. |

PROSECUTIONS UNDER "COAL-MINES REGULATION ACT."

As is incumbent upon the Inspector, he has been obliged to lay information before the local Magistrates in a large number of cases for infractions, by the workmen in the mines, of the general and special rules, which are provided solely for their own protection. These regulations are for the general safety of all the underground employees, and the carelessness of one man endangers all his fellow workmen, whose lives are practically in the hands of such foolishly careless or criminal person.

It will be noticed that the number of prosecutions is less than half of that of 1910. This is owing to the strike in the Crowsnest Pass mines and to the closer supervision of the work in progress by the Inspectors.

The following prosecutions and convictions have been obtained during the year for the offences noted :—

| Offence committed. | In Violation of Provisions of "C. M. R. Act, 1888." | No. of Prosecutions. | No. of Convictions. | Penalties inflicted. |
|--|---|----------------------|---------------------|-----------------------|
| Having tobacco or matches in possession in mine where safety-lamps are required | | 3 | 3 | Fined \$10 and costs. |
| Going through danger-fence in mine..... | | 1 | 1 | Fined \$10 and costs. |
| Damaging safety-lamps. | | 4 | 4 | Fined \$5 and costs. |
| Failing to examine place after firing of shot | | 1 | 1 | Fined \$10 and costs. |
| Firing of shot by a miner..... | | 3 | 3 | Fined \$10 and costs. |
| Failing to prevent two workmen from passing danger-fence | | 1 | 1 | Fined \$5 and costs. |

METALLIFEROUS MINES SHIPPING IN 1911.

CASSIAR.

ATLIN MINING DIVISION.

| Mine or Group. | Locality. | Owner or Agent. | Address. | Character of Ore. |
|----------------|--------------|-----------------|----------|-------------------|
| Ben-my-chree | Taku arm | O. H. Partridge | Atlin | Gold, silver. |
| Maid-of-Erin | Rainy Hollow | J. W. Burnham | Haines | Gold, copper. |

PORTLAND CANAL MINING DIVISION.

| | | | | |
|----------------|---------------|-------------|----------|---------------------|
| Portland Canal | Glacier creek | E. J. Hearn | Victoria | Gold, silver, lead. |
|----------------|---------------|-------------|----------|---------------------|

SKEENA MINING DIVISION.

| | | | | |
|------------|-----------|-----------|--------------|---------------|
| Black Bear | Alice arm | F. Roundy | Naas Harbour | Gold, silver. |
|------------|-----------|-----------|--------------|---------------|

EAST KOOTENAY.

FORT STEELE MINING DIVISION.

| | | | | |
|--------------|-----------|-----------------|------------|---------------|
| Society Girl | Moyie | J. P. Farrel | Moyie | Silver, lead. |
| Sullivan | Kimberley | C. H. McDougall | Marysville | " |

WEST KOOTENAY.

NELSON MINING DIVISION.

| | | | | |
|-----------------|---------------|----------------|-----------------|---------------------|
| Arlington | Erie | Leslie Hill | Nelson | Gold, silver. |
| California | " | J. P. Bell | Erie | " |
| Canadian King | " | Leslie Hill | Nelson | " |
| Emerald | Salmo | J. Waldbeser | Salmo | Silver, lead. |
| Granite-Poorman | Granite | Thos. Gough | Williams Siding | Gold, silver. |
| Kootenay Belle | Sheep creek | F. E. Morrison | Nelson | " |
| Molly Gibson | Kokanee creek | R. H. Stewart | Trail | Silver, lead. |
| Nugget | Sheep creek | A. H. Gracey | Nelson | Gold, silver. |
| Ophir | Bird creek | John Baxter | " | " |
| Queen | Sheep creek | E. V. Buckley | Sheep Creek | " |
| Vancouver | " | J. Max Lompney | " | " |
| Yankee Girl | Ymir | John Fraser | Nelson | Gold, silver, lead. |

AINSWORTH MINING DIVISION.

| | | | | |
|------------|--------------|-----------------|-------|---------------------|
| Flint | Kaslo | J. A. Carter | Kaslo | Silver, lead. |
| Maestro | Ainsworth | H. Giegerich | " | " |
| No. 1 | " | " | " | " |
| Panama | Bear lake | " | " | " |
| Utica | Paddy's peak | Chas. Caldwell | " | " |
| Whitewater | Whitewater | J. L. Retallack | " | Gold, silver, lead. |

SLOCAN AND SLOCAN CITY MINING DIVISIONS.

| | | | | |
|---------------|-------------|----------------|------------|---------------------|
| Eastmont | Slocan lake | A. E. Griffith | Slocan | Gold, silver, lead. |
| Enterprise | Ten-mile | S. S. Fowler | Riondel | Silver, lead. |
| Hewitt | Silverton | G. Stilwell | Silverton | " |
| Idaho-Alamo | Three Forks | Thos. Avison | New Denver | " |
| Meteor | Lemon creek | G. H. Aylard | " | Gold, silver, lead. |
| Mollie Hughes | New Denver | M. Zattoni | " | " |
| Mountain Con | Sandon | Wm. Bennett | Sandon | " |
| Neepawa | Ten-mile | Ed. Shannon | New Denver | Silver, lead. |

WEST KOOTENAY—*Concluded.*SLOCAN AND SLOCAN CITY MINING DIVISIONS.—*Concluded.*

| Mine or Group. | Locality. | Owner or Agent. | Address. | Character of Ore. |
|--------------------|--------------------|---------------------|-------------------|-------------------|
| Noble Five | Cody | T. McAllister | Sandon | Silver, lead. |
| Ottawa | Slocan City | L. B. McPhee | Slocan City | Silver. |
| Rambler-Cariboo .. | McGuigan | W. E. Zwicky | Kaslo | Silver, lead. |
| Reco | Sandon | J. M. Harris | Sandon | " |
| Richmond Eureka .. | " | R. H. Stewart | Trail | " |
| Ruth | " | J. Anderson | Kaslo | " |
| Standard | Four-mile creek .. | G. H. Aylard | Silverton | " |
| Sunset | Sandon | A. J. Becker | Three Forks | " |
| Twilight | " | Harris Kelly | Sandon | " |
| Van-Roi | Silverton | Ernest Levy | Rosland | " |

LARDEAU AND TROUT LAKE MINING DIVISIONS.

| | | | | |
|------------------|------------------|----------------------|------------------|---------------------|
| Spider | Pool creek | Arthur Evans | Camborne | Silver, lead. |
| High Grade | Trout lake | J. W. Livingstone .. | Trout Lake | " |
| Silver Cup | Ferguson | F. Chas. Merry | Ferguson | Gold, silver, lead. |

TRAIL CREEK MINING DIVISION.

| | | | | |
|--------------------|---------------|---------------------|-------------------|-----------------------|
| Blue Bird | Rosland | Lyman Carter | Rosland | Gold, silver, lead. |
| Center Star | " | M. E. Purcell | " | Gold, silver, copper. |
| Cliff | " | G. W. Wooster | Grand Forks | " |
| I.X.L. | " | R. T. Evans | Rosland | Gold, silver. |
| Le Roi | " | M. E. Purcell | " | Gold, silver, copper. |
| Le Roi No. 2 | " | Ernest Levy | " | " |
| Nickle Plate | " | W. H. Falding | " | " |

BOUNDARY.

GRAND FORKS MINING DIVISION.

| | | | | |
|----------------|-------------------|---------------------|-------------------|-----------------------|
| Granby | Phoenix | G. W. Wooster | Grand Forks | Gold, silver, lead. |
| No. 7 | Boundary Falls .. | R. H. Stewart | Trail | " |
| Snowshoe | Phoenix | " | " | Gold, silver, copper. |

GREENWOOD MINING DIVISION.

| | | | | |
|-------------------|-------------------|--------------------|-----------------|-----------------------|
| Athelstan | Wellington | E. G. Warren | Greenwood | Gold, silver, copper. |
| Elkhorn | Greenwood | J. McCreath | " | Gold, silver, lead. |
| Emma | Summit camp | E. G. Warren | " | Gold, silver, copper. |
| Mother Lode | Deadwood | " | " | " |
| Rawhide | Phoenix | " | " | " |
| Wellington | Wellington | " | " | " |

OSOYOOS MINING DIVISION.

| | | | | |
|--------------------|--------------|----------------------|--------------|-------|
| Nickel Plate | Hedley | Gomer P. Jones | Hedley | Gold. |
|--------------------|--------------|----------------------|--------------|-------|

KAMLOOPS MINING DIVISION.

| | | | | |
|-----------------|----------------|-----------------------|--------------------|-----------------------|
| Iron Mask | Kamloops | E. G. Wallinder | Duluth, Minn. | Gold, silver, copper. |
|-----------------|----------------|-----------------------|--------------------|-----------------------|

BOUNDARY—*Concluded.*

LILLOOET MINING DIVISION.

| Mine or Group. | Locality. | Owner or Agent. | Address. | Character of Ore. |
|----------------|------------------------|-----------------|----------------|-------------------|
| Lorne | Cadwallader creek..... | D. Hurley..... | Lillooet | Gold. |

COAST.

NEW WESTMINSTER MINING DIVISION.

| | | | | |
|-----------------|-----------------|--------------------|---------------------|-----------------------|
| Britannia | Howe sound..... | J. W. Moodie | Britannia Beach.... | Gold, silver, copper. |
|-----------------|-----------------|--------------------|---------------------|-----------------------|

NANAIMO MINING DIVISION.

| | | | | |
|-----------------|---------------------|----------------------|---------------|-----------------------|
| Marble Bay..... | Texada island | D. C. Stephens | Van Anda..... | Gold, silver, copper. |
| Cornell..... | " | E. J. Hearn | Victoria..... | " " |

LIST OF CROWN-GRANTED MINERAL CLAIMS.

—10:—

CROWN GRANTS ISSUED IN 1911.

CASSIAR.

| Claim. | Division. | Grantee. | Lot No. | Acres. | Date. |
|---------------------------------|----------------------|--|------------|--------|----------|
| Abbott..... | Atlin..... | James A. Fraser, official administrator of Patrick Kennedy's estate..... | 956 G. 1 | 85.80 | Sept. 1 |
| Bonanza..... | "..... | Christopher William Andrew Nevill..... | 915 G. 1 | 48.03 | April 7 |
| Brothon..... | "..... | Frank Laverdiere..... | 248 G. 1 | 45.01 | Sept. 2 |
| Cariboo..... | "..... | Robert Todd..... | 920 G. 1 | 22.94 | Aug. 5 |
| Commet..... | "..... | Dennis Murphy..... | 953 G. 1 | 44.6 | April 6 |
| Cracker-Jack..... | "..... | Thomas R. Sewell..... | 925 G. 1 | 45.11 | Sept. 2 |
| "..... | "..... | Henry Nicholson..... | 914 G. 1 | 50.7 | Dec. 29 |
| Jumbo..... | "..... | John Perin Lindsay, Edward B. Hauley..... | 922 G. 1 | 48.43 | April 7 |
| Majestic..... | "..... | John Wm. Burnham, Richard Kennedy..... | 958 G. 1 | 51.65 | July 28 |
| My Little Lot Fractional..... | "..... | Henry Nicholson..... | 250 G. 1 | 28.66 | April 6 |
| Northern Partnership No. 3..... | "..... | James Alexander, Konrad Wawrecka, Benj. G. Nicoll, John Dunham..... | 106 G. 1 | 33.6 | Oct. 28 |
| Poorman..... | "..... | Albert Julius Dennerline..... | 928 G. 1 | 50.92 | April 6 |
| Portland..... | Atlin..... | Edward D. Wood..... | 924 G. 1 | 49.6 | April 6 |
| Rubberneck..... | "..... | Edwin L. Pillman..... | 916 G. 1 | 29.79 | April 6 |
| Victoria..... | "..... | Christopher William A. Nevill..... | 909 G. 1 | 51.54 | Jan. 12 |
| Wood Chopper..... | "..... | Hugh McDonald..... | 146 G. 1 | 50.53 | Sept. 20 |
| Anney Fractional..... | Queen Charlotte..... | Elizabeth A. D. Heming..... | 138 | 48.41 | July 31 |
| Blue Bell..... | "..... | "..... | 135 | 51.66 | July 3 |
| Dingo..... | "..... | Paul H. McMillan..... | 87 | 30.45 | July 31 |
| Go East..... | "..... | Queen Charlotte Mining & Prospecting Co., Ltd..... | 1223 | 25.45 | Nov. 28 |
| Hawk's Nest Fractional..... | "..... | Elizabeth A. D. Heming..... | 139 | 10.48 | July 31 |
| Homestake..... | "..... | The Queen Charlotte Mining & Prospecting Co., Ltd..... | 1222 | 33.01 | Nov. 28 |
| Lilly..... | "..... | Elizabeth A. D. Heming..... | 137 | 51.65 | July 31 |
| Magnet..... | "..... | Lyman W. Nestelle..... | 79 | 38.03 | Oct. 28 |
| Maud..... | "..... | Elizabeth A. D. Heming..... | 136 | 41.11 | July 31 |
| No. 4..... | "..... | Queen Charlotte Mining & Prospecting Co., Ltd..... | 1224 | 28.7 | Nov. 28 |
| Togo..... | "..... | Benjamin Metcalfe..... | 140 | 45 | Sept. 20 |
| Alice..... | Skeena..... | George Martin, William Shannon, and James B. Mathers..... | 174 R. 4 | 47.74 | Feb. 8 |
| Anna..... | "..... | "..... | 173 R. 4 | 48.28 | Feb. 8 |
| Bear..... | "..... | "..... | 385 R. 4 | 37.30 | Feb. 8 |
| Colusa..... | "..... | Canadian-American Mining Co..... | 581 R. 4 | 41.66 | April 27 |
| Francis..... | "..... | "..... | 382 R. 4 | 41.97 | April 27 |
| Goat..... | "..... | George Martin, Wm. Shannon, James B. Mathers..... | 396 R. 4 | 44.50 | Feb. 8 |
| Happy Jack..... | "..... | "..... | 117 R. 4 | 10.91 | Feb. 8 |
| Hope..... | "..... | Canadian-American Mining Co..... | 585 R. 4 | 43.39 | April 27 |
| Ida..... | "..... | George Martin, William Shannon, and James B. Mathers..... | 384 R. 4 | 44.90 | Feb. 8 |
| Joanna..... | "..... | "..... | 180 R. 4 | 51.66 | Feb. 8 |
| Lulu..... | "..... | George Martin, Wm. Shannon, James B. Mathers..... | 175 R. 4 | 51.66 | Feb. 8 |
| Oshkosh..... | "..... | Canadian-American Mining Co..... | 584 R. 4 | 16.25 | April 27 |
| Sonoma..... | "..... | "..... | 580 R. 4 | 32.63 | April 27 |
| Vita..... | "..... | "..... | 583 R. 4 | 32.06 | April 27 |
| Lulu..... | Portland Canal..... | Glacier Creek Mining Co., Ltd..... | 926 G. 1 | 51.85 | Aug. 10 |
| Red Reef No. 1..... | "..... | Horace E. Newton..... | 1405 G. 1 | 47.54 | Sept. 22 |
| " No. 2..... | "..... | "..... | 1406 G. 1 | 51.65 | Sept. 22 |
| " No. 3..... | "..... | "..... | 1407 G. 1 | 51.65 | Sept. 22 |
| " No. 4..... | "..... | "..... | 1408 G. 1 | 45.68 | Sept. 22 |
| " Fractional..... | "..... | "..... | 1390 G. 1 | 4.07 | Sept. 22 |
| Anna..... | Omineca..... | Telkwa Mining, Milling & Development Co., Ltd..... | 1806 R. 5 | 50.03 | April 26 |
| Anniversary..... | "..... | "..... | 1847 R. 5 | 41.66 | April 27 |
| Amy Fractional..... | "..... | "..... | 1814 R. 5 | 19.17 | April 26 |
| Babine Chief..... | "..... | Babine Bonanza Mining & Milling Co., Ltd. (N.P.L.)..... | 1863A R. 5 | 40.69 | April 8 |
| Bell Mare..... | "..... | Charles D. Rand..... | 3404 R. 5 | 51.65 | Sept. 22 |
| Bonanza..... | "..... | Babine Bonanza Mining & Milling Co., Ltd. (N.P.L.)..... | 1860A R. 5 | 35.35 | April 8 |
| Boston..... | "..... | Telkwa Mining, Milling & Development Company, Ltd..... | 1840 R. 5 | 51.65 | July 12 |
| Bulkeley Pioneer..... | "..... | Babine Bonanza Mining & Milling Co., Ltd. (N.P.L.)..... | 1864 R. 5 | 47.77 | April 8 |
| Bull Dog..... | "..... | Bornite Co., Ltd..... | 3269 R. 5 | 51.65 | Jan. 28 |
| Bunker Hill..... | "..... | Babine Mining Co., Ltd. (N.P.L.)..... | 1542 G. 1 | 40.9 | Sept. 27 |
| Butte..... | "..... | Telkwa Mining, Milling & Development Co., Ltd..... | 1832 R. 5 | 51.31 | July 11 |
| Centre Star Fractional..... | "..... | Babine Mining Co., Ltd. (N.P.L.)..... | 1545 G. 1 | 25.53 | Sept. 27 |
| Copper Basin..... | "..... | Charles D. Rand..... | 3400 R. 5 | 28.70 | Sept. 21 |
| Copper Bluff..... | "..... | "..... | 3396 R. 5 | 51.65 | Sept. 21 |
| Copper Dome..... | "..... | "..... | 3398 R. 5 | 50.82 | Sept. 21 |
| Copper King..... | "..... | Telkwa Mining, Milling & Development Co., Ltd..... | 1850 R. 5 | 51.65 | April 27 |
| Copper Peak..... | "..... | Charles D. Rand..... | 3403 R. 5 | 51.33 | Sept. 21 |

CASSIAR.—*Concluded.*

| Claim. | Division. | Grantee. | Lot No. | Acres. | Date. |
|--------------------------|---------------|--|------------|---------|----------|
| Copper Queen | Omineca | Telkwa Mining, Milling & Development Co., Ltd. | 1861 R. 5 | 51.65 | April 27 |
| Copper Ridge | " | Charles D. Rand | 3401 R. 5 | 51.65 | Sept. 21 |
| Duchess | " | Silver Cup Mines, Ltd. | 385 G. 1 | 44.19 | Sept. 21 |
| Duke | " | " | 364 G. 1 | 44.1 | Sept. 21 |
| Eagle | " | Telkwa Mining, Milling & Development Co., Ltd. | 1846 R. 5 | 51.65 | April 27 |
| Eau Galle | " | " | 1838 R. 5 | 47.71 | July 11 |
| Eureka | " | Babine Bonanza Mining & Milling Co., Ltd. | 1861A R. 5 | 51.65 | April 8 |
| Evening | " | Telkwa Mining, Milling & Development Co., Ltd. | 1816 R. 5 | 51.65 | April 26 |
| F.N. Fractional | " | Babine Mining Company, Ltd. | 1548 G. 1 | 3.82 | Sept. 27 |
| Fourth of July | " | Telkwa Mining, Milling & Development Co., Ltd. | 1881 R. 5 | 51.65 | July 11 |
| Granville | " | " | 1804 R. 5 | 51.65 | July 11 |
| Heather Bell | " | " | 1844 R. 5 | 46.53 | July 12 |
| Homestake | " | Babine Bonanza Mining & Milling Co., Ltd. (N.P.L.) | 1859A R. 5 | 46.81 | April 8 |
| Homestead | " | Telkwa Mining, Milling & Development Co., Ltd. | 1813 R. 5 | 51.65 | April 26 |
| Howson | " | " | 1841 R. 5 | 51.65 | July 12 |
| Hudson | " | " | 1836 R. 5 | 47.71 | July 11 |
| Independence | " | " | 1848 R. 5 | 51.65 | April 27 |
| Iron Colt | " | " | 1808 R. 5 | 15.73 | July 11 |
| Iron Mask | " | " | 1807 R. 5 | 44.74 | July 11 |
| Kamloops | " | " | 1803 R. 5 | 51.65 | July 11 |
| Kyle | " | " | 1854 R. 5 | 51.65 | April 27 |
| Last Chance | " | " | 1812 R. 5 | 48.04 | April 26 |
| " | " | Babine Mining Co., Ltd. (N.P.L.) | 1543 G. 1 | 28.78 | Sept. 27 |
| " | " | " | 1538 G. 1 | 38.81 | Sept. 27 |
| Lucky Jim | " | Babine Bonanza Mining & Milling Co., Ltd. | 1862A R. 5 | 51.65 | April 8 |
| Lucky Strike | " | Telkwa Mining, Milling & Development Co., Ltd. | 1818 R. 5 | 49.6 | April 26 |
| Lukens | " | " | 1819 R. 5 | 5.84 | July 11 |
| Maud Fractional | " | " | 2270 R. 5 | 26.71 | Jan. 23 |
| Mona | " | Bornite Co., Ltd. | 1815 R. 5 | 51.65 | July 11 |
| Morning | " | Telkwa Mining, Milling & Development Co., Ltd. | 1845 R. 5 | 86.53 | April 27 |
| Mountain View | " | " | 2271 R. 5 | 49.25 | Jan. 23 |
| Mountizuma | " | Bornite Co., Ltd. | 1849 R. 5 | 21.37 | April 27 |
| Nell Fractional | " | Telkwa Mining, Milling & Development Co., Ltd. | 1836 R. 5 | 45.69 | April 27 |
| Normandy | " | " | 1837 R. 5 | 30.92 | July 11 |
| Osceola | " | " | 2272 R. 5 | 41.22 | Jan. 23 |
| Portland | " | Bornite Co., Ltd. | 1852 R. 5 | 51.65 | Apr. 27 |
| Prince of Copper | " | Telkwa Mining, Milling & Development Co., Ltd. | 1853 R. 5 | 51.65 | Apr. 27 |
| Princess of Copper | " | " | 1842 R. 5 | 50.92 | July 12 |
| Scallon | " | " | 1839 R. 5 | 33.79 | July 12 |
| St. Croix | " | The Silver Cup Mines, Ltd. (N.P.L.) | 366 G. 1 | 41.68 | Sept. 21 |
| Silver Cup | " | " | 367 G. 1 | 51.69 | Sept. 21 |
| Silver Dollar | " | Telkwa Mining, Milling & Development Co., Ltd. | 1834 R. 5 | 51.47 | April 27 |
| Stanley | " | " | 1810 R. 5 | 43.89 | April 26 |
| Strathcona | " | " | 1865 R. 5 | 51.29 | July 12 |
| Tenderfoot No. 1 | " | " | 1856 R. 5 | 51.65 | April 27 |
| " No. 2 | " | " | 2268 R. 5 | 45.28 | Jan. 23 |
| Toulon | " | Bornite Co., Ltd. | 1853 R. 5 | 44.66 | July 11 |
| Victoria | " | Telkwa Mining, Milling & Development Co., Ltd. | 1857 R. 5 | 38.43 | April 27 |
| Virginia | " | " | 1817 R. 5 | 47.8 | April 26 |
| Virginia Queen | " | Babine Mining Company, Ltd. (N.P.L.) | 1541 G. 1 | 33.89 | Sept. 27 |
| Wake Up, Jim | " | Telkwa Mining, Milling & Development Co., Ltd. | 1811 R. 5 | 38.93 | July 11 |
| Walter | " | " | 1809 R. 5 | 19.84 | April 26 |
| War Eagle | " | " | 1843 R. 5 | 51.58 | July 12 |
| Wild Flower | " | " | " | " | " |

EAST KOOTENAY.

| | | | | | |
|---------------------------------|-------------------|---|-----------|-------|----------|
| Burton Fractional | Fort Steele | Consolidated Mining & Smelting Co. of Canada, Ltd. | 6135 G. 1 | 28.66 | May 10 |
| Clinton Fractional | " | " | 7004 G. 1 | 33.06 | Mar. 14 |
| Collingwood | " | Wm. J. Langley, Judson B. Langley, and Andrew J. Devlin | 6570 G. 1 | 6.06 | Feb. 9 |
| Columbia Fractional | " | Consolidated Mining & Smelting Co. of Canada, Ltd. | 6183 G. 1 | 43.76 | May 10 |
| Dailly Fractional | " | " | 6136 G. 1 | 42.21 | May 10 |
| Delta Fractional | " | " | 7005 G. 1 | 6.34 | Mar. 24 |
| Dixy | " | William J. Langley, Judson B. Langley, Andrew J. Devlin | 6567 G. 1 | 51.65 | Feb. 9 |
| Dominion | " | Consolidated Mining & Smelting Co. of Canada, Ltd. | 6187 G. 1 | 32.66 | May 10 |
| Empire Fractional | " | James T. Laidlaw, James Angus, Wm. Tarrant | 7014 G. 1 | 8.6 | Apr. 25 |
| Golden Fleece | " | William Forsyth, George H. Scott, Nels Hanson, Albert Mutz, Thomas E. Rea, James A. Harvey, Wm. R. Ross, Bernard Lundin | 6354 G. 1 | 44.44 | Oct. 12 |
| Jumbo Fractional | " | Consolidated Mining & Smelting Co. of Canada, Ltd. | 6134 G. 1 | 29.5 | May 10 |
| Juno | " | Joseph C. Hooker | 8758 G. 1 | 50.79 | April 25 |
| Kootenay Fractional | " | Consolidated Mining & Smelting Co. of Canada, Ltd. | 6131 G. 1 | 20.22 | May 10 |
| Mabelle Fractional | " | Cambrian Mining Co., Ltd. (N.P.L.) | 9993 G. 1 | 25.47 | Jan. 24 |
| Mayflower | " | Wm. J. Langley, Judson B. Langley, Andrew J. Devlin | 6571 G. 1 | 38.1 | Feb. 9 |
| Owen Sound Boy Fractional | " | James A. Harvey, Bruce Clendinning | 6190 G. 1 | 7.51 | Feb. 21 |
| Reno | " | Joseph H. Wright | 8755 G. 1 | 51.55 | April 4 |
| Rustler Fractional | " | Consolidated Mining & Smelting Co. of Canada, Ltd. | 6133 G. 1 | 46.3 | May 10 |
| Stanley | " | Albert Mutz, George H. Scott, Wm. Forsyth, Thomas E. Rea, Nels Hanson, Wm. R. Ross, and Bernard Lundin | 6355 G. 1 | 37.4 | Oct. 12 |
| Blackbird | Windermere | Wm. Waldie | 9178 G. 1 | 29.67 | Jan. 23 |
| Bunyan | " | Rufus A. Kimpton, David M. Jackson, Richard Morland, John H. Taynton, William W. Taynton | 9096 G. 1 | 44.18 | Sept. 23 |

EAST KOOTENAY.—Concluded.

| Claim. | Division. | Grantee. | Lot No. | Acres. | Date. |
|-------------------------------------|-----------------|---|------------|--------|----------|
| Camille..... | Windermere..... | John H. Taynton, David M. Jackson, Richard Morland..... | 9695 G. 1 | 39.48 | Sept. 22 |
| Christian..... | " | Rufus A. Kimpton, David M. Jackson, Richard Morland, John H. Taynton..... | 10116 G. 1 | 51.29 | Sept. 22 |
| Delight..... | " | William Waldie..... | 9181 G. 1 | 51.65 | Jan. 23 |
| Evelyn No. 2..... | " | James Ferguson Armstrong, official administrator, adminis- trator of the estate of David R. McLean, deceased, intestate..... | 9242 G. 1 | 51.65 | May 31 |
| Grey Eagle..... | " | William Waldie..... | 9179 G. 1 | 30.19 | Jan. 23 |
| Lucky Boy..... | " | " | 9180 G. 1 | 51.14 | Jan. 23 |
| M.T. Fractional..... | " | Ritchie S. Gallop..... | 10110 G. 1 | 24.39 | Aug. 24 |
| Pilgrim..... | " | Rufus A. Kimpton, David M. Jackson, Richard Morland, John H. Taynton..... | 10115 G. 1 | 42.7 | Sept. 22 |
| Second Effort..... | " | James Ferguson Armstrong, official administrator, adminis- trator of the estate of David R. McLean, deceased, intestate..... | 9241 G. 1 | 26.21 | May 31 |
| Silver Crown..... | " | James T. Laidlaw..... | 10151 G. 1 | 35.24 | June 17 |
| Eagle Cliff..... | Golden..... | The Certainty Gold & Mining Co., Ltd..... | 307 G. 1 | 5.75 | Mar. 16 |
| Eastern Township Fractional..... | " | " | 269 G. 1 | 10.50 | Mar. 16 |
| Monday Fractional..... | " | Louis Jodoin..... | 7550 G. 1 | 18.06 | Jan. 4 |
| Porphyry and Iron Hill..... | " | The Certainty Gold & Mining Co., Ltd. (N.P.L.)..... | 268 G. 1 | 26.03 | Mar. 16 |

WEST KOOTENAY.

| | | | | | |
|------------------------------|----------------|---|------------|-------|----------|
| Alma M..... | Nelson..... | Nels Lowenring, John Ostin, George Matthews, John J. Malone, William Gossnell..... | 9174 G. 1 | 41.73 | May 11 |
| Argyle..... | " | Edwin V. Buckley..... | 10155 G. 1 | 22.62 | Oct. 12 |
| Bella Watson Fractional..... | " | George R. Devlin, William H. Willson, Arthur R. Poole, and Edward K. Mahon..... | 10157 G. 1 | 19.82 | May 29 |
| Belt..... | " | William H. Willson, George R. Devlin, Edward K. Mahon, and Arthur R. Poole..... | 9334 G. 1 | 21.6 | April 4 |
| Bethel..... | " | Thomas Olsen..... | 10222 G. 1 | 51.65 | Mar. 14 |
| Camp View..... | " | John G. Devlin, James S. B. O'Brien, Albert E. Duchesnay, Charles H. Gore..... | 10019 G. 1 | 51.65 | Nov. 30 |
| Cathie Fractional..... | " | George R. Devlin, William H. Willson, Edward K. Mahon, Arthur R. Poole..... | 10156 G. 1 | 9.49 | May 29 |
| Clyde..... | " | William H. Willson, George R. Devlin, Edward K. Mahon, Arthur R. Poole..... | 8873 G. 1 | 47.60 | April 4 |
| Collins..... | " | George D. Bell..... | 10004 G. 1 | 51.65 | Feb. 9 |
| Columbia..... | " | Harry Amas, Alexander Pool..... | 8870 G. 1 | 51.65 | Aug. 10 |
| Davenport..... | " | Benj. Fallows..... | 9164 G. 1 | 38.98 | April 3 |
| Democrat..... | " | Edmund C. Wragge..... | 235 G. 1 | 8.75 | Mar. 28 |
| Edward D..... | " | Harry Amas, Alexander Pool..... | 8872 G. 1 | 23.65 | Aug. 10 |
| Elkhorn..... | " | Frederick Irvine..... | 9175 G. 1 | 44.34 | April 28 |
| Forest..... | " | Edmund C. Wragge..... | 233 G. 1 | 14 | Mar. 28 |
| Free Silver..... | " | Napoleon Deharnais, Joseph Boyer, Trefle Boyer..... | 5581 G. 1 | 40.78 | Sept. 21 |
| Golden Chain..... | " | Robert S. Lennie..... | 4154 G. 1 | 38.05 | Mar. 27 |
| Golden Era..... | " | " | 4153 G. 1 | 43.24 | Mar. 27 |
| Hidden Treasure..... | " | Edmund C. Wragge..... | 411 G. 1 | 17.57 | Mar. 28 |
| Irene..... | " | Robert S. Lennie..... | 4151 G. 1 | 51.65 | Mar. 27 |
| Iron Silver..... | " | George H. Green..... | 3242 G. 1 | 33.67 | Sept. 20 |
| Leach Fractional..... | " | Robert H. Leach..... | 10158 G. 1 | 3.45 | April 6 |
| Lilly D..... | " | Wm. H. Willson, George R. Devlin, Edward K. Mahon, Arthur R. Poole..... | 10164 G. 1 | 44.91 | June 17 |
| May Flower..... | " | Consolidated Mining & Smelting Co. of Canada, Ltd..... | 3605 G. 1 | 33.14 | Mar. 29 |
| Moline..... | " | Benjamin Fallows..... | 9165 G. 1 | 51.65 | Apr. 3 |
| M.S..... | " | Edmund C. Wragge..... | 2916 G. 1 | 30.92 | April 5 |
| Navada..... | " | Harry Amas, Alexander Pool..... | 8869 G. 1 | 29.66 | Aug. 10 |
| New Market..... | " | Edmund C. Wragge..... | 235 G. 1 | 12.65 | Mar. 28 |
| Norah..... | " | Napoleon Deharnais, Joseph Boyer, Trefle Boyer..... | 5580 G. 1 | 40.05 | Sept. 21 |
| Rambler..... | " | Harold Selous..... | 4293 G. 1 | 51.65 | Oct. 17 |
| Rebecca..... | " | Gustave B. Matthew..... | 3589 G. 1 | 41.83 | Mar. 30 |
| Rover..... | " | Harold Selous..... | 5292 G. 1 | 51.65 | Oct. 17 |
| Royal City..... | " | Consolidated Mining & Smelting Co., Ltd. Lby..... | 4066 G. 1 | 42.44 | Mar. 29 |
| Silver Queen..... | " | George H. Green..... | 5477 G. 1 | 31.11 | Sept. 20 |
| Standard..... | " | Napoleon Deharnais, Joseph Boyer, Trefle Boyer..... | 5582 G. 1 | 44.05 | Sept. 21 |
| Struggle..... | " | George D. Bell and Frank C. Green..... | 10172 G. 1 | 50.04 | Dec. 28 |
| Sunbeam Fractional..... | " | Robert Scott Lennie..... | 9342 G. 1 | 14.01 | Mar. 14 |
| U.B..... | " | Wm. H. Sherr d..... | 3013 G. 1 | 24.50 | Mar. 14 |
| Alaska Fractional..... | Ainsworth..... | Dan Henry Nellis..... | 8372 G. 1 | 50.70 | Mar. 13 |
| Amit..... | " | James A. M. Atkins..... | 3867 G. 1 | 49.7 | Oct. 2 |
| A. 1..... | " | Dan Henry Nellis..... | 6956 G. 1 | 50.9 | Mar. 13 |
| Apex Fractional..... | " | " | 6965 G. 1 | 50.8 | Mar. 13 |
| Cable..... | " | Angus Campbell..... | 6503 G. 1 | 51.65 | Jan. 23 |
| Coffin Nail No. 1..... | " | Cutler Thomas Porter..... | 7854 G. 1 | 45.45 | June 16 |
| Coffin Nail No. 2..... | " | " | 7853 G. 1 | 50.53 | June 16 |
| Crescent..... | " | Edmund C. Wragge..... | 2540 G. 1 | 18.17 | June 30 |
| Dayton..... | " | David P. Kane..... | 3879 G. 1 | 45.49 | Mar. 13 |
| Dayton No. 2..... | " | " | 3881 G. 1 | 40.8 | Mar. 13 |
| Dell..... | " | Dan Henry Nellis..... | 6963 G. 1 | 51.65 | Mar. 13 |
| Dimond..... | " | " | 6274 G. 1 | 51.65 | Mar. 13 |
| Dixie..... | " | Axel Milton, Andrew G. Erickson..... | 9062 G. 1 | 50.68 | Aug. 11 |
| Dora..... | " | Dan Henry Nellis..... | 7473 G. 1 | 50.00 | Mar. 13 |
| E.L..... | " | " | 6508 G. 1 | 50.72 | Mar. 13 |
| Fox..... | " | " | 6964 G. 1 | 51.65 | Mar. 11 |

WEST KOOTENAY.—*Concluded.*

| Claim. | Division. | Grantee. | Lot No. | Acres. | Date. |
|---------------------|-------------|--|------------|--------|----------|
| Frisco | Ainsworth | Cutler Thomas Porter | 7858 G. 1 | 51.65 | June 16 |
| General | " | Maxwell Stevenson, Jr. | 9266 G. 1 | 51.29 | Mar. 21 |
| Olen Fractional | " | Dan Henry Nellis | 6962 G. 1 | 37.5 | Mar. 11 |
| Grafton | " | James English and Wm. English | 10059 G. 1 | 51.65 | Dec. 29 |
| Granite | " | James English | 10057 G. 1 | 51.65 | Dec. 28 |
| Grant | " | Maxwell Stevenson, Jr. | 9267 G. 1 | 47.23 | Mar. 21 |
| Grouse | " | Dan Henry Nellis | 7825 G. 1 | 41.2 | Mar. 11 |
| I.X.L. | " | Thomas Cutler Porter | 7858 G. 1 | 51.65 | June 16 |
| J. Fractional | " | Dan Henry Nellis | 6511 G. 1 | 49.7 | Mar. 11 |
| Lake | " | " | 7828 G. 1 | 51.65 | Mar. 11 |
| Little May | " | Henry Giegerich | 5870 G. 1 | 35.6 | Sept. 2 |
| Lynx Fractional | " | Dan Henry Nellis | 6968 G. 1 | 48.00 | Mar. 11 |
| Maple Leaf | " | William English | 10063 G. 1 | 50.90 | Dec. 29 |
| Marten | " | Dan Henry Nellis | 6967 G. 1 | 51.65 | Mar. 11 |
| Metis | " | Wm. A. Allan | 3638 G. 1 | 14.8 | Aug. 5 |
| Mink Fractional | " | Dan Henry Nellis | 7074 G. 1 | 51.65 | Mar. 11 |
| Mountain Goat | " | David P. Kane | 8380 G. 1 | 49.6 | April 13 |
| Nellie S. | " | James A. M. Atkins | 8666 G. 1 | 36.31 | Oct. 2 |
| N.P. | " | Dan Henry Nellis | 6504 G. 1 | 51.0 | Mar. 11 |
| N.P. Fractional | " | " | 6971 G. 1 | 46.44 | Mar. 13 |
| No. 3 | " | Henry Giegerich | 6490 G. 1 | 47.4 | Sept. 2 |
| Olson | " | Carl Frederick Olson | 10054 G. 1 | 51.65 | April 4 |
| Olson No. 1 | " | " | 10055 G. 1 | 48.7 | April 4 |
| Omega | " | Dan Henry Nellis | 6969 G. 1 | 51.4 | Mar. 13 |
| Park | " | " | 7076 G. 1 | 50.2 | Mar. 13 |
| Portland | " | Cutler Thomas Porter | 7855 G. 1 | 51.65 | June 16 |
| Revenue Fractional | " | Scott Thornberg, Lachlan McLean | 7141 G. 1 | 7.1 | Dec. 29 |
| Revenue | " | Thomas Melrose, Lachlan McLean | 7139 G. 1 | 51.65 | Dec. 29 |
| Ritzville | " | Cutler Thomas Porter | 7857 G. 1 | 50.79 | June 16 |
| S. Fractional | " | Dan Henry Nellis | 6966 G. 1 | 49.6 | Mar. 13 |
| Silver Fractional | " | " | 6966 G. 1 | 51.5 | Mar. 13 |
| Sitka Fractional | " | " | 6271 G. 1 | 41.80 | Mar. 11 |
| Summit | " | " | 6970 G. 1 | 51.65 | Mar. 13 |
| Sun | " | " | 6955 G. 1 | 41.65 | Mar. 11 |
| Sun Fractional | " | " | 6957 G. 1 | 51.6 | Mar. 13 |
| Wolf | " | " | 6500 G. 1 | 51.65 | Mar. 13 |
| Wolf Fractional | " | " | 6961 G. 1 | 46.0 | Mar. 13 |
| Bland No. 2 | Slocan | William E. Zwicky | 3577 G. 1 | 47.62 | June 28 |
| Boadicean | " | " | 1961 G. 1 | 51.65 | June 28 |
| Deadwood | " | Wm. E. Zwicky | 3576 G. 1 | 84.81 | June 28 |
| Edith Fractional | " | Byron N. White Company | 9842 G. 1 | 32.18 | June 16 |
| Eva Fractional | " | " | 6522 G. 1 | 12.75 | May 23 |
| G.H. | " | James G. L. Hughes | 5502 G. 1 | 31.99 | Mar. 27 |
| Hillside | " | Byron N. White Company | 6523 G. 1 | 42.00 | Feb. 14 |
| Howard Fractional | " | Wm. E. Zwicky | 3578 G. 1 | 6.64 | June 28 |
| Mackinaw | " | Van Roi Mining Co., Ltd. | 6528 G. 1 | 50.37 | May 15 |
| Moccasin Fractional | " | " | 6527 G. 1 | 41.00 | May 15 |
| Tiger Fractional | " | Wm. E. Zwicky | 3579 G. 1 | 3.39 | June 28 |
| Tiger No. 7 | " | " | 3153 G. 1 | 50.06 | June 28 |
| Whistler | " | Byron N. White Co. | 6916 G. 1 | 36.96 | Mar. 30 |
| Bob-o-link | Slocan City | Donald Duncan McPherson, Bertha Angrignon, Mary Hicks, Alexander M. Rogers | 9848 G. 1 | 46.18 | Dec. 11 |
| Lark | " | Donald Duncan McPherson, Mary Hicks, Alex. M. Rogers, Bertha Angrignon | 9847 G. 1 | 41.10 | Dec. 11 |
| Adelina Fractional | Trout Lake | Wm. A. Foote, David Morgan | 8662 G. 1 | 23.67 | May 29 |
| Darwin Fractional | " | George Ernest Revell | 9198 G. 1 | 9.71 | May 26 |
| Harry | " | Alfred R. Heyland | 6488 G. 1 | 18.00 | April 4 |
| Humming Bird | " | Thomas J. Beatty, Arthur W. Sullivan | 8709 G. 1 | 34.23 | April 7 |
| I.X.L. | " | Catherine Florence Beatty | 8710 G. 1 | 46.00 | April 7 |
| Lucky Jim | " | George Ernest Russell | 9191 G. 1 | 35.55 | May 26 |
| North Star | " | Cutler T. Porter | 7859 G. 1 | 41.11 | Sept. 23 |
| Silverton Bay | " | Edmund C. Wragge | 2536 G. 1 | 36.96 | June 30 |
| Silver Pick | " | Catherine Florence Beatty | 8711 G. 1 | 44.46 | April 7 |
| Surprise | " | Wm. A. Foote and David Morgan | 8661 G. 1 | 46.51 | June 29 |
| Welsh | " | " | 8663 G. 1 | 51.65 | June 29 |
| Winslow | " | Bruce White, Nell O'Donnell, and Wm. M. Bennett | 8680 G. 1 | 51.65 | Aug. 24 |
| Y.R.U. | " | Cutler T. Porter | 7860 G. 1 | 37.72 | Sept. 23 |
| Colorado | Lardeau | John R. Henry | 10270 G. 1 | 41.53 | May 8 |
| Del Norte | " | " | 10273 G. 1 | 9.65 | Sept. 20 |
| Del Rey | " | " | 10373 G. 1 | 22.23 | May 8 |
| Delta | " | " | 10376 G. 1 | 27.18 | May 8 |
| Marguerite | " | " | 10373 G. 1 | 28.25 | May 8 |
| San Juan | " | " | 10374 G. 1 | 12.36 | May 8 |
| Wakefield | " | " | 10376 G. 1 | 33.93 | May 8 |
| Boita | Arrow Lake | Fred. R. Blockberger | 5159A G. 1 | 51.65 | Aug. 8 |
| Colorado | Trail Creek | Alfred James Harris | 1476 G. 1 | 38.00 | Feb. 24 |

BOUNDARY.

| | | | | | |
|--------------------|-------------|--|-----------|-------|---------|
| Athelstan Fraction | Grand Forks | The British Columbia Copper Co., Ltd. | 1320 | 6.81 | Feb. 13 |
| Ax | " | Forbes M. Kerby, Chris. Christianson | 927 S. | 51.65 | Jan. 4 |
| Banner | " | Frederick Wm. Russell, William Spier, Jean Helen Miller, Edward Raymond Northrop, Donald McLaren | 1199 G. 1 | 50.05 | May 16 |

BOUNDARY.—Continued.

| Claim. | Division. | Grantee. | Lot No. | Acres. | Date. |
|---------------------------------|----------------|--|-----------|--------|----------|
| Benhar..... | Grand Forks... | Charles Dempster..... | 1183 S. | 38.71 | Aug. 1 |
| Dempster Fractional..... | " | " | 1186 S. | 1.12 | Aug. 5 |
| Dykehead No. 2..... | " | " | 1184 S. | 50.75 | Aug. 6 |
| Eclipse..... | " | James F. Cunningham, Wm. T. Smith, Edward J. Roberts. | 570 S. | 32.23 | Oct. 12 |
| Evening Star..... | " | Alexander Rogers, Locke D. Walford, Forbes M. Kerby..... | 919 S. | 51.19 | Feb. 10 |
| Fife..... | " | Charles Dempster..... | 1185 S. | 38.12 | Aug. 5 |
| Glouster Fractional..... | " | Maggie M. Kerman and Hugh B. Cannon..... | 145 S. | 38.47 | Apr. 20 |
| Hot Air..... | " | Frederick W. Reid, Albert L. Whiteside, John W. Cook..... | 88 S. | 27.96 | May 29 |
| Iron Bell Fractional..... | " | Bertha J. Knight..... | 93 S. | 27.53 | Jan. 4 |
| Iron Chief..... | " | Grace A. Simpson, John A. Nelson, Peter J. Davis..... | 1314 S. | 51.65 | Aug. 14 |
| Iron Chief Fractional..... | " | Grace A. Simpson, John A. Nelson..... | 1315 S. | 32.55 | Aug. 14 |
| Iron Chief Fractional..... | " | British Columbia Copper Co., Ltd..... | 1212 S. | 16.5 | Jan. 4 |
| Jack Pot..... | " | British Columbia Copper Co., Ltd..... | 2224 S. | 44.5 | Feb. 13 |
| Jim Fractional..... | " | George Cook, Wm. Wellington Cook, Duncan Buchanan..... | 1258 S. | 36.04 | Mar. 30 |
| June..... | " | Albert E. Savage..... | 92 S. | 23.8 | Mar. 29 |
| King..... | " | George C. Rose..... | 177 S. | 46.15 | Jan. 24 |
| Lone Pine..... | " | Frederick W. Reid, Albert L. Whiteside, John W. Cook..... | 1180 S. | 36.29 | May 29 |
| Look-out..... | " | Frederick W. Reid..... | 89 S. | 49.51 | May 29 |
| Maine Fractional..... | " | Patrick J. Byrne..... | 430 S. | 7.63 | Oct. 11 |
| Mayflower..... | " | David Braithwaite..... | 1089 | 17.5 | June 29 |
| Mohawk..... | " | Edmund C. Wragge..... | 2637 G. | 22.92 | June 30 |
| Molloy Pritchard..... | " | British Columbia Copper Co., Ltd..... | 1554 | 40.00 | Feb. 13 |
| M.S..... | " | A. Erskine Smith, John Aylmer McCallum, Richard Arthur Henderson, Clinton A. S. Atwood..... | 577 S. | 51.65 | Feb. 13 |
| Munster..... | " | Bernard Leguere, David Whiteside, Forbes M. Kerby..... | 923 S. | 33.7 | June 15 |
| New York..... | " | William A. Powder..... | 1018 S. | 51.65 | Aug. 14 |
| Prince Fractional..... | " | British Columbia Copper Co., Ltd..... | 1211 S. | 38.26 | Jan. 3 |
| Queen..... | " | George C. Rose..... | 178 S. | 28.67 | Jan. 24 |
| Rio..... | " | Donald D. McLaren and John McLaren..... | 441 S. | 35.33 | Feb. 10 |
| Three Bells..... | " | Charles Dempster..... | 1182 S. | 42.37 | Aug. 5 |
| Tiger Fractional..... | " | Thomas Newby..... | 1009 S. | 29.37 | Feb. 9 |
| Willada..... | " | John A. Nelson..... | 968 S. | 32.83 | Aug. 14 |
| Albion..... | Greenwood..... | John Gooding..... | 715 S. | 50.00 | Feb. 14 |
| Alice M. Fractional..... | " | The Vancouver & Boundary Creek Development & Mining Co., Limited..... | 2618 | 37.85 | Jan. 20 |
| Arlington..... | " | Wm. F. Proctor..... | 867 S. | 51.65 | May 29 |
| Black Jack..... | " | The Consolidated Mining & Smelting Co. of Canada, Ltd..... | 662 S. | 46.65 | April 3 |
| Cabertae Fractional..... | " | " | 1417 S. | 29.91 | Mar. 31 |
| Castor Fractional..... | " | Vancouver & Boundary Creek Developing & Mining Co., Ltd..... | 2278 | 27.77 | Jan. 20 |
| Colby..... | " | George Dalton Cunningham..... | 1088 S. | 44.61 | Feb. 9 |
| Croesus..... | " | Joseph Ernest McEwen..... | 864 S. | 40.21 | Dec. 2 |
| Dixie..... | " | Donald A. MacDonald, James N. Paton, James S. Birnie..... | 468 S. | 41.61 | Oct. 19 |
| Duncan Fractional..... | " | Vancouver & Boundary Creek Developing & Mining Co., Ltd..... | 2620 | 11.88 | Jan. 20 |
| Emeline..... | " | Eved L. Steeves..... | 1081 S. | 51.65 | Sept. 27 |
| Emerald..... | " | Spencer Benerman & Fred. Moser..... | 823 S. | 51.65 | Feb. 10 |
| Excelsior Fractional..... | " | Vancouver & Boundary Creek Developing & Mining Co., Ltd..... | 1204 S. | 26.22 | Jan. 19 |
| " 55"..... | " | Consolidated Mining & Smelting Co. of Canada, Ltd..... | 1420 S. | 51.65 | April 3 |
| Gem..... | " | Spencer Benerman, Fred. Moser..... | 521 S. | 51.65 | Feb. 9 |
| Gold Drop..... | " | Kenneth Carlton-Boyd Frith, Donald Alex. MacDonald, Charles Henry Fair, Herbert Fenwick Stow, Harry Seymour Simmons, John L. White..... | 1195 S. | 51.65 | Feb. 10 |
| Gold Drop Fractional..... | " | Wilfred Cookson, Arthur H. Noyes, Donald A. MacDonald..... | 3164 G. 1 | 51.28 | June 28 |
| Gold Drop No. 2 Fractional..... | " | Kenneth Carlton-Boyd Frith, Donald Alexander MacDonald, Charles Henry Fair, Herbert Fenwick Stow, Harry Seymour Simmons, and John L. White..... | 1196 S. | 44.28 | Feb. 21 |
| Golden..... | " | John A. Tuzo, Robert Ward, administrator of the estate of Wm. Boyle, deceased, intestate, and Wm. M. Law, administrator of the estate of Thomas Curry, deceased..... | 1433 S. | 51.65 | Nov. 1 |
| Granite..... | " | Michael H. Kane..... | 1288 G. 1 | 47.67 | Aug. 31 |
| Great Laxey..... | " | Thomas Kerneen and Andrew Hamilton..... | 1426 S. | 45.19 | Aug. 19 |
| Hard Times..... | " | Vancouver & Boundary Creek Dev. & Mining Co., Ltd. Lby..... | 2616 | 18.61 | Jan. 20 |
| Headlight..... | " | Wm. F. Proctor..... | 868 S. | 49.67 | May 29 |
| Highland Queen..... | " | Vancouver & Boundary Creek Dev. & Mining Co., Ltd. Lby..... | 2095 | 16.78 | Jan. 20 |
| Hime Fractional..... | " | Consolidated Mining & Smelting Co. of Canada, Ltd..... | 1421 S. | 0.89 | Mar. 31 |
| Homestake..... | " | Kenneth Carlton-Boyd Frith, Donald Alex. MacDonald, Charles Henry Fair, Herbert Fenwick Stow, Harry Seymour Simmons, John L. White..... | 1197 S. | 50.50 | Feb. 9 |
| Kid Fractional..... | " | Vancouver & Boundary Creek Dev. & Mining Co., Ltd. Lby..... | 2096 | 0.52 | Jan. 20 |
| Lexicon..... | " | James Stuart Birnie, Charles Herbert Tye, Sydney M. Johnson..... | 3303 | 51.65 | May 11 |
| L. Fractional..... | " | Philip S. Stanhope & Mark W. Smith..... | 2575 | 43.20 | Nov. 23 |
| Nightingale Fractional..... | " | Edmund T. Wickwire..... | 1194 S. | 49.52 | Feb. 13 |
| Nodaway..... | " | Victoria & Boundary Creek Dev. & Mining Co., Ltd. Lby..... | 2615 | 41.95 | Jan. 20 |
| Norene Fractional..... | " | Harry H. Shallenberger..... | 1254 S. | 2.17 | Feb. 9 |
| Observatory..... | " | James C. Dale, Alfred S. Black..... | 1252 S. | 51.65 | Sept. 27 |
| Old Guard..... | " | John Peter McLeod, executor of the estate of Alex. Wallace, deceased..... | 1644 | 50.82 | June 12 |
| Pueblo Fractional..... | " | Vancouver & Boundary Creek Dev. & Mining Co., Ltd. Lby..... | 1206 S. | 4.27 | Jan. 19 |
| Relief Fractional..... | " | John A. Tuzo and Wm. M. Low, administrator of the estate of Thomas Curry, deceased..... | 1432 S. | 30.97 | Nov. 1 |
| Rob Roy..... | " | The Vancouver & Boundary Crk. Dev. & Mining Co., Ltd. Lby..... | 2093 | 49.11 | Jan. 20 |
| Sally..... | " | " | 2092 | 44.02 | Jan. 20 |
| Sally Fractional..... | " | " | 2617 | 16.41 | Jan. 20 |
| 77 Fractional..... | " | The Consolidated Mining & Smelting Co. of Canada, Ltd..... | 1419 S. | 48.65 | Mar. 31 |
| Silver Cloud Fractional..... | " | James Napier Paton and Alfred Seymour Black..... | 454 S. | 4.75 | Oct. 26 |
| Silver King..... | " | John L. McKinnon..... | 1332 G. 1 | 44.21 | Jan. 24 |
| " 66"..... | " | The Consolidated Mining & Smelting Co. of Canada, Ltd..... | 1418 S. | 44.98 | Apr. 3 |
| Sovereign Fractional..... | " | Fred. Moser, John Zurfuh..... | 1216 S. | 49.15 | Feb. 14 |

BOUNDARY.—*Concluded.*

| Claim. | Division. | Grantee. | Lot No. | Acres. | Date. |
|-------------------------|--------------|--|-----------|--------|----------|
| Triumvirate Fractional. | Greenwood | James Stewart Birnie. | 1777 G. 1 | 4.13 | May 11 |
| Tunnel Fractional | " | The Vancouver & Boundary Creek Dev. & Mining Co., Ltd. Lby. | 2619 | 45.98 | Jan. 20 |
| Vernon Fractional | " | Michael H. Kane | 3138 G. 1 | 34.60 | Aug. 7 |
| X.L.C.R. | " | James M. Matchett, executor of the will of John Hope Forster, deceased. | 1556 S. | 38.65 | Sept. 25 |
| X.L.C.R. Fractional | " | James M. Matchett, executor of the will of John Hope Forster, deceased. | 1557 S. | 48.82 | Sept. 25 |
| Borden | Osoyoos | George Steed and John W. Sinclair | 3 S. | 46.57 | Jan. 3 |
| Czar Fractional | " | Francis Henry French and George H. Cahill. | 2832 G. 1 | 37.68 | April 25 |
| Dolphin | " | Lemuel S. Brown, Charles W. Jordan | 973 S. | 12.9 | June 29 |
| Evening | " | The Evening Gold Mining Co., Ltd. (N.P.L.) | 771 G. 1 | 46.25 | Aug. 2 |
| Forty-nine | " | Leonard H. Patten, Frederick Stone. | 895 S. | 51.44 | May 30 |
| Goldman | " | " | 896 S. | 51.65 | May 30 |
| Hope | " | George Steed, John W. Sinclair | 2 S. | 51.65 | Jan. 3 |
| Humming Bird Fractional | " | Leonard H. Patten, Frederick Stone. | 900 S. | 44.22 | June 14 |
| Laurier | " | George Steed, John W. Sinclair. | 4 S. | 51.65 | Jan. 13 |
| Look-out. | " | Leonard H. Patten, Frederick Stone. | 899 S. | 34.05 | May 30 |
| Mother Lode. | " | " | 898 S. | 47.03 | May 30 |
| Mountain View. | " | " | 901 S. | 31.3 | May 30 |
| Snowflake | " | " | 897 S. | 35.76 | May 30 |
| Spar Fractional. | " | Lemuel S. Brown and Charles W. Jordan | 898 S. | 23.2 | June 29 |
| Rosemont | Lillooet | Alfred Poole, John H. Purdy, and Joseph B. Smith | 664 G. 1 | 51.89 | Aug. 23 |
| White Rose. | " | " | 664A G. 1 | 31.10 | Aug. 23 |
| Number Two | Vernon. | Frederic Billings, Alex. Archie McPhail, Sam. James MacCorkill. | 3915 G. 1 | 50.01 | Mar. 27 |
| Number Three. | " | Frederic Billings, Alex. Archie McPhail, Sam. James MacCorkill. | 3916 G. 1 | 50.98 | Mar. 27 |
| Number Four. | " | Frederic Billings, Alex. Archie McPhail, Sam. James MacCorkill. | 3913 G. 1 | 46.43 | Mar. 27 |
| Copper King. | Similkameen. | Albert Elgin Howse, Hannibal L. Jones, Edgar Elmer Burr, Peter Johnson, and Francis W. Groves. | 1668 G. 1 | 50.97 | Mar. 29 |
| Copper Queen | " | Albert Elgin Howse, Hannibal L. Jones, Edgar Elmer Burr, Peter Johnson, Francis W. Groves. | 1665 G. 1 | 46.80 | Mar. 29 |
| Dominion | " | Harvey Boone | 1595 | 51.65 | Feb. 24 |
| Windfall. | " | British Columbia Copper Co., Ltd. | 1210 S. | 43.61 | Jan. 4 |
| Forest Rose | Nicola | John Clapperton | 1418 G. 1 | 45.76 | June 1 |
| Hit-or-Miss. | " | Albert Elgin Howse, Hannibal L. Jones, Edgar Elmer Burr, Peter Johnson, Francis W. Groves. | 1664 G. 1 | 51.65 | Mar. 14 |
| Despatcher | Kamloops | James H. Woodside. | 1748 G. 1 | 51.65 | Sept. 27 |
| Glencairn. | " | John Goddard. | 1326 G. 1 | 51.65 | Feb. 23 |
| Keystone Fractional | " | Kimberley Copper Mines of Kamloops, B.C., Ltd. | 1453 G. 1 | 1.92 | Aug. 17 |
| Morning Star. | " | " | 1450 G. 1 | 50.45 | Aug. 17 |
| Stemwinder | " | " | 1451 G. 1 | 48.74 | Aug. 17 |

VANCOUVER ISLAND AND COAST.

| | | | | | |
|--------------------------------|----------------|--|-----------|-------|---------|
| Defiance | Alberni | Mike Comerford | 498 | 41.25 | May 16 |
| O.K. No. 1 | " | Thor Gunderson Norgar. | 350 | 47.08 | June 14 |
| O.K. No. 2 | " | " | 349 | 48.79 | June 14 |
| O.K. No. 3 | " | " | 348 | 48.49 | June 14 |
| O.K. No. 4 | " | " | 335 | 51.65 | July 12 |
| Armour | N. Westminster | Kennedy Lake Mining Co., Ltd. (N.P.L.) | 2108 G. 1 | 47.99 | May 30 |
| Bank of Vancouver | " | Robert H. Leach | 3096 G. 1 | 50.59 | April 5 |
| Bank of Vancouver, No. 1 | " | Joseph Sauter | 3067 G. 1 | 51.65 | April 5 |
| Bank of Vancouver, No. 2 | " | Chas. E. Deal | 3094 G. 1 | 45.72 | April 5 |
| Bank of Vancouver, Fractional. | " | Joseph Sauter | 3103 G. 1 | 48.8 | April 5 |
| Blue Jacket | " | John McL. MacKinnon | 1833 G. 1 | 39.36 | Jan. 24 |
| Copper Mountain | " | Joseph Sauter | 3062 G. 1 | 51.65 | April 5 |
| Copper Mountain, No. 1. | " | " | 3093 G. 1 | 33.84 | April 5 |
| Copper Mountain, No. 2. | " | " | 3095 G. 1 | 43.43 | April 5 |
| Nansen | " | Robert H. Leach | 2107 G. 1 | 49.25 | Mar. 30 |
| Pitt Fractional | " | Pitt Lake Brick & Cement Co., Ltd. | 2724 G. 1 | 3.21 | Aug. 7 |
| Queen May | " | Max. J. Cameron | 2669 G. 1 | 40.15 | May 27 |
| Silicon No. 1. | " | Pitt Lake Brick & Cement Co., Ltd. | 2721 G. 1 | 51.65 | Aug. 7 |
| Silicon No. 2. | " | " | 2722 G. 1 | 51.65 | Aug. 7 |
| Silicon Fractional. | " | " | 2723 G. 1 | 13.82 | Aug. 7 |
| Theodosia | " | John McL. MacKinnon | 1881 G. 1 | 44.02 | Jan. 24 |
| Weasel | " | Britannia Mining & Smelting Co., Ltd. | 2745 G. 1 | 51.65 | Feb. 10 |
| Annex | Clayoquot | Arthur E. Waterhouse | 799 | 36.33 | Aug. 8 |
| Belvidere | " | Arthur E. Waterhouse & Barbara Van Brendel. | 798 | 36.33 | Aug. 7 |
| R.C.P. No. 9 Fractional. | Quatsino | James A. Moore. | 284 | 37.9 | Oct. 10 |
| R.C.P. No. 10 Fractional. | " | " | 281 | 21.00 | Oct. 10 |
| R.C.P. No. 11 Fractional. | " | " | 282 | 23.43 | Oct. 10 |
| R.C.P. No. 12 Fractional. | " | " | 283 | 7.85 | Oct. 10 |
| Belle | Nanaimo | William E. Burns. | 325 | 51.51 | May 31 |
| Roe | " | James Roper | 326 | 26.8 | May 31 |
| Roe and Bell. | " | Harry W. Treat | 327 | 11.56 | June 29 |
| St. Anthony | " | Lasqueti Island Mining Co., Ltd. (N.P.L.) | Sec. 51 | 36.23 | Aug. 31 |
| St. Joseph | " | " | Sec. 50 | 31.00 | Aug. 31 |
| Jacob | Victoria | Lars N. Anderson, Edwin J. Smith, Elizabeth Berryman, John H. Smith, Wm. Harrison, Oliver Smith, and Carl Stromgran, executor, and Mary H. Shore, executrix of the will of Sidney Shore, deceased. | 253 | 51.65 | Feb. 23 |

DEPARTMENT OF MINES.

VICTORIA, B.C.

| | | | | | |
|-----------------------|---|---|---|---|--|
| HON. RICHARD MCBRIDE, | - | - | - | - | <i>Minister of Mines.</i> |
| R. F. TOLMIE, | - | - | - | - | <i>Deputy Minister of Mines.</i> |
| WM. FLEET ROBERTSON, | - | - | - | - | <i>Provincial Mineralogist.</i> |
| HERBERT CARMICHAEL, | - | - | - | - | <i>Provincial Assayer.</i> |
| D. E. WHITTAKER, | - | - | - | - | <i>Assistant Assayer.</i> |
| THOMAS GRAHAM, | - | - | - | - | <i>Chief Inspector of Mines, Victoria.</i> |
| THOMAS MORGAN, | - | - | - | - | <i>District " Nanaimo.</i> |
| JOHN NEWTON, | - | - | - | - | <i>" " "</i> |
| EVAN EVANS, | - | - | - | - | <i>" " Fernie.</i> |
| THOMAS H. WILLIAMS | - | - | - | - | <i>" " "</i> |
| ROBERT STRACHAN, | - | - | - | - | <i>" " Merritt.</i> |
| JAMES MCGREGOR, | - | - | - | - | <i>" " Nelson.</i> |

GOLD COMMISSIONERS AND MINING RECORDERS.

| Mining Divisions. | Location of Office. | Gold Commissioner. | Mining Recorder. | Sub-Recorder. |
|----------------------------|--------------------------------|---------------------|------------------------------|-------------------|
| Atlin Mining Division.. | Atlin | J. A. Fraser | W. G. Paxton..... | |
| Sub-office | Discovery City | | | R. Webster. |
| " | Telegraph Creek | | | John Cartmel. |
| " | Summit Station | | | Geoffrey Butler. |
| " | Wynnton | | | W. H. Simpson. |
| " | Haines (U.S.) | | (Com. for taking Affidavits) | Risdon M. Odell. |
| " | Nahlin | | | J. F. Pilling. |
| Stikine Mining Division .. | Telegraph Creek .. | John Cartmel..... | John Cartmel..... | |
| Sub-office | Boundary | | | C. A. Tervo. |
| Liard Mining Division ... | Telegraph Creek .. | John Cartmel..... | John Cartmel..... | |
| Skeena Mining Division.. | Prince Rupert.... | J. H. McMullin... | J. H. McMullin | |
| Sub-office | Kitimat | | | Geo. L. Anderson. |
| " | Port Simpson | | | J. R. C. Deane. |
| " | Easington | | | A. Forsythe. |
| " | Stewart (Portland Canal) | | | John Conway. |
| " | Unuk River | | | Burt E. Daily. |
| " | Hartley Bay | | | |
| " | Goose Bay | | | F. A. McKinnon. |
| Portland Canal M.D. | Stewart | J. H. McMullin ... | John Conway..... | |
| Bella Coola Mining Div... | Prince Rupert.... | J. H. McMullin... | J. H. McMullin ... | |
| Sub-office | Bella Coola | | | Chris. Carlaon. |
| Queen Charlotte Min'g D. | Queen Char. City .. | E. M. Sandilands.. | E. M. Sandilands.. | |
| Sub-office | Jedway | | | W. Prescott. |
| " | Masset | | | C. Harrison. |
| " | Lockeport | | | H. L. Beresford. |
| Omineca Mining Division. | Hazelton | William Allison ... | Jas. E. Kirby | |
| Sub-office | | | | |
| " | Fort Grahame..... | | | Wm. Fox. |
| " | Fort St. James | | | Alex. C. Murray. |
| " | Manson Creek | | | W. B. Steele. |
| " | Copper City | | | P. R. Skinner. |
| " | Aldermere | | | R. Gale. |
| " | Lorne Creek | | | F. E. Holt. |
| " | Kitsulas | | | J. H. Patterson. |
| " | Fort St. John | | | F. W. Beaton. |
| " | Babine Portage | | | R. J. Cameron. |

GOLD COMMISSIONERS AND MINING RECORDERS.—*Continued.*

| Mining Divisions. | Location of Office. | Gold Commissioner. | Mining Recorder. | Sub-Recorder. |
|---------------------------|--------------------------|----------------------|---------------------|---------------------|
| Peace River Mining Div. | Fort St. John | Thos. Jamieson.... | Thos. Jamieson.... | F. W. Beaton. |
| Cariboo Mining Division.. | Barkerville | C. W. Grain | R. S. C. Randall .. | Frank Islip. |
| Sub-office | Quesnel ..... | ..... | ..... | T. W. Herne. |
| " | Fort George ..... | ..... | ..... | Stanley Beyts. |
| " | 17-Mile Post G.T.P. .... | ..... | ..... | ..... |
| Quesnel Mining Division.. | 150-Mile House... .. | C. W. Grain | E. C. Lunn..... | Frank Islip. |
| Sub-office | Quesnel..... | (at Barkerville) | ..... | ..... |
| Clinton Mining Division.. | Clinton | F. C. Campbell.... | ..... | ..... |
| Lillooet | Lillooet..... | Caspar Phair.... | Caspar Phair..... | ..... |
| " | | | | |
| Kamloops Mining Division | Kamloops | E. T. W. Pearse .. | E. Fisher ..... | ..... |
| Ashcroft | Ashcroft | " (at Kamloops) | H. P. Christie..... | ..... |
| " | | | | |
| Nicola | Nicola | " | W. N. Rolfe ..... | ..... |
| Yale | Yale | " | L. A. Dodd ..... | ..... |
| Sub-Office | Hope ..... | " ..... | ..... | A. H. Gravener. |
| Similkameen | Princeton | Hugh Hunter | Hugh Hunter ..... | ..... |
| Sub-office | Hedley ..... | ..... | ..... | F. M. Gillespie. |
| Vernon Mining Division.. | Vernon | L. Norris | H. F. Wilmot ..... | ..... |
| Greenwood Mining Div... | Greenwood..... | W. R. Dewdney... | ..... | ..... |
| Sub-office | Vernon ..... | ..... | ..... | H. F. Wilmot. |
| " | Rock Creek ..... | ..... | ..... | H. Nicholson |
| " | Beaverdell ..... | ..... | ..... | E. F. Ketchum. |
| Grand Forks Min. Div.... | Grand Forks | S. R. Almond | S. R. Almond ..... | ..... |
| Osoyoos Mining Division.. | Fairview | J. R. Brown | Ronald Hewat ..... | ..... |
| Sub-office | Olalla ..... | ..... | ..... | R. W. Northey. |
| " | Hedley ..... | ..... | ..... | F. M. Gillespie. |
| Golden Mining Division.. | Golden | W. G. McMynn | F. H. Bacon ..... | ..... |
| Windermere | Wilmer ..... | ..... | G. F. Stalker ..... | ..... |
| Fort Steele Mining Div... | Cranbrook | Alfred C. Nelson .. | N. A. Wallenger... | ..... |
| Sub-office | Steele ..... | ..... | ..... | Joseph Walsh. |
| " | Fernie ..... | ..... | ..... | J. S. T. Alexander. |
| " | Moyie ..... | ..... | ..... | John P. Farrell. |
| " | Marysville ..... | ..... | ..... | G. W. Mowatt. |
| Ainsworth Mining Div.... | Kaslo | E. E. Chipman | R. J. Stenson | Wm. J. Green. |
| Sub-office | Howser ..... | ..... | ..... | W. Simpson. |
| " | Trout Lake ..... | ..... | ..... | F. Mummery. |
| Slocan Mining Division... | New Denver | E. E. Chipman (at .. | Angus McInnes ..... | ..... |
| Sub-office | Sandon | " Kaslo) | ..... | W. J. Parham. |
| Slocan City Mining Div... | Slocan City ..... | ..... | Howard Parker..... | ..... |
| Trout Lake Mining Div... | Trout Lake | E. E. Chipman..... | F. Mummery ..... | ..... |
| Nelson Mining Division.. | Nelson | W. F. Teetzel | S. H. Hoskins..... | ..... |
| Sub-office | Creston ..... | ..... | ..... | Guy Loewenberg. |
| " | Ymir ..... | ..... | ..... | Geo. S. Coleman. |
| Arrow Lake Min. Division | Nakusp | W. F. Teetzel (at .. | Walter Scott ..... | ..... |
| Sub-office | Vernon | Nelson) | ..... | H. F. Wilmot. |
| Revelstoke Mining Div... | Revelstoke..... | Robt. Gordon | W. E. McLaughlin. | Edward Edwards. |
| Lardeau Mining Division. | Camborne..... | " (at Revelstoke) | B. E. Drew ..... | ..... |
| Trail Creek Mining Div... | Rossland | John Kirkup | J. E. Hooson..... | ..... |

GOLD COMMISSIONERS AND MINING RECORDERS.—*Concluded.*

| Mining Division. | Location of Office. | Gold Commissioner. | Mining Recorder. | Sub-Recorder. |
|----------------------------|---------------------|---------------------|--------------------|----------------|
| Nanaimo Mining Division | Nanaimo | George Thomson... | George Thomson... | |
| Sub-office | Ladysmith ..... | ..... | ..... | John Stewart. |
| " | Alert Bay ..... | ..... | ..... | Edward Conway. |
| " | Van Anda ..... | ..... | ..... |  |
| " | Rock Bay ..... | ..... | ..... | W. H. Lines. |
| Alberni Mining Division.. | Alberni | H. C. Rayson | H. C. Rayson | |
| Clayoquot " .. | Clayoquot | " (at Alberni) | W. T. Dawley | |
| Quatsino " .. | Quatsino | " " | O. A. Sherberg.... | |
| Victoria Mining Division.. | Victoria | Herbert Stanton... | Herbert Stanton... | |
| New Westminster Min. D. | New Westminster. | S. A. Fletcher..... | John Mahony | |
| Sub-office | Vancouver ..... | ..... | ..... | Geo. D. McKay. |
| " | Harrison Lake ... | ..... | ..... | L. A. Agassiz. |
| " | Chilliwack ..... | ..... | ..... | J. Pelly. |

TABLE OF CONTENTS.

| Subject. | Submitted by | Page. |
|---|-------------------------------|---------|
| Mineral Production..... | Provincial Mineralogist | 7 |
| Statistical Tables..... | " " | 7 to 15 |
| Progress of Mining during Year..... | " " | 16 |
| Bureau of Mines—Work of Year..... | " " | 30 |
| Assay Office Report..... | " Assayer | 31 |
| Examination for Assayers..... | " " | 32 |
| List of Licensed Assayers..... | " " | 32 |
| Examination of Coal-mine Officials | " Mineralogist | 34 |
| Board of Examiners—Report of Secretary | Tully Boyce, Secretary..... | 35 |
| List of Licensed Coal-mine Officials | Provincial Mineralogist | 38 |
| Cariboo District—Report on..... | Gold Commissioner | 48 |
| Cariboo Mining Division—Report on..... | " " | 48 |
| Quesnel " " " " | Mining Recorder..... | 51 |
| " " " " Notes on..... | Provincial Mineralogist..... | 52 |
| Cassiar District—Report on Atlin Mining Division | Gold Commissioner | 55 |
| Stikine and Ljard Mining Divisions—Report on | " " | 62 |
| Skeena District—Report on..... | " " | 65 |
| Skeena and Bella Coola Mining Divisions—Report on | " " | 65 |
| Skeena Mining Division—Notes on Unuk River..... | Provincial Mineralogist | 66 |
| " " " " Alice Arm | " " | 67 |
| Portland Canal Mining Division—Report..... | Mining Recorder | 72 |
| Queen Charlotte Mining Division | Gold Commissioner | 75 |
| Omineca Mining Div..... | " " | 78 |
| " " " " Notes on Groundhog Coal..... | Provincial Mineralogist | 82 |
| " " " " Coal in Vicinity of Hazelton..... | " " | 91 |
| " " " " Mineral Claims in Hazelton Dist..... | " " | 95 |
| Peace River Mining Division | " " | 120 |
| South-East Kootenay District | " " | 121 |
| Fort Steele Mining Division | " " | 121 |
| " " " " Notes on..... | " " | 122 |
| North-East Kootenay District..... | " " | 126 |
| Golden Mining Division..... | " " | 126 |
| Windermere Mining Division..... | Mining Recorder | 127 |
| North-West Kootenay District | Gold Commissioner | 128 |
| Revelstoke Mining Division | Mining Recorder | 128 |
| Lardeau " " | " " | 129 |
| Slocan District..... | Gold Commissioner | 130 |
| Ainsworth Mining Division..... | " " | 130 |
| Slocan " " | Mining Recorder | 133 |
| " " " " Notes on..... | Provincial Mineralogist | 134 |
| Slocan City " " | Mining Recorder | 153 |
| Trout Lake " " | " " | 154 |
| Nelson District..... | Gold Commissioner | 157 |
| Nelson Mining Div..... | " " | 157 |
| " " " " Notes on French's Zinc Process..... | Provincial Mineralogist | 162 |
| " " " " Reported Discovery of Platinum | " " | 165 |
| Arrow Lake Mining Division | Mining Recorder | 170 |
| Rossland District..... | " " | 172 |
| Trail Creek Mining Division..... | Gold Commissioner | 172 |
| Boundary District..... | " " | 174 |
| Greenwood Mining Division..... | Gold Commissioner | 174 |
| Grand Forks " " | " " | 174 |
| Osoyoos " " | " " | 177 |
| Vernon " " | " " | 180 |
| Yale District..... | " " | 181 |
| Kamloops Mining Division | " " | 181 |
| Ashcroft " " | Mining Recorder | 182 |
| Yale " " | " " | 183 |
| Nicola " " | " " | 185 |
| Similkameen " " | " " | 186 |
| Lillooet District..... | " " | 188 |
| Lillooet Mining Division | Gold Commissioner | 188 |
| Clinton " " | " " | 189 |

TABLE OF CONTENTS. — *Concluded.*

| Subject. | Submitted by | Page. |
|---|-------------------------------|-------|
| Vancouver Island and Coast Districts | | 191 |
| Alberni Mining Division | Gold Commissioner | 191 |
| Clayoquot " " | Mining Recorder | 192 |
| Quatsino " " | " " | 192 |
| Nanaimo " " Report on | Gold Commissioner | 194 |
| " " " " Texada Island | Provincial Assayer | 195 |
| " " " " Oil-smelting | " Mineralogist | 196 |
| Victoria " " | Mining Recorder | 201 |
| New Westminster Mining Division | " " | 201 |
| Notes on Britannia Mine | Provincial Mineralogist | 202 |
| " Limestones of Coast | " Assayer | 204 |
| Inspection of Metalliferous Mines: | | |
| West Kootenay and Boundary Districts | Inspector of Districts | 210 |
| East Kootenay District | " District | 212 |
| Coast District | " " | 212 |
| List of Accidents in Metalliferous Mines | Provincial Mineralogist | 214 |
| " " " " Tabulated | " " | 216 |
| Coal-mining in British Columbia | " " | 217 |
| Collieries producing | " " | 219 |
| " of the Coast Inspection District | " " | 220 |
| " " East Kootenay Inspection District | " " | 222 |
| Coal Potentialities of British Columbia | " " | 223 |
| Inspection of Coal and Metalliferous Mines: | | |
| Vancouver Island and Coast Inspection District | Inspectors of Districts | 224 |
| East Kootenay Inspection District | " " | 258 |
| Accidents in British Columbia Collieries, 1902-1911 | Provincial Mineralogist | 275 |
| " " " " 1911 | " " | 276 |
| Detailed Statement of Accidents, Coast District | Inspector of District | 278 |
| " " " " East Kootenay Dist. | " " | 281 |
| Prosecutions under "Coal-mines Regulation Act" | Provincial Mineralogist | 283 |
| Shipping Mines—List of | " " | 284 |
| Crown-granted Mineral Claims, 1911 | " " | 287 |
| Gold Commissioners and Mining Recorders—List of | " " | 293 |
| Table of Contents | " " | 297 |
| Index | " " | 299 |
| List of Illustrations | " " | 313 |
| Library Catalogue Slips | " " | 315 |

INDEX.

A.

| | PAGE. | | PAGE. |
|--|---------|--|---------------|
| <i>Abitibi</i> | 74 | Andesite, quarries for..... | 27 |
| <i>Acacia</i> | 179 | <i>Anna</i> | 113 |
| <i>Acacia Fraction</i> | 179 | <i>Annie</i> | 173 |
| <i>Acadia</i> | 179 | <i>Annie Fraction</i> | 173 |
| Accidents in collieries, table of, for 10 years..... | 275 | <i>Antelope</i> | 140 |
| Table of, in 1911..... | 276 | Anthracite..... | 86 |
| Analyses, table of..... | 277 | Groundhog mountain (Field)..... | 82 |
| Detailed statement of..... | 278 | Antimony, occurrence of..... | 97, 104 |
| Accidents, list of, in mines..... | 214 | <i>Apex</i> (Queen Charlotte)..... | 77 |
| Actinolite, occurrence of..... | 196 | " (Slocan)..... | 134 |
| Agassiz (town)..... | 201 | " (Osoyoos)..... | 179 |
| Ahousat..... | 192 | <i>Apex Fraction</i> | 179 |
| Ainsworth mines, report of Inspector of Mines..... | 211 | <i>Arlington</i> (Nelson)..... | 159 |
| AINSWORTH MINING DIVISION: | | " (Slocan City)..... | 154 |
| Report of Gold Commissioner..... | 130 | ARROW LAKE MINING DIVISION: | |
| <i>Ajax</i> (Slocan)..... | 144 | Report of Mining Recorder..... | 170 |
| " (Portland Canal)..... | 74 | Arsenic, occurrence of..... | 184 |
| <i>Alabama</i> | 49 | ASHCROFT MINING DIVISION: | |
| <i>Alamo</i> (Glen mountain, Omineca)..... | 100 | Report of Gold Commissioner..... | 182 |
| Alberni, railway to..... | 191 | Ashman Coal Mines, Ltd..... | 93 |
| Alberni canal..... | 191 | Assay Office, annual report..... | 31 |
| " limestone on..... | 208 | Free determination of minerals..... | 32 |
| ALBERNI MINING DIVISION: | | Assay fees, Government Laboratory..... | 31 |
| Report of Gold Commissioner..... | 191 | Assayers, list of..... | 32 |
| Cinnabar..... | 191 | Assayers' examinations..... | 30, 31 |
| <i>Alderbarab</i> —Report by D. A. Forbes..... | 67, 70 | <i>Athabasca</i> (stamp-mill at)..... | 24, 158 |
| Aldermere (town)..... | 107 | <i>Athelstan</i> (Grand Forks)..... | 174, 176, 177 |
| <i>Aldyth I.</i> | 192 | Atlin (town)..... | 60 |
| Alert Bay (town)..... | 256 | Quartz and coal locations..... | 55 |
| <i>Alexander</i> | 192 | Atlin Consolidated Mining Co..... | 56 |
| Alexandria coal-mine..... | 236 | ATLIN MINING DIVISION: | |
| Alice arm..... | 65 | Placer gold production..... | 23 |
| Alice Arm camp—Report by D. A. Forbes..... | 67 | Report of Gold Commissioner..... | 55 |
| Alice Arm Mohawk Mines, Ltd..... | 65 | Mineral claims..... | 59 |
| Alice lake..... | 192 | Coal..... | 60 |
| <i>Alpha</i> (Osoyoos)..... | 179 | Hydro-magnesite..... | 60 |
| " (Slocan)..... | 145 | Statistics..... | 61 |
| <i>American Boy</i> | 79, 107 | <i>A. T. Monteith</i> | 193 |
| American creek..... | 75 | Aufas Gold Mining Co..... | 184 |
| <i>Anaconda</i> | 194 | <i>Aurora</i> | 121, 122, 212 |
| Analyses of Skeena coal..... | 90 | <i>Australian</i> | 179 |
| Anderson creek..... | 184 | Awilgate Indians..... | 95 |

B.

| | | | |
|---|-------------|--|--------|
| Babine-Bonanza Mining & Milling Co..... | 108 | Beaufort range..... | 207 |
| Babine lake coal showing..... | 92 | Beaver cove..... | 205 |
| " mineral claims on..... | 108 | <i>Bell</i> | 212 |
| Babine Mining Co..... | 102 | BELLA COOLA MINING DIVISION: | |
| Babine mountains..... | 81, 98, 108 | Report of Gold Commissioner..... | 65 |
| <i>Balmoral</i> | 191 | <i>Ben Bolt</i> | 72, 74 |
| <i>Balsam</i> | 80 | <i>Ben d'Or</i> | 188 |
| Barkley sound..... | 204 | <i>Ben M'Chree</i> | 55, 60 |
| Limestone..... | 208 | Benoit seam, Groundhog coal-field..... | 87 |
| <i>Bayonne</i> | 162 | <i>Best Fraction</i> | 140 |
| Bayonne camp..... | 162 | Bierne creek..... | 87 |
| <i>Beaconsfield</i> | 77 | Big Bend..... | 128 |
| Bear lake (Slocan)..... | 130, 136 | <i>Big Casino</i> | 75 |
| " Cariboo, coal at..... | 223 | Big Casino Mining Co..... | 75 |
| <i>Bear River</i> | 192 | <i>Big Four</i> | 115 |
| Bear river (Portland canal)..... | 73, 85 | Big Horn river..... | 60 |
| Cariboo, coal on..... | 223 | <i>Big Interior</i> | 191 |

| | PAGE. | | PAGE. |
|---|----------|--|--------------------|
| <i>Big Ledge</i> | 171 | Boundary Falls Smelter | 199 |
| <i>Big Missouri</i> | 73 | <i>Boundary No. 1.</i> | 73 |
| <i>Big Six</i> | 79 | " <i>No. 2.</i> | 73 |
| Birch creek..... | 24, 57 | " <i>No. 4.</i> | 73 |
| <i>Bird</i> | 77 | Bowen island..... | 201 |
| Bird creek..... | 158 | Boyd's (town in Washington)..... | 176 |
| <i>Bismarck</i> | 77 | Brick, red: production of, importation of, and price of..... | 8, 9, 28 |
| Bitter creek..... | 74 | Bridge river..... | 189 |
| Bitter Creek Mining Co..... | 75 | <i>Britannia</i> | 202, 213 |
| <i>Black Bear</i> (Portland Canal)..... | 74 | Britannia Beach..... | 202, 213 |
| <i>Black Bear</i> (Trail Creek)..... | 172 | Britannia Copper Co..... | 160 |
| <i>Black Bear</i> (Alice arm, Skeena)..... | 65 | B.C. Anthracite Coal Syndicate..... | 87 |
| Report by Forbes..... | 67, 70 | British Columbia Copper Co..... | 174, 176, 177, 186 |
| <i>Black Prince</i> (Slocan City)..... | 154 | British Columbia Eastern Railway..... | 272 |
| <i>Black Prince</i> (Omineca)..... | 81 | B.C. Portland Cement Co..... | 186 |
| Black sand..... | 133 | B.C. Pottery Co..... | 28 |
| Blind bay, limestone at..... | 206 | Brown creek..... | 155 |
| Blubber Bay lime-kiln..... | 28, 206 | <i>Brown Jug No. 3</i> | 192 |
| <i>Bluebell</i> (Ainsworth)..... | 130 | <i>Ruena Vista</i> | 73 |
| <i>Blue Bell</i> (Hudson Bay mountain, Omineca)..... | 119 | Building materials, production of..... | 27 |
| <i>Blue Bird</i> (Trail creek)..... | 173 | Building-stone, production of..... | 8, 9, 27 |
| Blue Bird Mining Company..... | 173 | Bulkley & Telkwa Valley Coal Co..... | 110 |
| <i>B.N.A.</i> | 132 | Bulkley eruptives..... | 95 |
| Board of Examiners for Coal-mine Officials..... | 35 | Bulkley river..... | 91 |
| <i>Bonanza</i> | 65 | " coal on..... | 108 |
| Booming method of hydraulic mining..... | 52 | Bullion..... | 54 |
| Bornite..... | 185 | Bullion Mining Co..... | 51 |
| Boulder creek (Atlin)..... | 57 | Bureau of Mines..... | 30 |
| Boulder creek (Skeena river, Omineca)..... | 87 | <i>Burniere</i> | 129 |
| Boulder Creek Company..... | 62 | Burniston mountains..... | 67 |
| Boundary, tons mined per man..... | 16 | <i>Burns</i> | 49 |
| Lode gold of..... | 24 | Burnt basin..... | 177 |
| Copper production..... | 26 | Burrard inlet..... | 201 |
| Report of Gold Commissioner..... | 174 | Burrows bay..... | 66 |
| Report of Inspector of Mines..... | 210, 211 | Burton..... | 170 |
| <i>Boundary</i> (Portland Canal)..... | 73 | | |
| | | C. | |
| Cabin creek..... | 110 | Canadian Pacific Railway— <i>Concluded.</i> | |
| Cadwallader creek..... | 188 | Nicola branch..... | 244 |
| <i>Calder</i> | 57 | Crowsnest branch..... | 272 |
| <i>California</i> | 158 | <i>Canadian Queen</i> | 81 |
| California oil..... | 200 | Canadian St. John's Ambulance Association..... | 271 |
| " oil-fuel from..... | 22 | Canadium, reported discovery of, at Nelson..... | 157, 168 |
| Cameron lake..... | 207 | Canyon creek (Bulkley river)..... | 109 |
| <i>Camp McLeod</i> | 182 | " (Inklyn river, Atlin)..... | 59 |
| Camp Robertson..... | 223 | Capilano creek..... | 201 |
| Camp Wilson..... | 223 | Carbonado Colliery, annual returns..... | 259 |
| Camsell, Charles, reference to coal, Tulameen..... | 223 | CARIBOO DISTRICT..... | 24 |
| Canadian-Alaska Exploration Co..... | 59 | Placer gold in, annual reports..... | 48 |
| Canadian Boundary Survey..... | 63 | CARIBOO MINING DIVISION: | |
| <i>Canadian Boy</i> | 154, 155 | Report of Gold Commissioner..... | 48, 50 |
| Canadian Collieries, Ltd., fireclay from..... | 28 | <i>Cariboo</i> (Hudson Bay mountain, Omineca)..... | 119 |
| Annual returns..... | 231 | Cariboo creek..... | 161 |
| Report of Inspector..... | 249 | " Gold Mining Co..... | 51 |
| Canadian Geological Survey, report on platinum..... | 170 | " Mountain camp, Provincial Mineralogist's report on..... | 98 |
| <i>Canadian King</i> (Nelson)..... | 159 | Carlsrud, Mr., reference to..... | 199 |
| " (Omineca)..... | 81, 101 | Carmichael, H., notes on lime on coast..... | 204 |
| " group..... | 81 | Notes on Nanaimo Mining Division..... | 195 |
| Canadian Marble & Granite Co..... | 28 | Carpenter creek..... | 134, 138 |
| C.M.I. (Western Branch), meeting at New Denver..... | 31 | Cascade creek..... | 72 |
| Canadian Mining Journal, reference to article in..... | 53 | " Falls Mining Co., Ltd..... | 73 |
| Canadian North-eastern Railway..... | 72 | <i>Cascade Falls, No. 2</i> | 73 |
| Canadian Northern Pacific Railway..... | 181 | " <i>No. 3</i> | 73 |
| " " at Yale..... | 155 | " <i>No. 4</i> | 72 |
| Canadian Pacific Railway..... | 122 | " <i>No. 7</i> | 73 |
| New branch, Slocan..... | 133, 140 | " <i>No. 8</i> | 72 |
| Nakusp branch..... | 144 | Cash..... | 181 |
| Phoenix branch..... | 175 | <i>Cash Box</i> | 76 |
| Eholt branch..... | 176 | CASSIAR DISTRICT, annual report..... | 55 |
| Fernie branch..... | 258 | Cayoosh creek..... | 188 |

| | PAGE. | | PAGE. |
|--|----------|--|----------|
| Cement production | 9 | Coal-miners, examinations for | 34 |
| Cement-works | 28 | List of successful candidates | 36 |
| <i>Central Star</i> | 102 | Coal-mine officials, examinations for | 34 |
| <i>Centre Star</i> | 172 | Registered list of | 38 |
| <i>Ceperley</i> | 67 | Coal-mining in B.C., notes by Provincial Miner- | |
| Certificates of competency for coal-miners | 34 | alogist | 217 |
| <i>Champion</i> | 184 | Cralmont (town) | 186, 248 |
| <i>Chance</i> | 154, 155 | Coal Potentialities of B.C. | 223 |
| <i>Chance Fraction</i> | 155 | Coal produced in Province | 220 |
| <i>Charlotte</i> | 72 | Coal resources discussed at C.M.I. meeting | 30 |
| Chase river | 230 | Coast collieries | 21 |
| Chemainus, limestone | 207 | COAST DISTRICT: | |
| <i>Chicago</i> | 74 | Production | 16 |
| Chilko river | 190 | Copper production | 26 |
| Chilliwaok river | 201 | Coast granite | 66 |
| Chimney-tiles, production of | 28 | Coast Inspection District, report of Inspector | 212 |
| <i>China Creek</i> | 50 | Cobble Hill (town), lime near | 207 |
| Choquette seam, Skeena coalfield | 87 | Coke: | |
| Christina lake | 177 | Production tables | 11 |
| Cinnabar | 191 | Price of | 27 |
| <i>City of Spokane</i> | 172 | From Pennsylvania | 175 |
| Clarence straits | 66 | Vancouver Island | 22 |
| Clay, production of | 9 | Produced | 220 |
| Clayburn (town) | 28 | East Kootenay collieries | 259 |
| Clayburn Company, Ltd. | 28 | Coldwater river | 242 |
| CLAYQUOT MINING DIVISION: | | Coldwater series, geology | 186 |
| Report of Mining Recorder | 192 | Collieries of coast | 220 |
| Clayoquot sound | 208 | East Kootenay | 222 |
| Clear creek | 115 | Collins gulch, coal | 223, 248 |
| <i>Clearwater</i> | 81 | Collison bay | 76 |
| CLEARWATER DISTRICT | 52 | Colonial Gold Mining Co. | 179 |
| CLINTON MINING DIVISION: | | <i>Colorado</i> , Hunter basin | 112 |
| Report of Gold Commissioner | 189 | Colorado Iron Works | 200 |
| <i>Clyde-Belt</i> | 160 | <i>Coller</i> | 79 |
| Coal: | | Columbia canyon | 57 |
| Statistics for 1911 | 20 | Columbia Coal & Coke Co. | 22, 186 |
| Price of | 19 | (Similkameen) | 223 |
| Production tables | 11 | Annual returns | 248 |
| Production <i>per capita</i> | 277 | Columbia valley | 122 |
| Quartz veins in | 86 | Comox | 231, 249 |
| Analyses, Crown mountain | 125 | Computation of production | 7 |
| Strikes in Crowsnest | 22 | <i>Comstock</i> | 72 |
| Effects of same | 174 | Comstock Mining Partnership | 72 |
| Cretaceous, in British Columbia | 223 | Concentrator: | |
| Submarine mines | 229 | At Creston | 122 |
| Coal-cutting machine | 226 | <i>Molly Gibson</i> | 159 |
| Atlin Mining Division | 60, 55 | <i>Mother Lode</i> | 161 |
| Omineca | 81 | Roseberry (zinc) | 144 |
| Klappan river | 64 | <i>Standard</i> | 146 |
| Fraser lake | 94 | <i>Van-Roi</i> | 133 |
| Peace River canyon | 120 | <i>Condor</i> | 194 |
| Hazelton | 91 | Consolidated Cariboo Hydraulic Mining Co. | 54 |
| Telkwa river | 110 | Consolidated M. & S. Co.: | |
| Morice river | 92 | References to 30, 122, 130, 159, 160, 161, 172, 176 | |
| Zymoetz river | 93 | Opening of <i>Sullivan</i> | 25 |
| Port Alberni | 191 | Copper: | |
| Kamloops | 181 | Production table | 12 |
| Kootenay mines shut down | 16 | Production | 25, 26 |
| Michel creek | 125 | Gold from copper-ores | 24 |
| Quatsino | 193 | Nelson Mining Division | 158 |
| Bear lake (Cariboo) | 223 | Quatsino Mining Division | 192 |
| Groundhog field (Skeena river) | 27 | Unuk river | 67 |
| " report of J. McEvoy | 85 | Copper (Franklin camp) | 176, 177 |
| " description | 82 | Copper Creek Company Ltd. | 50 |
| " anthracite in | 82 | Copper Island (Queen Charlotte) | 76 |
| Coal creek, Zymoetz river, coal on | 93 | Copper island (limestone, Alberni) | 208 |
| " (Port Steele) | 258 | Copper islands (Queen Charlotte) | 76 |
| Coal Creek Colliery, annual returns | 260 | <i>Copper King No. 3</i> (Clayoquot) | 192 |
| Coal Hill Syndicate, " | 244 | Copper mountain (Similkameen) | 186 |
| Coal-mines, inspection of | 224 | <i>Copper Queen</i> (Queen Charlotte) | 76 |
| Fireclay from | 28 | " (Nanaimo) | 195 |

| | PAGE. | | PAGE. |
|---|----------|---|----------|
| Copper River Coal Syndicate | 93 | Cretaceous coal at Skeena | 86 |
| "Copper River trail" | 114 | Crocker | 57 |
| Coquihalla river, placer gold | 183 | Crooked creek | 60 |
| Corbin Coal & Coke Company, annual returns .. | 272 | Crown Coal & Coke Co. | 123 |
| Corbin Colliery, annual returns | 272 | Crown-granted mineral claims | 287 |
| Cork | 132 | Crown mountain | 124, 125 |
| Cornell | 195, 212 | Crowsnest coal-mines, effect of strike at | 174, 122 |
| Coronado (Hudson Bay mountain) | 118 | Crowsnest Pass | 123 |
| Coronation Mines Ltd. | 188 | Crow's Nest Pass Coal Co., annual returns .. | 258, 268 |
| Coryell | 177 | Crowsnest Railway (see also B.C. Southern) .. | 122 |
| Cotton Belt | 181 | Crushed rock, production of | 9, 29 |
| Cottonwood creek | 158, 162 | Cultus creek | 162 |
| Countless | 183 | Culver classifier | 144 |
| Courrier creek | 84 | Cumberland, examination at | 35 |
| Cracker Jack | 156 | " reference to | 254 |
| Cranberry District | 231 | Cummings creek | 114 |
| Cranbrook | 122 | Cumshewa inlet | 77 |
| Creston, concentrator at | 122 | Cuppage, G. (rep. as M.R.) | 201 |
| Cretaceous age, rocks of | 207 | | |

D.

| | | | |
|---|--------|---|----------|
| Dandy Fraction (Hudson Bay mountain) | 116 | Dominion telegraph extended to Stewart via | |
| Danny | 72 | Granby bay | 67 |
| Dardanelles creek | 141 | Double Standard | 192 |
| Davenport | 161 | Douglas (Alaska) | 59 |
| Davis creek (Omineca) | 87 | Douglas mine (Nanaimo) | 225 |
| Deadwood camp | 176 | Annual returns | 230 |
| Dease creek | 62 | Dowling, D. B., estimated area of coalfields .. | 223 |
| Dease lake, sawmill at | 62, 66 | Dowling's classification for coal | 89 |
| Deep diggings in the Slocan | 31 | Draeger apparatus | 271 |
| Deer creek (Nelson) | 161 | Drain-pipe, production of | 28 |
| Dellie | 131 | Dredging, Fraser river | 183 |
| Department of Mines, officers of | 293 | Driftwood creek, coal on | 93, 108 |
| Deserted creek (Clayoquot) | 208 | Dry ores of Slocan | 134 |
| Devlin (Nelson) | 165 | Reference to | 152 |
| Devlin Lode (Nelson) | 161 | Duchess (Nine-mile, Omineca) | 105 |
| Diamond-drilling, Hidden creek | 68 | " (Howson basin, Omineca) | 114 |
| Diamond Vale Collieries, annual returns | 242 | Duke | 105 |
| Dinner rock, lime at | 205 | Duncan river | 132 |
| Dixon entrance | 66 | Dundee | 157, 159 |
| Dominion (Hudson Bay mountain) | 118 | Dundee mountain (Nelson) | 159 |
| Dominion mountain (Nelson) | 160 | Duty | 129 |
| Dominion Oil Smelting Co., Ltd. (Nanaimo) .. | 196 | | |

E.

| | | | |
|--|---------------|--|----------|
| Eagle creek | 158 | Engineer group | 60 |
| Earty Bird | 77 | Enterprise (Trail creek) | 172 |
| Eastmont | 153 | Enterprise (Slocan City) | 154 |
| East Wellington Colliery | 238 | Era | 102 |
| Effingham inlet, lime on | 208 | Erie | 159 |
| Eighteen-mile creek | 180 | Esplanade shaft | 225 |
| Eight-mile creek | 183 | Esquimalt lime-kilns | 207 |
| Eldorado | 193 | Esquimalt harbour | 28 |
| Eldorado creek | 188 | E. & N. Railway | 207 |
| Electric motors in coal-mines | 226 | Eslington | 72 |
| Electro-thermic smelting of iron | 27 | Eureka | 158, 161 |
| Elford lime-quarry | 207 | Eva | 113 |
| Elk lake | 192 | Evans creek | 87 |
| Elk river | 123 | Evening | 114 |
| Elkshore | 192 | Evening Star | 134 |
| Ella lake | 49 | Examination for assayers | 30 |
| Elmore process (Slocan) | 133 | Examinations for coal-mine officials | 34 |
| Wakefield | 153 | Examinations for miners | 34 |
| Britannia | 204 | Excise | 129 |
| Emerald | 161 | Exit passage | 229 |
| Emily Edith | 145 | Expanded analysis of coal | 89 |
| Emma | 174, 176, 177 | Extension Colliery | 231, 234 |
| Emory bar | 183 | | |

F.

| | PAGE. | | PAGE. |
|--|---------|--|------------------|
| Face-brick, production of | 9 | FORT STEELE MINING DIVISION: | |
| Fairview (New Westminster) | 213 | Iron in | 121 |
| Fairview (town) | 177 | Statistics of | 121 |
| Famous | 75 | Report by Provincial Mineralogist | 122 |
| Fawn creek | 160 | Production of | 16 |
| Fern | 158 | Silver and lead production | 25 |
| Fernie, coal-miners' examinations at | 35, 258 | Forty-nine creek | 158 |
| Fiddick Colliery, annual returns | 235 | Fossils | 204 |
| Fidelity | 155 | Four Leaf Clover Hydraulic Mining Co. | 50 |
| Field (town) | 126 | Four-mile camp, visited by Provincial Mineral- | |
| Fife | 176 | ogist | 31 |
| Fire in Michel mine | 268 | Four-mile creek | 101, 133 |
| Firebrick, production of | 9 | Four-mile mountain | 81 |
| " at Clayburn | 28 | Fourth Cabin | 82 |
| Fireclay from coal-mine | 28 | Franklin camp | 177 |
| " from Union Colliery | 255 | Fraser's classification, applied to Skeena coal .. | 88 |
| Fires, forest fires destroy mine property .. | 25 | Fraser lake, coal on | 94 |
| First New B.C. Goldfields | 72 | Fraser river, dredging on | 183, 184 |
| Five-mile creek | 156 | " lower river | 204 |
| Flint | 132 | " upper, coal on | 223 |
| Florence | 131 | Freibergite | 147 |
| Foghorn | 169 | French, Andrew G.: | |
| Forest fires | 136 | Claims to find platinum. | 27, 57, 162, 165 |
| Forest Rose | 49 | French creek | 128 |
| Fort George, claims located near | 48 | French's process for zinc | 162 |
| Fort St. John | 120 | Frue vanners | 203 |
| Fort Steele | 50 | | |

G.

| | | | |
|--|----------|---|----------------------|
| Gabriel creek, coal-area | 92 | Gold, placer— <i>Concluded.</i> | |
| Galena | 192 | Yale | 183, 184 |
| Gallagher (see also <i>Let-her-go-Gallagher</i>) .. | 131 | Omineca | 81 |
| Gambier island | 201 | Revelstoke | 128 |
| Garneau seam (Skeena coalfield) | 87 | Graham island | 78 |
| Geological Survey of Canada, report on Yale Dis. | 185 | Production | 10, 122 |
| Geology of Hidden creek | 67 | Gold creek | 56 |
| Skeena coalfields | 85 | Gold Drop | 175, 176 |
| Telkwa river | 113 | Golden (town) | 122, 126 |
| George island (Queen Charlotte) | 76 | Golden Belle | 160 |
| Georgia river, Portland canal, claims on .. | 72 | Golden Gate | 192 |
| Gerrard (town) | 155 | GOLDEN MINING DIVISION | 126 |
| Glacier Creek (Portland Canal) | 72 | Report of Gold Commissioner | 127 |
| Glacier creek (Portland Canal) | 72, 74 | Golden West | 193 |
| " (Telkwa river) | 113 | Gold Harbour (Queen Charlotte) | 77 |
| " (Unuk river) | 67 | Gold Hill (Atlin) | 59 |
| " (Zymoetz river, coal on) | 93 | " (Nelson) | 158 |
| Glacier Creek Mining Co. | 74 | Gold Run | 56 |
| Glad Hand | 154 | Goldstream, coal on | 92 |
| Gladstone | 24, 57 | Goose bay (see Granby bay) .. | |
| Gladys | 191 | Goose creek | 52 |
| Glen mountain, claims on | 81, 99 | Graham island, oil on | 78 |
| Goat creek | 81, 110 | Gold placer on | 78 |
| Go East | 77 | Coal on | 223 |
| Gold, produce of lode mines | 10 | Granby bay | 65, 67, 69 |
| Proportion from copper-ores | 24 | Granby Con. M. S. & P. Co., Goose Bay .. | 65, 67, 174 |
| Lode | 24 | Granby smelter, shipment from Nelson mines | 158, 159 |
| On Unuk river | 67 | Grand Forks (town) | 177 |
| Dust melted at Government office | 31 | GRAND FORKS MINING DIVISION | 174 |
| Gold, free | 129 | Report of Gold Commissioner | 174 |
| Lardeau | 129 | Grand Trunk British Columbia Coal Co., Ltd. . | 93 |
| Kamloops | 181 | Grand Trunk Pacific Development Co. | 110 |
| Yale | 183, 184 | Grand Trunk Pacific Railway | 78, 82, 91, 116, 223 |
| From milling | 24 | Granite creek (Slocan) | 148 |
| Quesnel | 52 | " coal at (Similkameen) | 223, 248 |
| Queen Charlotte islands | 77 | Granite-Poorman | 158 |
| Gold, placer | 23 | Platinum reported | 27 |
| Placer production | 23 | Investigation by British Columbia Govt. | 165 |
| Recovery in proportion to water-supply .. | 54 | Granite quarries (Vancouver harbour) .. | 29 |
| Kamloops | 181 | Vancouver Island | 27 |

| | PAGE. | | PAGE. |
|-----------------------------------|-------|---|--------|
| Granite Siding (place)..... | 167 | Grenville mountain (Trail creek)..... | 173 |
| <i>Granville</i> | 113 | <i>Grey Copper</i> | 161 |
| Gravel, production of..... | 9, 29 | <i>Greyhound</i> | 176 |
| Great Central lake (Alberni)..... | 191 | <i>Groundhog</i> (Hudson Bay mountain)..... | 119 |
| <i>Great Gold</i> | 205 | Groundhog mountain (anthracite coal)..... | 82 |
| Great Northern mountain..... | 154 | " " coal, analysis table..... | 90 |
| Great Northern Railway: | | Trails to fields..... | 82, 84 |
| At Phoenix..... | 176 | Coal of..... | 223 |
| At Similkameen..... | 186 | <i>Guggenheim</i> (Portland Canal)..... | 72 |
| At Fernie..... | 258 | Guggenheim properties (Atlin)..... | 23 |
| <i>Great Ohio</i> | 96 | <i>Guilher</i> | 194 |
| <i>Great Western</i> | 192 | Gun creek (Lillooet)..... | 188 |
| GREENWOOD MINING DIVISION..... | 174 | Gypsum, production of..... | 9 |
| Report of Gold Commissioner..... | 174 | Reported..... | 206 |

H.

| | | | |
|---|----------|--|----------|
| Hall creek..... | 158 | <i>Hillside</i> | 192 |
| <i>Hampton</i> | 154 | Hirtuda point (lime)..... | 205 |
| Hancock jig..... | 203 | Hobson lease (placer, Quesnel)..... | 24 |
| Hankin basin..... | 110 | " Mining Co..... | 130 |
| <i>Hanna</i> | 177 | Ainsworth, Slocan City..... | 154 |
| Hanson island (lime)..... | 205 | <i>Homes'ake</i> (Queen Charlotte)..... | 77 |
| Harbledown island (lime)..... | 205 | " (Omineca)..... | 79 |
| Harper's Camp (town)..... | 54 | " No. 4 (Queen Charlotte)..... | 77 |
| Harriet harbour..... | 76 | <i>Hoodoo</i> | 74 |
| Harrison lake..... | 201 | Hope (town)..... | 183, 184 |
| Harz jigs..... | 126 | <i>Hope</i> (Ainsworth)..... | 131 |
| Hastings (B.C.) Exploration Synd., Ltd..... | 159 | " (Slocan)..... | 134 |
| Hazelton..... | 81 | Horne lake..... | 207 |
| Railway to..... | 83 | Horsefly basin (Trout Lake)..... | 155 |
| Coal in vicinity..... | 91 | Horsefly Hydraulic Mining Co..... | 54 |
| Report of Provincial Mineralogist..... | 30 | Horsefly river..... | 54 |
| Mineral claims..... | 95 | <i>Horse Shoe</i> | 155 |
| Trail to Groundhog..... | 82 | Hosmer..... | 285 |
| Map of vicinity of..... | 100 | Hosmer Colliery (annual returns)..... | 266 |
| <i>Hazelton</i> (Portland Canal)..... | 72 | Hosmer Mines, Ltd. (annual returns)..... | 266 |
| " (Omineca)..... | 103 | Howe sound..... | 201, 202 |
| Hazelton Sunrise Mines, Ltd..... | 79 | "..... | 213 |
| Hazelton group (rocks)..... | 109 | Howson (town)..... | 113 |
| <i>Hector</i> | 171 | " basin (Omineca)..... | 31 |
| Hedley camp..... | 177 | " creek, geology on..... | 113 |
| Hedley, stamp-mill at..... | 24 | " coal..... | 92 |
| Hedley Gold Mining Co..... | 177 | " lake (see Mooseskin lake, correct name)..... | |
| Hematite, none on coast..... | 26 | " Lake camp (Telkwa river)..... | 113 |
| Fort Steele..... | 121 | <i>Hudson Bay</i> (Nelson)..... | 157, 161 |
| Hemlock tree..... | 66 | Hudson's Bay Co. (gold-mine, Queen Charlotte)..... | 77 |
| Henderson bay..... | 206 | " steamers on Skeena..... | 95 |
| <i>Henrietta</i> | 80 | Hudson Bay mountain (Omineca)..... | 81, 116 |
| <i>Hercules</i> | 76 | " " visited by P.M..... | 31 |
| Hesquiat lake (clay)..... | 192 | " ranch..... | 108 |
| <i>Hetty Green</i> | 192 | Hudson's Hope (Peace river)..... | 120 |
| <i>Hewitt</i> | 26 | <i>Humboldt</i> | 148 |
| Zinc production (Slocan)..... | 151 | <i>Humphrey</i> | 140 |
| Hewitt Mining Co..... | 151 | <i>Hunter</i> (Hunter basin, Omineca)..... | 112 |
| <i>Hidden Creek</i> (Alice arm, Skeena, report by | | Hunter basin (Omineca)..... | 110 |
| Donald Forbes)..... | 67 | Huston inlet..... | 76 |
| Hidden creek (Yale)..... | 183, 184 | Hydraulic (town)..... | 51 |
| " Observatory inlet, geology of..... | 67 | " mining (booming method)..... | 52 |
| <i>High Grade</i> | 155 | Hydro-electric power..... | 249 |
| <i>Highlander</i> | 131 | Hygrometer reading in mines..... | 250 |
| Highlander Mill & Mining Co..... | 131 | <i>H. Y. M.</i> | 155 |

I.

| | | | |
|---------------------------------------|-----|--|-----|
| <i>Idaho</i> | 112 | Independence mountain..... | 179 |
| <i>Ikeda</i> | 76 | Index..... | 299 |
| Ikeda bay..... | 76 | Industrial Development & Finance Co..... | 185 |
| Ikeda Mines, Ltd..... | 76 | Inklin river..... | 59 |
| <i>It's Chance It</i> | 70 | Inland Coal & Coke Co..... | 244 |
| Incandescent lamps, material for..... | 52 | <i>Inland Empire</i> | 173 |

| | PAGE. | | PAGE. |
|------------------------------------|----------|---------------------|--------|
| Inland Empire Mining & Milling Co. | 173, 177 | <i>Iron Mask</i> | 172 |
| International Mining Co. | 73 | Iron mountain | 161 |
| Iowa | 80 | Iron Mountain, Ltd. | 161 |
| Iridium | 158 | <i>Iron Pot</i> | 72 |
| Iron, electro-thermic smelting of | 27 | <i>Isabel</i> | 101 |
| Micaceous specular. | 111 | <i>Iscoyd</i> | 76 |
| Queen Charlotte islands | 77 | Iskut Mining Co | 63 |
| Smelting of | 27 | Iskut river | 63, 66 |
| Production | 26 | <i>Ivan</i> | 76 |
| Barkley sound | 204 | <i>Ivanhoe</i> | 192 |
| <i>Iron Colt</i> | 113 | <i>I. X. L.</i> | 173 |
| <i>Iron King</i> | 192 | | |

J.

| | | | |
|------------------------------|----------|-------------------------------|--------|
| Jacko lake | 181 | Johnson, Matthey & Co., Ltd. | 169 |
| <i>Jack Pine</i> | 80 | Johnson vanner | 203 |
| <i>Jackpot</i> (Grand Forks) | 176, 177 | <i>Jo-Jo</i> | 134 |
| (Hunter basin, Omineca) | 111 | <i>Joker</i> | 57 |
| Jane schists | 203 | Jones lake | 201 |
| <i>Jay Gould</i> | 192 | <i>Josie</i> | 173 |
| Jedway | 76 | <i>J. P. Morgan</i> | 72 |
| <i>Jennie Bell</i> | 159 | <i>Judy Fraction</i> | 179 |
| Jervis inlet | 201 | <i>Jumbo</i> (Portland Canal) | 74 |
| <i>Jesperson</i> | 188 | (Yale) | 184 |
| <i>Jessie-Blue Bird</i> | 131 | Juneau (Alaska) | 59 |
| <i>Jim</i> | 194 | <i>Juniper</i> (Omineca) | 80, 96 |
| <i>John D.</i> | 72 | " basin, claims in | 95 |
| John Hopp mines | 49 | " creek (Omineca) | 95 |

K.

| | | | |
|--|---------------|---|---------------|
| <i>Kamloops Goldfield</i> | 181 | Klaskino Gold Mines, Ltd. | 193 |
| Kamloops lake (copper-ore) | 181 | Klaskino inlet | 193 |
| KAMLOOPS MINING DIVISION : | | Klehini river | 60 |
| Coal | 181 | <i>Knob Hill</i> (Grand Forks) | 175 |
| Placer gold | 181 | (Omineca) | 80 |
| Report of Gold Commissioner | 181 | Kokanee creek | 159 |
| Kaslo | 130, 136 | Kokshittle arm | 193 |
| Kaslo creek | 131, 132, 136 | <i>Kootenay Belle</i> | 160 |
| Kaslo & Slooan Railway | 25 | Kootenay Central Railway | 122, 126 |
| Destroyed by forest fires | 26, 130, 136 | Kootenay, East | 126 |
| Keithley creek | 51, 52 | Report of Gold Commissioner | 121 |
| Kennedy lake (lime) | 208 | Placer | 24 |
| <i>Keno</i> | 140 | Coalfield statistics | 22 |
| Kettle river, claims on | 177 | Strike at coal-mines | 16 |
| Kiddie, Thomas, report on oil-fuel furnace | 199 | Report of Inspector of Mines | 212, 258, 265 |
| Kimberley (town) | 212 | Kootenay Gold Mines, Ltd., letter re platinum | 166 |
| <i>King</i> (Hunter basin) | 79, 111 | Kootenay lake, marble on | 28, 135, 162 |
| <i>King George V.</i> | 158 | Kootenay, North-West : | |
| <i>Kingston</i> | 177, 180 | Report of Gold Commissioner | 128 |
| Kiskagash (village) | 98 | Kootenay, South-East : | |
| Kitsalas, trail to Telkwa | 95, 114 | Report of Inspector of Mines | 258 |
| Kitsalas canyon | 81, 83 | Kootenay valley | 122 |
| <i>Kitsequekla</i> | 80 | Kootenay, West : | |
| Kitsequekla river | 80, 95 | Report of Inspector of Mines | 210 |
| Kla-anch river, lime on | 205 | Kootanie series, East Kootenay | 124 |
| Klappan river, coal on | 64 | Kyuquot sound | 193 |

L.

| | | | |
|---------------------------------------|-----|------------------------------|---------|
| Laboratory, Government, moving of | 31 | LARDEAU MINING DIVISION : | |
| Labour troubles, Crowneast coal-mines | 16 | Report of Gold Commissioner | 128 |
| Labour employed per ton of ore | 16 | Free gold | 129 |
| Ladysmith smelter | 65 | Report of Inspector of Mines | 211 |
| La France creek | 162 | Lardo | 28 |
| La France Creek Mining Co | 162 | Lardo-Trout Lake Railway | 28 |
| Laidlaw | 184 | <i>Last Chance</i> (Sloocan) | 143 |
| Lake Bennett | 60 | (Omineca) | 79, 102 |
| Laketon | 66 | (Nanaimo) | 194 |
| Lardeau creek | 135 | <i>L. B.</i> | 156 |

| | PAGE. | | PAGE. |
|---|----------|----------------------------|----------|
| Leach, R. H. | 203 | Limestone on Coast. | 205 |
| Lead on Unuk river. | 67 | " silica in. | 205 |
| Lead-ores, silver from. | 25 | " table of analyses. | 209 |
| Production table. | 12 | Limestone island. | 208 |
| Lead King. | 79, 104 | Lincoln creek. | 59 |
| Lead Queen. | 79 | Little Billie. | 195, 212 |
| Leckie. | 76 | Little Deloire creek. | 62 |
| Le Roi Mining Co., Ltd. | 172 | Little Florence. | 80 |
| Le Roi No. 2 Mining Co. | 148, 173 | Little Heather. | 119 |
| Le Roi No. 3. | 148 | Little Valley creek. | 49 |
| L. H. | 176 | L. L. & H. | 75 |
| LIARD MINING DIVISION: | | Lockeport. | 77 |
| Report of Gold Commissioner. | 62 | Log Cabin. | 80 |
| Placer-mining. | 62 | Lone Star. | 176 |
| Lidgerwood hoist. | 212 | Lookout. | 72 |
| Lightning creek (Cariboo). | 49 | Lordsburg. | 200 |
| " (Yale). | 184 | Lorimer, Mr. | 209 |
| Lightning Creek, B.C., Hydr. Mining Co., Ltd. | 49 | Lorna Doone. | 151 |
| Lightning Creek Gold & Gravels Drainage Co., Ltd. | 49 | Lorne. | 188 |
| Lightning Creek Mines Co. | 184 | Lost Treasure. | 115 |
| Lignitic coal. | 223 | Louise island. | 77 |
| LILLOOET MINING DIVISION: | | Lowhee. | 49 |
| Report of Gold Commissioner. | 188 | Lowhee creek. | 49 |
| Notes by Provincial Mineralogist. | 189 | Luce. | 51 |
| Stamp-mill. | 24 | Lucky Boy. | 79 |
| Lilly May. | 192 | " No. 1. | 79 |
| Lily B. | 154 | Lucky Jim (Slocan). | 26, 138 |
| Lime, production of. | 28 | " (Nanaimo). | 104 |
| Notes on Coast lime by H. Carmichael. | 204 | " (Omineca). | 111 |
| Lime-kilns. | 28 | Lucky Jim Zinc Mines, Ltd. | 138 |
| " at Esquimalt. | 207 | Lucky Thought. | 134 |
| Lime, production of. | 8, 9 | Lulla. | 172 |
| Limestone (Texada island). | 195 | Lynn creek. | 201 |

M.

| | | | |
|---|----------|---|--------------------|
| Mabry Co. | 130 | Masset, coal near. | 223 |
| Madison. | 194 | Mayflower. | 74 |
| Maestro. | 131 | McAllister. | 134 |
| Magnesite (at Atlin). | 60 | McCulloch creek. | 128 |
| Magnesia in limestone. | 206 | McDane creek. | 62 |
| Magnet. | 194 | McEachern. | 128 |
| Magnetite, Valdes island. | 194 | McGillvray (station). | 272 |
| Production of. | 26, 196 | McGuigan basin. | 140 |
| Maid of Erin. | 60 | McKee creek. | 24, 55 |
| Mainland. | 73 | McKinley. | 177 |
| Malaspina. | 194, 212 | McLeod. | 182 |
| Malaspina inlet (lime report). | 205 | Meal Ticket. | 76 |
| Malcolm island, reference to. | 235 | Menzies. | 56 |
| Maluin Syndicate. | 58 | Mermaid. | 63 |
| Mammoth. | 73 | Merritt (town). | 185, 242 |
| Managers' Board, coal-miners' examinations. | 34 | " coal-miners' examination at. | 35 |
| Maple bay, claims on. | 72 | Metalliferous mines. | 214 |
| Maple Leaf. | 80 | Accidents in. | 214 |
| Maps (see illustrations). | 80 | Inspection of. | 210 |
| Marble. | 28 | Meteor. | 154 |
| Production of. | 28 | Metropolitan. | 132 |
| Nootka sound. | 28 | Mica (Big Bend). | 128 |
| Lardo. | 27 | Michel Colliery (annual returns). | 268 |
| Kootenay lake. | 27 | Michel creek. | 123, 258, 269, 272 |
| Malaspina inlet. | 205 | Middlesboro Colliery (annual returns). | 240 |
| Heuderson bay. | 206 | Middlesboro Siding. | 244 |
| Marble Bay. | 194, 195 | Milk creek (Telkwa river). | 114 |
| (Nanaimo). | 212 | Milk Creek camp, Omineca, visited by Provincial Mineralogist. | 31 |
| Marble bay, lime-kiln. | 28 | Miller creek (Pine creek, Telkwa river). | 119 |
| " lime on. | 205 | Millie Mack. | 170 |
| Marble creek. | 208 | Mineral Mountain Mining & Milling Co. | 74 |
| Mark creek. | 121 | Mine-rescue apparatus. | 270 |
| Marmot river, claims on. | 72 | At Michel Colliery. | 270 |
| Martin. | 132 | At Hosmer Colliery. | 27 |
| Martin creek. | 52 | At Union Colliery. | 25 |
| Mary Jane. | 101 | | |

| | PAGE. | | PAGE. |
|--|----------|---------------------------------------|----------|
| Miners' Board (coal-miners' examination) | 34 | Moose-skin lake (Telkwa river) | 113 |
| <i>Mint</i> | 159 | Morice river (coal) | 92 |
| Miscellaneous products | 8, 9 | Morristown (town) | 108, 119 |
| Mispickle | 184 | Morrissey (town) | 258 |
| <i>Missing Link Fr.</i> | 73 | " creek | 258 |
| Mitchell harbour | 77 | <i>Mosquito creek</i> (Cariboo) | 49 |
| <i>Mohawk</i> | 65 | Mosquito creek (Cariboo) | 49 |
| <i>Molly Gibson</i> (Nelson) | 157, 159 | <i>Mother Lode</i> (Nelson) | 157, 160 |
| " (Grand Forks) | 177 | " (Greenwood) | 174, 176 |
| <i>Monarch</i> (Yale) | 184 | <i>Mountain-Boomer</i> | 148, 150 |
| " (Golden) | 126 | <i>Mountain Chief</i> (Slocan) | 134 |
| <i>Monita</i> (Trail creek) | 172 | " (Kamloops) | 181 |
| <i>Monitor</i> (Slocan) | 144 | Moyie (town) | 212 |
| Moodie, J. W. D. | 203 | Moyie lake | 121 |
| <i>Moonlight</i> | 74 | <i>Mugwump</i> | 172 |
| <i>Moonshine</i> | 119 | Myrtle creek | 73 |
| Moose-skin Johnny trail (Telkwa river) | 113 | <i>Mystery</i> | 194 |

N.

| | | | |
|--|----------|---|-------------|
| Nahmint river (lime) | 208 | New Denver (meeting C.M.I. Western Branch) .. | 31 |
| Nahlin Telegraph-station | 59 | Reference to | 134 |
| Nakusp | 144 | New Dominion Copper Co | 176 |
| Nakusp & Slocan Railway | 144 | New East Wellington Colliery (annual returns) .. | 238 |
| Nanaimo | 30 | Newtown | 83, 95, 120 |
| Meeting Western Branch C.M.I. | 30 | NEW WESTMINSTER MINING DIVISION : | |
| " Board of Examiners | 35 | Report of Mining Recorder | 201 |
| Reference to town | 230, 249 | Notes by Provincial Mineralogist | 202 |
| NANAIMO DISTRICT : | | Report of Inspector of Mines | 213 |
| Report of Gold Commissioner | 194 | <i>New York Fractional</i> | 179 |
| NANAIMO MINING DIVISION : | | <i>Nickel Plate</i> (Osoyoos) | 177 |
| Report of Gold Commissioner | 194 | " stamp-mill at | 24 |
| Notes by Provincial Mineralogist | 196 | " (Trail creek) | 173 |
| " " Assayer | 195 | Nicola, coal at | 223 |
| Nanoose bay (limestone) | 207 | NICOLA MINING DIVISION : | |
| <i>Napoleon</i> | 176 | Report of Mining Recorder | 185 |
| Nass harbour | 84 | Nicola valley | 245 |
| " ranch | 114 | Nicola Valley Coal & Coke Co. (annual returns) .. | 240 |
| " river, coalfields on | 83 | Nimkish lake | 192 |
| National Finance Co. | 94 | " lime on | 205 |
| Needles | 171 | Nine-mile camp | 31 |
| <i>Neepawa</i> | 154 | " report by Provincial Mineralogist .. | 103 |
| <i>Nelson</i> (Queen Charlotte) | 77 | " creek | 103 |
| Nelson, copper at | 158 | " mountain | 78 |
| " reported platinum at | 27 | " report by Provincial Mineralogist .. | 98 |
| " zinc separation at | 26 | Nitre-cake | 163 |
| " District (report of Gold Commissioner) .. | 157 | <i>Noble Five</i> | 134, 143 |
| " tons mined per man | 16 | <i>Nome</i> | 132 |
| " granite | 139 | Non-shipping mines, table showing | 17 |
| " island | 201 | Nootka marble-quarries | 28, 206 |
| " limestone on | 206 | " sound, marble at | 28 |
| NELSON MINING DIVISION : | | " limestone at | 208 |
| Shipping mines | 16 | North Columbia Gold Mining Co. | 23, 56 |
| Lode gold of | 24 | North-east point | 206 |
| Notes of Provincial Mineralogist | 162 | Northern Terminus Mines, Ltd | 75 |
| Report of Inspector of Mines | 210 | Northfield (annual returns) | 225, 228 |
| <i>Nevada</i> | 153, 159 | <i>North Star</i> (Fort Steele) | 121 |
| New Canadian Metal Co. | 130 | " (Osoyoos) | 177 |
| <i>Newcastle</i> (Hudson Bay mountain, Omineca) .. | 118 | <i>Nugget</i> (Nelson), stamp-mill at | 24, 161 |
| <i>Newcastle</i> island, coal-mine under | 229 | " gulch (Cariboo) | 50 |
| " seam | 230 | <i>No. 1.</i> (Trail creek) | 173 |
| | | " (Ainsworth) | 130 |

O.

| | | | |
|-------------------------------------|---------|--------------------------------|-----|
| Observatory inlet | 67 | Oil-fired furnace | 196 |
| O'Donnell river | 59 | <i>O.K.</i> (Trout Lake) | 156 |
| <i>Ohio</i> | 80, 96 | " (Portland Canal) | 72 |
| Oil, borings on Graham island | 78 | <i>O.K. Fraction</i> | 74 |
| " fuel from California | 22, 200 | Okanagan lake | 180 |
| " on steamers | 217 | Olalla creek | 49 |

| | PAGE. | | PAGE. |
|--|--------|---------------------------------------|-------|
| <i>Old Ironsides</i> | 175 | <i>Oppenhoff</i> | 60 |
| Omineca (steamer) | 120 | Ore-bodies of Hidden creek | 68 |
| " (placer gold) | 24, 81 | <i>Oregon</i> | 180 |
| Omineca Copper Co. | 102 | Orford Copper Co. | 199 |
| OMINECA MINING DIVISION: | | OSOYOOS MINING DIVISION: | |
| Report of Gold Commissioner | 78 | Report of Mining Recorder | 177 |
| Notes by Provincial Mineralogist | 82 | Gold from stamp-mills | 24 |
| Coal of | 223 | Otard bay | 78 |
| Map of | 80 | <i>Ottawa</i> (Queen Charlotte) | 77 |
| Map of part of | 100 | <i>Ottawa</i> (Slocan City) | 154 |
| Open bay, lime on | 205 | Otter creek | 58 |
| <i>Ophir</i> | 158 | Otter Creek Development Co. | 58 |

P.

| | | | |
|--|--------------|--|---------------|
| Pacific Coast Coal Mines, Ltd. | 223 | <i>Poorman</i> (Trail creek) | 173 |
| Annual returns | 235, 256 | " (Nelson), stamp-mill at | 24 |
| Pacific Coast Colliery Co. | 223 | Porcupine Siding | 159 |
| Nicola | 22 | " creek | 159 |
| Annual returns | 245 | Port Alberni, coal at | 191 |
| Pacific Coast Exploration Co. | 74 | <i>Portland canal</i> (Portland Canal) | 72 |
| Pacific Coast Lime Co., Ltd. | 206 | Portland canal | 66, 85 |
| Pacific Metal Co. | 65 | Portland Canal Mining Co. | 72, 74 |
| <i>Pady</i> | 155 | PORTLAND CANAL MINING DIVISION | 65 |
| Palladium, reported occurrence at Nelson | 158 | Report of Gold Commissioner | 65 |
| <i>Panama</i> | 132 | Report of Mining Recorder | 72 |
| Paper-making, lime for | 206 | Statistics | 75 |
| <i>Paramount</i> | 192 | Portland cement, production of | 28 |
| <i>Parrsboro</i> | 155 | Portland Star Mines, Ltd. | 74 |
| Paulson (town) | 177 | <i>Portland Wonder</i> | 72 |
| <i>Payne</i> | 134, 135 | Port Nooke | 208 |
| Peace River coalfields | 223 | Port Renfrew (lime) | 208 |
| Peace River canyon, coal on | 120 | Port Simpson (steamer) | 95 |
| PEACE RIVER MINING DIVISION | 120 | Pottery, production of | 9, 28 |
| Report of Gold Commissioner | 120 | Powell River Pulp & Paper Co. | 206 |
| Pelletier seam, Skeena coalfield | 87 | Prices of metals | 7 |
| Pemberton trail | 201 | Prices of coal | 19 |
| Pennsylvania, coke imported from | 175 | <i>Prince Alfred</i> | 191 |
| Perkins gulch | 50 | <i>Prince Rupert</i> (Omineca) | 80 |
| <i>Perrier</i> | 158 | Prince Rupert | 66, 95, 120 |
| <i>Pete</i> | 192 | <i>Princess</i> | 80 |
| Peters creek | 49 | <i>Princess May</i> | 72 |
| Phoenix (town) | 174, 176 | Princeton | 186 |
| <i>Pictou</i> | 72 | Coal at | 223 |
| <i>Pilgrim</i> | 172 | Princeton Coal & Land Co. | 186, 187, 223 |
| Pillar-and-stall workings | 260 | Annual returns | 246 |
| <i>Pilot</i> | 80 | Production tables | 7, 12, 14, 15 |
| Pine creek (Atlin) | 23, 56 | Progress of mining | 16 |
| " (Telkwa river) | 94, 98, 116 | Prosecutions under "Coal-mines Regulation Act" | 283 |
| " Flume Co. (Atlin) | 56 | Protection Island mine, annual returns of | 225, 228 |
| Pine river | 120 | Provincial Assayer | 31 |
| <i>Pingree</i> | 158 | Annual report of | 31 |
| <i>Pioneer</i> | 188 | Notes on Nanaimo Mining Division | 195 |
| Pioneer Smelting Co., oil-fuel furnace | 200 | Provincial Mineralogist | 30 |
| Pipestem inlet, lime | 208 | Annual report | 30 |
| Pitt lake | 201 | Notes on Quesnel Mining Division | 52 |
| Pittsburg-British Gold Co. | 24, 55 | " Skeena Mining Division | 66 |
| Placer gold (see Gold, placer) | | " Omineca Mining Division | 82 |
| Placer Gold Mines Co. | 57 | " Telkwa river (coal) | 91 |
| Platinum | 27 | " Hazelton District | 95 |
| Occurrence of | 27 | " Slocan Mining Division | 134 |
| At Yale | 183 | Ref. to Provincial Mineralogist | 162 |
| Reported discovery at Nelson | 27, 157, 165 | Provincial Mineralogist | 196 |
| Platinum Gold Fields, Ltd. | 186 | Notes on Nanaimo Mining Division | 196 |
| Platinum group of metals, reported find of | 27 | New Westminster Mining Division | 202 |
| Platinum Metals Co. | 166 | Puntledge river, hydro-electric power from | 249 |
| <i>Poker</i> | 57 | <i>Python</i> | 181 |

Q.

| | | | |
|--------------------------------------|-----|---------------------|----|
| Qualicum river, Big and Little | 207 | Quartz creek | 63 |
| Quarries | 27 | Quartz-mining | 52 |

| | PAGE | | PAGE |
|---|---------------|--|--------------------|
| Quartz-veins in coal..... | 86 | Queen Charlotte Mining & Development Co..... | 77 |
| Quatsino Coal Syndicate..... | 193 | QUEEN CHARLOTTE MINING DIVISION..... | 75 |
| Quatsino King..... | 192 | Report of Gold Commissioner..... | 78 |
| QUATSINO MINING DIVISION: | | Queen Charlotte Pioneer Development Co..... | 77 |
| Report of Mining Recorder..... | 192 | Quesnel, quartz-mining in..... | 52 |
| Coal in..... | 223 | Free gold in..... | 52 |
| Quatsino narrows..... | 208 | Notes by Provincial Mineralogist..... | 52 |
| Quatsino sound..... | 192, 193, 208 | Galena in..... | 52 |
| Coal on..... | 223 | Placer gold..... | 24 |
| Queen (Nelson), stamp-mill at, ref. to..... | 24, 160 | Quesnel Forks..... | 52, 54 |
| Queen Charlotte islands, iron on..... | 77 | Quesnel lake..... | 52 |
| " " zinc..... | 76 | Quesnel river, placer of..... | 24, 50, 51, 52, 54 |
| " " free gold..... | 77, 204 | Quesnelle Hydraulic Gold Mining Co..... | 24, 50, 51, 52 |

R.

| | | | |
|---------------------------------------|---------------|---|---------------|
| Rain, Cariboo M.D..... | 48 | Rio (Slocan)..... | 143 |
| Quesnel..... | 52 | Rio Mines, Ltd..... | 143 |
| Rainbow..... | 111 | Rip-rap, production of..... | 9 |
| Rainy Hollow..... | 60 | Rising Sun..... | 194 |
| Rambler-Cariboo..... | 133, 135, 140 | Riverside..... | 176 |
| Rambler-Cariboo Extension..... | 143 | Robertson, W. F., Provincial Mineralogist..... | 5 |
| Rambler-Cariboo Mines, Ltd..... | 140 | Report on Fort Steele..... | 122 |
| Rapid Transit..... | 73 | Omineca..... | 82 |
| Raven..... | 196 | Notes on Nanaimo Mining Division..... | 196 |
| Rawhide..... | 174, 176, 177 | Rochers Déboulés camp (Omineca)..... | 31, 95 |
| Raymond & Sons, lime-works..... | 207 | Visited by Provincial Mineralogist..... | 31, 95 |
| Raymond Crossing..... | 207 | Mountain..... | 80 |
| Reco..... | 134 | Rochers Déboulés Copper Co..... | 80 |
| Red..... | 65 | Rocky mountains, coal of..... | 123, 223, 258 |
| Red Bluff..... | 63 | Roddick..... | 184 |
| Red Cliff..... | 72 | Roosevelt..... | 192 |
| Red Cliff Extension..... | 74 | Rose..... | 212 |
| Red Cliff Extension Mining Co..... | 74 | Rosebank Lime Co., Ltd. (lime-kiln)..... | 208 |
| Red Cliff Mining Co..... | 72, 74 | Roseberry, concentrator at..... | 144 |
| Red Elephant..... | 132 | Rose hill (placer gold)..... | 181 |
| Red Mountain..... | 172 | Ross seam, Skeena coalfield..... | 78 |
| Red mountain..... | 172 | Rose spit..... | 87 |
| Red mountain (Yale)..... | 183 | Rossland, visit of Western Branch C.M.I..... | 30 |
| Redonda island (lime)..... | 205 | Reference to..... | 173 |
| Reid..... | 76 | ROSSLAND DISTRICT..... | 172 |
| Reliance Mining & Exploration Co..... | 195 | Report of Gold Commissioner..... | 172 |
| Revelstoke (town)..... | 128 | Lode gold..... | 24 |
| REVELSTOKE MINING DIVISION..... | 128 | Rossland mines, report of Inspector of Mines..... | 210 |
| Report of Gold Commissioner..... | 128 | Rothschilde..... | 192 |
| Mica in..... | 128 | Royal Canadian..... | 158 |
| Rec..... | 74 | Ruby creek..... | 57 |
| Reysbach, Mr..... | 184 | Ruffed Grouse..... | 155 |
| Richards classifiers..... | 203 | Ruffner Companies..... | 23 |
| Richardson seam..... | 236 | Rupert..... | 72 |
| Richmond (Trail Creek)..... | 173 | Rupert arm..... | 208 |
| Richmond-Eureka (Slocan)..... | 134 | Ruth..... | 134 |

S.

| | | | |
|-------------------------------------|-------------------|---|----------|
| Saanich arm (lime-kiln)..... | 28 | Scotch Hill..... | 80 |
| Limestone of..... | 207 | Scott seam, Skeena coalfield..... | 87 |
| Sacramento..... | 180 | Sechart (town)..... | 191 |
| Sadie..... | 76 | Sechelt peninsula..... | 201 |
| Ste. Anne..... | 109 | Second Relief..... | 159 |
| St. Elmo (town), (see Laidlaw)..... | | Sentinel range (coal)..... | 123 |
| St. Eugene (Fort Steele)..... | 25, 121, 122, 212 | Service certificates, coal-mine officials..... | 38 |
| " (Omineca)..... | 109 | Seven-mile (town)..... | 155 |
| Salmo (town)..... | 161 | " creek..... | 52 |
| Salmon-Bear River Mining Co..... | 72 | Seventeen-mile post, lime at (E. & N. Ry. station)..... | 207 |
| Salmon river, claims on..... | 72 | Sewer-pipe, production of..... | 28 |
| Sandhurst Gold Mines Co..... | 78 | Seymour arm (Kamloops)..... | 181 |
| Sandon (town)..... | 134 | " camp..... | 182 |
| Sand, production of..... | 9 | Seymour creek..... | 201 |
| Sandstone, quarries for..... | 27 | Shale-quarry on Vancouver Island..... | 28 |
| Saucy Lass..... | 191 | Sheep creek..... | 157, 160 |

| | PAGE. | | PAGE. |
|--|-------------|--|---------------|
| Sheep Creek mines, report of Inspector of Mines | 210 | SLOCAN DISTRICT— <i>Concluded.</i> | |
| Shegunia River coal-area | 91 | Shipping mines | 16 |
| Reference to | 98, 104 | Tons mined per man | 16 |
| Shepherd, F. H., resigned as Inspector of Mines | 210 | Lead production | 23 |
| Shipping mines | 16, 17 | Report of Inspector of Mines | 211 |
| List of | 284 | Slocan lake | 135, 144, 151 |
| Shorts creek | 180 | SLOCAN MINING DIVISION: | |
| Shunseaw | 145 | Report of Gold Commissioner | 133 |
| Silica in limestone | 205 | Notes by Provincial Mineralogist | 134 |
| Silica brick | 9 | Deep digging in | 31 |
| Silver in dry ore of Slocan | 134 | Slocan series | 139 |
| Ruby | 148 | " slates | 148 |
| Production table | 12 | <i>Slocan Star</i> | 134, 136 |
| Production of Fort Steele | 25 | SLOCAN CITY MINING DIVISION | 153 |
| " Slocan | 25 | Sluice, plates of steel (Atlin) | 51, 53 |
| From lead-ores | 25 | " steel rails in | 51 |
| Unuk river | 67 | Smelter at Tacoma | 75, 202 |
| <i>Silver Bell</i> (Trout Lake) | 156 | " Ladysmith | 65 |
| " (Omineca) | 79 | " Granby bay | 69 |
| <i>Silver Bow</i> | 79 | " Granby | 175 |
| Silver creek (Yale) | 184 | " Van Anda | 196 |
| " (Hudson Bay mountain), Zymoetz | | Smith creek (Revelstoke) | 128 |
| river | 116, 119 | Smith's landing (Alberni), lime | 208 |
| " flats, (Hudson Bay mountain) | 116 | Snowfall | 48 |
| <i>Silver Cup</i> (Trout Lake) | 154 | <i>Snowshoe</i> (Grand Forks) | 176 |
| " (Omineca) | 78, 104 | Snowshoe creek (Quesnel), free-gold quartz | 51, 52 |
| <i>Silver Cup Extension</i> | 80 | Société Minière de la Colombie Britannique | 57 |
| Silver Cup Mines, Ltd. | 105 | <i>Society Girl</i> | 121, 122, 212 |
| <i>Silver Dollar</i> (Nelson) | 161 | Sooke (lime) | 208 |
| " (Omineca) | 105 | " South Belt" | 173 |
| Silver Hoard Company | 131 | <i>South Easter</i> | 77 |
| <i>Silver King</i> | 157 | Southfield coal-mines | 236 |
| Silver lake | 119 | <i>South Wales</i> | 49 |
| <i>Silver Lead</i> | 161 | South Wellington Mines, Ltd. | 235 |
| Silver mountain | 133 | <i>Spade Flush</i> | 76 |
| <i>Silverplate</i> | 177 | Spanish creek | 51, 54 |
| <i>Silver Standard</i> | 81, 99, 100 | " lake | 54 |
| <i>Silverton</i> (Cariboo mountain, Omineca) | 98 | <i>Speculation</i> | 81 |
| Silverton | 133, 151 | <i>Spider</i> | 129 |
| " zinc from | 26 | Spillimacheen | 126 |
| " creek | 147 | Split Volatile Ratio for coal | 89 |
| " Mines, Ltd. | 133, 151 | Springer creek | 154 |
| SIMILKAMEEN MINING DIVISION | 176, 186 | Sproat lake | 191 |
| Report of Inspector of Mines | 211 | Spruce | 107 |
| Similkameen river | 180 | " creek (Atlin) | 23, 56 |
| <i>Simpson</i> | 72 | " Creek Power Co | 23, 56 |
| <i>Sinclair and Munger</i> | 182 | Spuzzum | 184 |
| Siwash creek, placer gold | 183, 184 | Squamish | 201 |
| Siwash Creek Mines, Ltd. | 183 | <i>Stafford</i> | 193 |
| Six-mile creek | 101 | Stamp-mill (Nelson) | 157 |
| Sixteen-mile creek | 180 | <i>Queen</i> | 157 |
| Skagit river | 183 | <i>Granite-Poorman</i> | 157 |
| Skeena Crossing | 80 | <i>Nugget</i> | 157 |
| SKEENA DISTRICT: | | <i>Athabasca</i> | 157 |
| Report of Gold Commissioner | 65 | <i>Wilcox</i> | 157 |
| SKEENA MINING DIVISION: | | <i>Second Relief</i> | 157 |
| Report of Gold Commissioner | 65 | Stamp-mill at Nickel Plate | 24 |
| Notes by Provincial Mineralogist | 66 | Gold from | 24 |
| Map of | 80 | Queen Charlotte Islands | 77 |
| Skeena river, coal on | 82, 91, 95 | <i>Standard</i> (Slocan) | 145 |
| Skeena River coal, possible use in iron smelting | 27 | " (Glen mountain, Omineca) | 100 |
| Geology of field by McEvoy | 85 | " (Hudson Bay mountain, Omineca) | 116 |
| Report by Campbell Johnston | 87 | Standard Silver Lead Mines | 133 |
| Analysis table | 90 | <i>Star</i> | 131 |
| Skidegate (town) | 77 | Statistical tables, explanation of | 18 |
| " inlet | 223 | Stave lake | 201 |
| <i>Skookum</i> | 161 | Steamboat mountain | 181, 183 |
| Slate creek | 186 | <i>Sleeple Jack</i> | 182 |
| Slocan, production of silver | 25 | <i>Stemwinder</i> (Fort Steele) | 121 |
| " dry ore of | 134 | " (Nanaimo) | 194 |
| SLOCAN DISTRICT: | | <i>Stewart</i> (Portland Canal) | 72 |
| Report of Gold Commissioner | 130 | Stewart, Telegraph line to | 67, 85, 86 |

| | PAGE. | | PAGE. |
|--|---------------|------------------------------|---------------|
| <i>Stewart Fraction</i> (Trail Creek) | 172 | <i>Summit</i> (Nelson) | 161 |
| <i>Stewart Mining & Development Co.</i> | 74 | " (Portland Canal) | 73 |
| STIKINE MINING DIVISION | 62 | <i>Summit camp</i> | 186 |
| Report of Gold Commissioner | 62 | " creek | 162 |
| Mineral claims | 63 | <i>Sunnyside</i> | 177 |
| Statistics | 64 | <i>Sunrise</i> | 79, 104 |
| Coal in | 63 | <i>Sunset</i> | 134 |
| <i>Stikine river</i> | 82 | <i>Sunshine</i> | 154 |
| Coal on | 66 | <i>Superior</i> | 132 |
| <i>Stouts Gulch</i> | 49 | <i>Squash Colliery</i> | 235 |
| <i>Strathcona</i> | 113 | Annual returns | 256 |
| <i>Strike in Crowsnest Pass</i> | 265 | <i>Surprise</i> | 134, 143, 145 |
| <i>Sugar creek</i> | 50 | <i>Surprise basin</i> | 143 |
| <i>Sullivan</i> | 25 | <i>Sutton</i> | 57 |
| Opening by Consolidated Mining & Smelting Company | 121, 122, 212 | <i>Swede</i> | 77 |
| <i>Sulphate creek</i> | 66 | <i>Swede American</i> | 75 |
| <i>Sulphide</i> | 192 | <i>Swift river</i> | 52 |
| <i>Sulphite-pulp, lime for</i> | 206 | <i>Swiftwater</i> | 81 |
| <i>Sumas mountain</i> | 201 | <i>Sylvanite</i> | 192 |

T.

| | | | |
|---|---------------|---|----------|
| <i>Table of contents</i> | 297 | <i>Three Guardsmen</i> | 60 |
| <i>Tacoma smelter</i> | 75 | <i>Thunder</i> | 76 |
| " ore to | 202 | <i>Tiger</i> | 130 |
| <i>Tacoma Steel Co.</i> | 195, 206, 212 | <i>Tiles, production of</i> | 8, 9, 28 |
| <i>Taku arm</i> | 55, 60 | <i>Timberline</i> | 80 |
| <i>Taku river</i> | 55 | <i>Tip Top</i> | 73 |
| <i>"Tar flats" (Atlin)</i> | 23 | <i>Toad mountain</i> | 157 |
| <i>Tartar</i> | 181 | <i>Toboggan creek</i> | 120 |
| <i>Taseko river</i> | 190 | <i>Tod inlet (cement-works)</i> | 28 |
| <i>Tassoo harbour</i> | 77 | " (limestone) | 207 |
| <i>Tatlayoko lake</i> | 190 | <i>Trail</i> | 30 |
| <i>Taylor arm</i> | 191 | <i>Trail smelter, shipments to, from Nels'n mines</i> | 158, 159 |
| <i>Taylor river</i> | 191 | " " from <i>Whitewater</i> | 138 |
| <i>Teddie</i> | 191 | <i>Trail creek, production of</i> | 16 |
| <i>Teeta river</i> | 192 | TRAIL CREEK DISTRICT: | |
| <i>Teeta River Mining Co.</i> | 192 | Tons mined per man | 16 |
| <i>Telegraph Creek</i> | 64, 66 | TRAIL CREEK MINING DIVISION: | |
| <i>Telephone</i> | 76 | Report of Gold Commissioner | 172 |
| <i>Telkwa</i> | 108, 110 | Copper production | 26 |
| <i>Telkwa Mines, Ltd.</i> | 114 | <i>Trail to Groundhog coalfields</i> | 82 |
| <i>Telkwa Mining, Milling & Development Co.</i> | 92, 114 | <i>Treasure Vault</i> | 76 |
| <i>Telkwa river, visited by Provincial Mineralogist</i> | 31 | <i>Tribune</i> | 112 |
| Coal-area | 91, 94, 108 | <i>Triumph</i> | 116 |
| Coal on | 110, 223 | <i>Triune</i> | 155 |
| Geology on | 113 | <i>Trout lake</i> | 156 |
| South fork of | 114 | TROUT LAKE MINING DIVISION | 154 |
| <i>Tenas creek</i> | 113 | Report by Mining Recorder | 156 |
| <i>Ten-mile creek</i> | 153 | <i>Tuchi river</i> | 92, 108 |
| <i>Ten Million</i> | 103 | <i>Tulameen river</i> | 186 |
| <i>Terminus</i> | 73 | Coal on | 22, 223 |
| <i>Tete Jaune Cache</i> | 48 | Valley of | 248 |
| <i>Texada island (lime-kiln)</i> | 28 | <i>Tutchi lake</i> | 60 |
| Lime on | 205 | <i>Twenty-mile creek</i> | 50 |
| Report by H. Carmichael | 195 | <i>Twenty-three-mile</i> | 183 |
| Mining claims on | 194, 212 | <i>Twin creek</i> | 94 |
| <i>Theodosia arm (lime)</i> | 205 | <i>Twin glacier</i> | 63 |
| <i>Thibert creek</i> | 62 | <i>Two-mile camp</i> | 107 |
| <i>Thibert Creek Mining Co.</i> | 62 | <i>Two-mile flat</i> | 97 |
| <i>Thomson creek</i> | 126 | <i>Tyee Copper Co., smelter of</i> | 71 |
| <i>Three Forks</i> | 30, 133 | | |

U.

| | | | |
|----------------------------------|----------|--|-----|
| <i>Uchucklesat harbour</i> | 191 | <i>United Empire Co.</i> | 186 |
| Lime on | 208 | <i>Unuk river, notes by Dailey</i> | 66 |
| <i>Union Bay</i> | 249, 254 | Report by F. E. Wright (U.S. Geological Sur- vey referred to) | 67 |
| <i>Union Colliery</i> | 231 | <i>Unuk River Mining & Dredging Co.</i> | 66 |
| Fireclay from | 255 | <i>Utica</i> | 131 |
| Report of Inspector | 250 | <i>Utopia</i> | 179 |
| <i>Union Jack</i> | 75 | | |

V.

| | PAGE. | | PAGE. |
|---|---------------|--|-------|
| Valdes island, mining claims on..... | 194 | Van-Roi Mining Co..... | 148 |
| Lime on..... | 205 | Venture Mining Co..... | 49 |
| Van Anda..... | 195, 205, 212 | Vermilion Forks Mining & Development Co. . | 246 |
| Smelter at..... | 196 | VERNON MINING DIVISION: | |
| Vancouver (Slocan)..... | 148 | Report of Gold Commissioner..... | 180 |
| " (Sheep creek, Nelson)..... | 160 | Coal claims..... | 180 |
| Vancouver..... | 29 | Vernon mountain..... | 161 |
| Granite quarries near..... | 213 | Victoria (cement-works)..... | 28 |
| Vancouver creek..... | 148 | Lime at..... | 28 |
| Vancouver Island..... | 191 | Granite quarries..... | 29 |
| Report of Gold Commissioner..... | 191 | VICTORIA DISTRICT: | |
| Quarries on..... | 27, 28 | Report of Gold Commissioner..... | 201 |
| Report of Inspector of Mines..... | 224 | VICTORIA MINING DIVISION: | |
| Coal on..... | 223 | Report of Gold Commissioner..... | 201 |
| Inspection of Northern District..... | 249 | Victoria West, pottery works at..... | 28 |
| Vancouver Mining Co..... | 148 | Victory..... | 116 |
| Vancouver-Nanaimo Coal Mining Co., Ltd..... | 238 | Voight..... | 186 |
| Vancouver-Portland Cement Co..... | 28, 207 | Voight's camp..... | 176 |
| Vancouver series..... | 204 | V. V. & E. (Yale)..... | 185 |
| Van-Roi..... | 133 | " (Similkameen)..... | 187 |
| Zinc production..... | 26 | | |

W.

| | | | |
|---|----------|--|----------|
| Wakefield..... | 151 | Wheat Tamar..... | 181 |
| Ward..... | 184 | White Horse..... | 62 |
| War Eagle (Howson basin, Omineca)..... | 113 | White Swan..... | 119 |
| " (Trail Creek)..... | 172 | Whitewater (Slocan)..... | 132, 136 |
| Washington..... | 132 | " Zinc from..... | 26 |
| Washington Mine, Ltd..... | 138 | Whitewater Deep (Ainsworth)..... | 131, 136 |
| Waterman, Ernest, manager Princeton Colliery..... | 246 | Whitewater river (see Taseko river)..... | |
| Water-power..... | 67 | Whonnock lake..... | 201 |
| Water Tight Dipper Dredge & Mining Company..... | 52 | Wilcox..... | 159 |
| Waverley..... | 50 | Wild Horse creek..... | 159 |
| Wayside..... | 188, 189 | Wild Rose..... | 101 |
| Wellington (Grand Forks)..... | 174, 176 | Williams..... | 49 |
| Wellington camp..... | 176 | Williams creek..... | 49 |
| Wellington Collieries Co., Ltd..... | 231 | Wilson creek..... | 58 |
| Reference to..... | 249 | WINDERMERE MINING DIVISION, Report of M.R..... | 127 |
| Wellington seam..... | 238 | Wingdam (town)..... | 49 |
| Werner bay..... | 77 | Winslow..... | 154 |
| West Canadian Deep Leads, Ltd..... | 49 | Wireless..... | 76 |
| West coast (Vancouver Island)..... | 208 | Wireless station (Ikeda bay)..... | 76 |
| Western Development Company..... | 83 | W. J..... | 191 |
| Coal claims..... | 85 | Wolf safety-lamps..... | 251 |
| Western Fuel Co..... | 225 | Wollan, P. J..... | 192 |
| Report of Inspector..... | 224 | Wood, W. F..... | 181 |
| Annual returns..... | 230 | Woodbury creek..... | 131 |
| Western ore-body (Hidden creek)..... | 68 | Wormwold creek..... | 50 |
| Western Steel Co..... | 77 | Wormwold Creek Mining Co..... | 50 |
| West Kootenay Corporation..... | 132 | Wright creek..... | 58 |

Y.

| | | | |
|----------------------------------|-----|---|----------|
| Yale, dredging at..... | 183 | Yankee Girl..... | 157, 159 |
| YALE DISTRICT: | | Yeatman classifier..... | 126 |
| Report by Camsell..... | 185 | Yellow Jacket..... | 184 |
| Placer of..... | 24 | Yellowstone (Portland Canal)..... | 73 |
| Report of Gold Commissioner..... | 181 | Yellowstone mountain..... | 160 |
| YALE MINING DIVISION: | | Ymir (Nelson)..... | 157, 159 |
| Report of Mining Recorder..... | 183 | Ymir mines, Report by Inspector of Mines..... | 210 |
| Platinum..... | 183 | " mountain..... | 159 |

Z.

| | | | |
|----------------------------|----------|---|---------|
| Zilor..... | 148 | Zinc—Concluded—(Lucky Jim)..... | 138 |
| Zinc: | | (Slocan)..... | 133 |
| French's process..... | 162 | (Britannia)..... | 203 |
| Reference to..... | 26 | Zinc blende..... | 109 |
| Production table..... | 13, 26 | Zinc Commission, extract from Report of..... | 152 |
| Zinc..... | 123, 161 | Zymoetz river, (Omineca), visited by Provincial Mineralogist..... | 31 |
| "Penalty" at smelters..... | 138 | " Coal on..... | 93, 94 |
| (Omineca)..... | 101 | " Reference to..... | 81, 115 |
| (Queen Charlotte)..... | 76 | " Coal on..... | 223 |
| (Hudson Bay mountain)..... | 117 | | |

LIST OF ILLUSTRATIONS.

| | |
|---|---------------|
| New Denver, B.C. | Frontispiece. |
| Alice Arm—Observatory Inlet. | Facing p. 64 |
| Beirnes Creek—a tributary of West Fork of Skeena River. | " 84 |
| Benoit Coal-seam—Groundhog Coalfield, Upper Skeena River. | " 88 |
| Blubber Bay—Lime Quarry at. | " 208 |
| Britannia Beach—Concentrating plant at. | " 200 |
| Britannia Mine—Mine plant | " 200 |
| Carpenter Creek—from Lucky Jim Mine. | " 136 |
| Choquette Coal-seam—Beirnes Creek—Groundhog Coalfield. | " 88 |
| Granby Smelter—general view of. | " 176 |
| " New Slag Conveyor at. | " 176 |
| Graphic Table of Mineral Production | Page 14 |
| Hankin's Camp—Hudson Bay Mountain. | Facing p. 124 |
| Hazelton—Pack-train loading at. | " 96 |
| Howson Basin—South Fork Telkwa River. | " 104 |
| Juniper Creek Mines—Tunnel of. | " 96 |
| Klua-tan-tan Valley—Headwaters of Skeena River—Groundhog Coalfield. | " 72 |
| Lucky Jim Mine—Slocan M.D. | " 140 |
| Map of Hazelton District of Omineca M.D. | " 100 |
| Map of parts of Skeena, Stikine, and Omineca Divisions. | " 80 |
| Merry Creek—a tributary of Klua-tan-tan River—Groundhog Coalfield. | " 84 |
| Moricetown and Hudson Bay Mountain. | " 108 |
| New Denver—Mining Recorders Office at. | " 128 |
| " Steamer Slocan at. | " 132 |
| Nicola Valley Coal and Coke Co.'s Tipple at Merritt. | " 240 |
| Nine-mile Mountain—near Hazelton. | " 104 |
| Oil-fuel Blast Furnace—Dominion Oil-smelting Co—Van Anda. | Page 198 |
| Oil-fuel Furnace—Anderson patent. | " 197 |
| Omineca Mining Division—map of part of. | Facing p. 100 |
| Quesnelle Hydraulic Gold Mining Co.—plan of ditch system. | " 56 |
| " " high carbon steel plate installation. | " 60 |
| " " manganese steel-rail installation. | " 60 |
| " " profile of water system. | " 56 |
| " " sluiceway. | " 52 |
| " " general view of hydraulic pit. | " 48 |
| " " monitors at work in hydraulic pit. | " 48 |
| Rambler-Cariboo Mine—Slocan M.D. | " 160 |
| Richmond-Eureka Mine—Slocan M.D. | " 168 |
| Sandon, B.C.—Town of. | " 160 |
| Silver Creek Flats. | " 112 |
| Silver Lake Pass. | " 120 |
| Silverton—Slocan Lake. | " 132 |
| Slocan Lake from New Denver. | " 128 |
| Slocan Star and Ruth Mines—Sandon. | " 168 |
| Standard Mine—Flow-sheet of Concentrator. | " 144 |
| Telkwa, Town of—Bulkley Valley. | " 108 |
| Telkwa River—Zymoetz River Pass. | " 116 |
| " Joe Nass Ranch on. | " 112 |
| Toboggan Creek Glacier—Hudson Bay Mt. | " 124 |
| Valley of Skeena River—near its source—Groundhog Coalfield. | " 72 |
| Van-Roi Mine—Flow-sheet of Concentrator. | " 148 |
| Van-Roi Mine—from Hewitt Mine. | " 152 |
| Western Branch of Canadian Mining Institute—Members of, at Standard Mine. | " 152 |
| Whitewater, Town—site of. | " 136 |

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