Minister of Mines

PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

For the Year Ended 31st December

1955

VICTORIA, B.C.
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1956

BRITISH COLUMBIA DEPARTMENT OF MINES

VICTORIA, B.C.

HON. W. K. KIERNAN, *Minister.*

JOHN F. WALKER, *Deputy Minister.*

H. C. HUGHES, *Chief Inspector of Mines.*

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HARTLEY SARGENT, *Chief, Mineralogical Branch.*

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J. D. LINEHAM, *Chief, Petroleum and Natural Gas Conservation Branch.*

To His Honour FRANK MACKENZIE ROSS, C.M.G., M.C.,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industry of the Province for the year 1955 is herewith respectfully submitted.

W. K. KIERNAN,
Minister of Mines.

Minister of Mines' Office.
May, 1956.

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ANNUAL REPORT OF THE MINISTER OF MINES, 1955

Introduction

A Report of the Minister of Mines of the Province of British Columbia has been published each year since 1874.

The Annual Report records the salient facts in the progress of the mineral industry, also much detail about individual operations, including those undertaken in the search for, exploration of, and development of mineral deposits, as well as the actual winning of material from mineral deposits.

The Annual Report of the Minister of Mines now contains introductory sections dealing with Statistics and Departmental Work, followed by sections dealing with Lode Metals; Placer; Structural Materials and Industrial Minerals; Petroleum and Natural Gas; Inspection of Lode Mines, Placer Mines, and Quarries; Coal; and Inspection of Electrical Equipment and Installations at Mines and Quarries, each with its own table of contents. A table listing the properties described, in geographic groupings, precedes the index.

An introductory review of the mineral industry and notes at the first of several of the main sections deal generally with the industry or its principal subdivisions. Notes in the various sections deal briefly with exploration or production operations during the year or describe a property in more complete detail, outlining the history of past work and the geological setting as well as describing the workings and the mineral deposits exposed in them. Some notes deal with areas rather than with a single property.

The work of the branches of the Department is outlined briefly in the section on Departmental Work. This section is followed by notes dealing briefly with the work of the British Columbia or Federal Government services of particular interest to the mineral industry of British Columbia. Information concerning mine operations and some of the activities of the Inspection Branch of the Department of Mines is contained in the section on Inspection of Lode Mines, Placer Mines, and Quarries, early in the section on Coal and in the section on Inspection of Electrical Equipment and Installations at Mines and Quarries.

The section on Statistics begins with an outline of current and past practice in arriving at quantities and calculating the value of the various products.

Review of the Mineral Industry in British Columbia, 1955

By Hartley Sargent

The mineral production of British Columbia in 1955 had a value of $174,710,606, exceeded only by the record value of $175,613,693 reached in 1951. The 1955 value exceeds that of 1954 by $21,000,000, reflecting higher prices for all the principal metals, a substantial increase in the output of zinc, and increased values for miscellaneous metals, industrial minerals, and structural materials. The value for fuel is somewhat less than in 1954; it is derived dominantly from coal but includes production of some natural gas.

The mint price for newly mined Canadian gold* was higher in 1955 than in 1954 because the United States dollar was at a lesser discount. The prices for the other principal metals were greater than in 1954 by the following approximate percentages: Silver, 5.9; lead, 9.1; zinc, 15.4; and copper, 31.5. The 1955 copper price was an all-time record. The prices for silver, lead, and zinc, although higher than in 1954, were well below the 1951 prices.

The quantities of gold, silver, copper, and lead were less than in 1954, but the quantity of zinc was materially greater than in 1954 or any previous year. The combination of quantity and price gave values for gold and silver that were somewhat below the 1954 values, and a value for lead about equal to the 1954 value, whereas copper and zinc greatly exceeded their 1954 values but did not reach the records set for copper in 1929 and for zinc in 1951. The values for precious metals were below those of recent years, but the increased values for zinc and copper offset this decline and gave the principal metals group a value well above that reached in any previous year except 1951 and 1952.

Most of the increase in output of zinc was zinc recovered by " fuming " current and reclaimed slags at the Trail smelter, which is in the tables as " not assigned " (*see* Table VIIB). Next in volume was the increase from the Nelson Mining Division, reflecting the beginning of production from the H.B. mine in May, the resumption of production at the Reeves MacDonald mine in October, and substantially increased production from the Jersey mine. Increased output from the Golden, Revelstoke, and Slocan Mining Divisions stemmed mainly from the increased output of the Mineral King, Spider, and Bluebell mines. Along with the increases in zinc from the mines named went increased production of lead and silver that partly offset the decreased output of these metals from the Fort Steele Mining Division.

The year witnessed the closing of the historic Nickel Plate mine at Hedley. In two periods, 1904 to 1931 and 1931 to 1955, this mine produced gold valued at more than $37,000,000; that is, about 9 per cent of the British Columbia lode-gold production to date.

The value of miscellaneous metals in 1955 was higher than in 1954 but lower than in 1953. The 1955 figure reflects record production of cadmium and indium, both recovered as by-products at the Trail smelter. Antimony also had a value materially higher than in 1954, but bismuth, iron, tin, and tungsten were somewhat lower than in 1954. The value for the group, although greater than in 1954, was less than in 1953, when the iron output was 50 per cent higher and was valued at more than twice the 1955 figure. The increases in sales of by-product metals recovered at the Trail smelter are noteworthy. Increases were recorded for antimony (as antimonial lead), cadmium, and indium. Indium production was 104,744 ounces, valued at $232,389 in 1955, the first

* Prices are averages for the year, in Canadian funds, unless otherwise stated. The prices for the principal metals and coal are listed on page A 16.

year that production has exceeded 7,000 ounces or a value of $15,000. This metal has very specialized uses, including use in superior bearings.

In the lode-mining field, exploration interest was focused most strongly on copper, and in addition to the continued exploration campaign on the Granduc property there was much activity elsewhere, including Vancouver Island, the Highland Valley-Kamloops-Nicola area, the old Boundary camp, and the Hope-Princeton area. Exploration and development of silver-lead-zinc deposits was at a satisfying level and produced encouraging results at Ainsworth and Silverton, at properties in the Golden Mining Division, and at the Highland-Bell mine at Beaverdell.

Dividends from lode-metal operations amounted to $34,823,111. Two lode-mining companies, Canadian Exploration Limited and Yale Lead & Zinc Mines Limited, distributed dividends for the first time.

The 1955 value for industrial minerals was higher than for any previous year because of record output of asbestos, sulphur, and barite. Structural materials also exceeded their value for any previous year, reflecting increases in most items, notably common brick, firebrick and blocks, cement, and lime and limestone. The materially increased output of common brick is in noteworthy contrast to that of the preceding few years, in which it might appear that concrete brick and clay brick imported from Alberta had largely replaced British Columbia common brick.

The output of coal was greater than in 1954, but reduced output of higher-priced coal from Vancouver Island and Bulkley Valley and increased output of low-priced coal from the Princeton-Merritt area resulted in a lower average price per ton in 1955, even though three-quarters of the output came from the Crowsnest Pass area, where the price was unchanged.

Statistics for the commercial production of natural gas in British Columbia are published for the first time in this Report. The production reported is of natural gas sold in Fort St. John, where commercial distribution was started in 1954.

Search for oil and gas continued to be pressed by many companies that undertook geological and geophysical work and the drilling of wells.

Most of the drilling was done in northeastern British Columbia. Drilling operations in that part of the Province extended from the Lone Mountain area to the Fort Nelson area, although most wells were located north of the Peace River in the Fort St. John district.

Texaco N.F.A. Boundary Lake 1, near the British Columbia-Alberta boundary north of the Peace River, was completed in February, 1955, as the first commercial oil well in British Columbia.

The successful completion of gas wells indicated the discovery of six new gas areas, namely, Cameron River, Milligan Creek, Paddy, Doig River, Bougie Creek, and North Blueberry.

Construction of a pipe-line to bring natural gas from northeastern British Columbia and near-by Alberta to the major British Columbia markets has been contingent upon finding a market for a substantial volume of gas in northwestern United States. In the latter part of 1955, after a long period of negotiations, the United States Federal Power Commission approved importation into the northwestern United States of 300 billion cubic feet of natural gas daily. The pipe-line proposal has been under study for several years, and construction was started before the end of 1955 on building a 650-mile 30-inch pipe-line from Dawson Creek to the Vancouver area for Westcoast Transmission Company Limited. Westcoast is a Canadian company with head office in Calgary. Completion of the pipe-line is expected in 1957.

Construction of the pipe-line with its pumping stations, and with plants for removing sulphur and liquid fractions, will be a tremendous undertaking. Assurance of market for gas will undoubtedly result in an intensified exploration programme in the northeastern part of the Province.

The average number employed throughout 1955 in placer, lode, coal, industrial-mineral, and structural-material mining was 14,102. Major expenditures by those branches of the industry included: Salaries and wages, $50,892,369; fuel and electricity, $5,401,548; process supplies, $24,598,773; Federal taxes, $18,591,258; Provincial taxes, $4,476,066; municipal and other taxes, $907,645; levies for workmen's compensation (including silicosis), unemployment insurance, and other items, $1,647,642. Dividends amounted to $35,071,583. The lode-mining industry spent $30,696,044 in freight and treatment charges on ores and concentrates. Expenditure in exploration for petroleum and natural gas in 1955 was $8,529,964.

Statistics

The statistics of the mineral industry are collected and compiled and the statistical tables for this Report are prepared by the Bureau of Economics and Statistics, Department of Trade and Industry.

In the 1951 Report, extensive rearrangements of tables and of their order were made. The tables in the present Report closely parallel those presented in Reports for years preceding 1951, but additional details have been incorporated, and the present order is considered to make more apparent the relationship between summary tables and the tables giving the details summarized.

METHOD OF COMPUTING PRODUCTION

The tables of statistics recording the mineral production of the Province for each year are compiled from certified returns made by the operators, augmented by some data obtained from the Royal Canadian Mint (Assay Office) and from the operators of customs smelters. The value of each mineral product, in Canadian funds, is calculated at the average price for the year (*see* p. A 16). The quantities of metals are net after making deductions for losses in smelting and refining.

METALS

Prior to 1925 the average prices for gold and copper are true average prices, but, as a means of correcting for losses in smelting and refining, the prices of other metals were taken at the following percentages of the year's average price for the metal: Silver, 95 per cent; lead, 90 per cent; and zinc, 85 per cent. For 1925 and subsequent years the value has been calculated using the true average price and the net metal contents, in accordance with the procedures adopted by the Dominion Bureau of Statistics and the co-operating Provincial Departments of Mines.

Beginning with the Annual Report for 1948, production figures for individual lode-mining operations are the assay contents of the products shipped (ore, concentrates, or bullion), no deductions being made for losses in smelting and refining. In previous Annual Reports the production figures given for individual properties are net, after deductions for smelting and refining losses.

Placer Gold

The data on placer-gold production were very largely obtained from the Gold Commissioners until 1925. The value of placer gold in dollars is now obtained from returns received annually from the operators. At the old standard price, $20.67 per ounce of fine gold, $17 was regarded as a close approximation of the average value per ounce of crude placer gold produced in British Columbia. Dividing the production reported in dollars by 17 gave the equivalent in crude ounces. The average value $17 per ounce is equivalent to a fineness of 822½. Beginning with 1932 the average value per crude ounce has been based on the same fineness but has recognized the varying price of gold. The average price per ounce of crude placer gold for the year is listed on page A 16.

Lode Metals, Gross and Net Contents

The gross contents are the gold and silver contents of bullion and for ores and concentrates the total assay contents, obtained by multiplying the assay by the weight. The quantities for gold, silver, copper, lead, and zinc in Table XV and in "Notes on Metal Mines" are gross.

Calculations of the value of production are based on the total assay content for gold and on net content for the other principal metals. These are: in lead ores and

concentrates and zinc concentrates, for silver 98 per cent, lead 95 per cent, and zinc 85 per cent of the total assay content; and in copper concentrates, 95 per cent of the silver and the total assay content of copper less 10 pounds per ton of concentrates. Quantities for silver, lead, zinc, and copper in Tables I to VIII, inclusive, are net.

Average Metal Prices

In the interests of uniformity the Statistical Bureaux of the Provinces and the Dominion Bureau of Statistics use the same average metal prices in valuing mineral production. Up to and including the year 1939 the prices used in evaluating metal and mineral production were:—

Gold and silver: The average United States price for the year, as quoted in the Engineering and Mining Journal, converted into Canadian funds at the average exchange rate.

Copper, lead, and zinc: For lead and zinc, the average London Metal Market prices for the year converted into Canadian funds at the average exchange rate; for copper, until 1932 the New York price for copper was used, thereafter the average London Metal Market price was used.

Suspension of trading on the London Metal Exchange in September, 1939, and the controls of metals during the war years necessitated changes from the procedures which had been followed.

The method of arriving at the price for gold continued unchanged, but the prices for the metals controlled were those set by the Canadian Metals Controller. In 1945 the controls were largely removed from sales but not from prices. Control of metal prices ended on June 6th, 1947. For 1945 and subsequent years the prices are those computed by the Dominion Bureau of Statistics, using information supplied by the principal Canadian refiners of silver and the base metals.

In the period 1945–47 the prices received for silver, lead, and zinc sold for use in Canada were substantially less than the prices received for these metals exported to the United States. The prices for silver in 1945 and 1946 and for copper, lead, and zinc in 1946 and 1947 are weighted averages, taking into consideration sales in Canada at the ceiling prices and sales abroad at New York prices converted into Canadian funds.

Prices are now arrived at by the methods as given in the footnotes to table of average prices on page A 16.

FUEL

Coal

In 1926 a change was made in computing coal and coke statistics. The practice in former years had been to list as coke production only the coke made in bee-hive ovens, the coal used in making it not being listed; coke made in by-product ovens was not listed as coke, but the coal used in making this coke was credited as coal production. The result was that both the coal and the coke production figures were incomplete. Starting with the 1926 Annual Report, the standard practice of the Bureau of Statistics, Ottawa, was adopted. This consists of crediting all coal produced, including that used in making coke, as primary mine production. Coke-making is considered a manufacturing industry. As the data are of interest to the mining industry, Table X is included in the Report to show the total coke produced in the Province, together with by-products, and the values given by the producers. The pre-1926 data have now been reworked and brought into conformity with current practice. Table IXA lists the full mine output (gross) produced and its net value, and these figures are incorporated in Table I, in the total mine production for the Province. Table X gives the complete data for coke, gas, and by-products manufacture for the period 1895 to 1925, and for each year subsequent to 1925.

Up to and including the year 1947, production was recorded in long tons (2,240 pounds). Beginning in 1948, production is given in short tons (2,000 pounds). The quantity of coal produced in the preceding years has been recalculated in short tons.

The average price for coal, listed year by year (*see* p. A 16), is the total value divided by the quantity. Up to and including 1945, the quantity is the gross mine output; for 1946 and subsequent years, the quantity is the quantity sold and used. For 1946 and subsequent years, the value (Tables I, III, VIIA, IXA, IXB, and IXC) is the amount realized from sales of coal, at colliery loading points, plus the colliery valuation of coal used under companies' boilers and in making coke. For 1946 and subsequent years the quantity sold and used is shown in Table IXC. "Use" includes coal used under company stationary and locomotive boilers, and used in making coke. Washery loss and changes in stocks, year by year, are shown in the table "Collieries of British Columbia, Production and Distribution by Collieries and by Districts," page 132 of this Report.

Natural Gas

Commercial production of natural gas began in 1954. The production shown in Tables I, III, VIIA, and VIIIA is gas sold in Fort St. John in 1954 and 1955. The figures are compiled from the Crown royalty statements filed monthly with the Department of Mines by the producer. The quantity is reported as thousands of cubic feet at standard conditions (14.4 pounds per square inch pressure, 60° F. temperature).

AVERAGE PRICES USED IN VALUING PROVINCIAL PRODUCTION OF GOLD, SILVER, COPPER, LEAD, ZINC, AND COAL

Year	Gold,[1] Crude, Oz.	Gold, Fine, Oz.	Silver, Fine, Oz.	Copper, Lb.	Lead, Lb.	Zinc, Lb.	Coal, Short Ton
	$	$	Cents	Cents	Cents	Cents	$
1901	17.00	20.67	56.002 N.Y.	16.11 N.Y.	2.577 N.Y.	.....	2.679
1902	.....	.....	49.55 ,,	11.70 ,,	3.66 ,,	.....	.....
1903	.....	.....	50.78 ,,	13.24 ,,	3.81 ,,	.....	.....
1904	.....	.....	53.36 ,,	12.82 ,,	3.88 ,,	.....	.....
1905	.....	.....	51.33 ,,	15.59 ,,	4.24 ,,	.....	.....
1906	.....	.....	63.45 ,,	19.28 ,,	4.81 ,,	.....	.....
1907	.....	.....	62.06 ,,	20.00 ,,	4.80 ,,	.....	3.125
1908	.....	.....	50.22 ,,	13.20 ,,	3.78 ,,	.....	.....
1909	.....	.....	48.93 ,,	12.98 ,,	3.85 ,,	.....	.....
1910	.....	.....	50.812 ,,	12.738 ,,	4.00 ,,	4.60 E. St. L.	.....
1911	.....	.....	50.64 ,,	12.38 ,,	3.98 ,,	4.90 ,,	.....
1912	.....	.....	57.79 ,,	16.341 ,,	4.024 ,,	5.90 ,,	.....
1913	.....	.....	56.80 ,,	15.27 ,,	3.93 ,,	4.80 ,,	.....
1914	.....	.....	52.10 ,,	13.60 ,,	3.50 ,,	4.40 ,,	.....
1915	.....	.....	47.20 ,,	17.28 ,,	4.17 ,,	11.25 ,,	.....
1916	.....	.....	62.38 ,,	27.202 ,,	6.172 ,,	10.88 ,,	.....
1917	.....	.....	77.35 ,,	27.18 ,,	7.91 ,,	7.566 ,,	.....
1918	.....	.....	91.93 ,,	24.63 ,,	6.67 ,,	6.94 ,,	4.464
1919	.....	.....	105.57 ,,	18.70 ,,	5.19 ,,	6.24 ,,	.....
1920	.....	.....	95.80 ,,	17.45 ,,	7.16 ,,	6.52 ,,	.....
1921	.....	.....	59.52 ,,	12.50 ,,	4.09 ,,	3.95 ,,	.....
1922	.....	.....	64.14 ,,	13.38 ,,	5.16 ,,	4.86 ,,	.....
1923	.....	.....	61.63 ,,	14.42 ,,	6.54 ,,	5.62 ,,	.....
1924	.....	.....	63.442 ,,	13.02 ,,	7.287 ,,	5.39 ,,	.....
1925	.....	.....	69.065 ,,	14.042 ,,	7.848 Lond.	7.892 Lond.	.....
1926	.....	.....	62.107 ,,	13.795 ,,	6.751 ,,	7.409 ,,	.....
1927	.....	.....	56.37 ,,	12.92 ,,	5.256 ,,	6.194 ,,	.....
1928	.....	.....	58.176 ,,	14.570 ,,	4.575 ,,	5.493 ,,	.....
1929	.....	.....	52.993 ,,	18.107 ,,	5.050 ,,	5.385 ,,	.....
1930	.....	.....	38.154 ,,	12.982 ,,	3.927 ,,	3.599 ,,	.....
1931	.....	.....	28.700 ,,	8.116 ,,	2.710 ,,	2.554 ,,	4.018
1932	19.30	23.47	31.671 ,,	6.380 Lond.	2.113 ,,	2.405 ,,	3.795
1933	23.02	28.60	37.832 ,,	7.454 ,,	2.391 ,,	3.210 ,,	.....
1934	28.37	34.50	47.461 ,,	7.419 ,,	2.436 ,,	3.044 ,,	.....
1935	28.94	35.19	64.790 ,,	7.795 ,,	3.133 ,,	3.099 ,,	.....
1936	28.81	35.03	45.127 ,,	9.477 ,,	3.913 ,,	3.315 ,,	.....
1937	28.77	34.99	44.881 ,,	13.078 ,,	5.110 ,,	4.902 ,,	.....
1938	28.93	35.18	43.477 ,,	9.972 ,,	3.344 ,,	3.073 ,,	.....
1939	29.72	36.14	40.488 ,,	10.092 ,,	3.169 ,,	3.069 ,,	.....
1940	31.66	38.50	38.249 ,,	10.086 ,,	3.362 ,,	3.411 ,,	.....
1941	31.66	38.50	38.261 ,,	10.086 ,,	3.362 ,,	3.411 ,,	.....
1942	31.66	38.50	41.166 ,,	10.086 ,,	3.362 ,,	3.411 ,,	.....
1943	31.66	38.50	45.254 ,,	11.75 ,,	3.754 ,,	4.000 ,,	.....
1944	31.66	38.50	43.000 ,,	12.000 ,,	4.500 ,,	4.300 ,,	.....
1945	31.66	38.50	47.000 ,,	12.550 ,,	5.000 ,,	6.440 ,,	.....
1946	30.22	36.75	83.650 ,,	12.80 ,,	6.750 ,,	7.810 ,,	4.68
1947	28.78	35.00	72.000 ,,	20.39 ,,	13.670 ,,	11.230 ,,	5.12
1948	28.78	35.00	75.000 Mont.	22.35 U.S.	18.040 ,,	13.930 ,,	6.09
1949	29.60	36.00	74.250 U.S.	19.973 ,,	15.800 U.S.	13.247 U.S.	6.51
1950	31.29	38.05	80.635 ,,	23.428 ,,	14.454 ,,	15.075 ,,	6.43
1951	30.30	36.85	94.55 ,,	27.70 ,,	18.4 ,,	19.9 ,,	6.46
1952	28.18	34.27	83.157 ,,	31.079 ,,	16.121 ,,	15.874 ,,	6.94
1953	28.31	34.42	83.774 ,,	30.333 ,,	13.265 ,,	10.675 ,,	6.88
1954	27.52	34.07	82.982 ,,	29.112 ,,	13.680 ,,	10.417 ,,	7.00
1955	**28.39**	**34.52**	**87.851** ,,	**38.276** ,,	**14.926** ,,	**12.127** ,,	**6.74**

[1] Unrefined placer gold, average price per ounce, is taken as $17 divided by $20.67 times the price of an ounce of fine gold.

Prices for fine gold are the Canadian Mint buying prices. Prices for other metals are those of the markets indicated, converted into Canadian funds. The abbreviations are: Mont.=Montreal; N.Y.=New York; Lond.=London; E. St. L. =East St. Louis; and U.S.=United States.

Prior to 1925 the prices for gold and copper are true average prices, but the prices of other metals were taken at the following percentages of the year's average price for the metal: Silver, 95 per cent; lead, 90 per cent; and zinc, 85 per cent.

For coal *see* last paragraph under "Fuel," page A 15.

The bases for the prices listed are discussed in detail on pages A 14 and A 15.

TABLE I.—TOTAL MINE PRODUCTION FOR ALL YEARS UP TO AND INCLUDING 1955

	Total Quantity	Total Value	Quantity, 1955	Value, 1955
Gold—placer ..... crude, oz.	5,193,495	$95,764,719	7,666	$217,614
„ lode ..... fine, oz.	14,721,151	421,095,172	242,477	8,370,306
Silver ..... oz.	386,292,041	225,352,853	7,902,145	6,942,113
Copper ..... lb.	2,835,394,382	450,904,188	44,238,031	16,932,549
Lead ..... lb.	11,719,223,118	795,756,879	302,567,640	45,161,245
Zinc ..... lb.	8,999,949,689	672,156,466	429,198,565	52,048,909
Miscellaneous metals[1]	.....	102,817,144	.....	12,935,887
Industrial minerals[2]	.....	52,538,931	.....	7,798,098
Structural materials[3]	.....	202,482,770	.....	15,299,254
Coal ..... tons	137,688,559[4]	523,521,783	1,332,874[4]	8,986,501
Natural gas ..... M c.f.	229,534	24,675	168,651	18,130
Totals	.....	$3,542,415,580	.....	$174,710,606

[1] For individual miscellaneous metals, *see* Tables III and VIIIc, pages A 18 and A 31.
[2] For individual industrial minerals, including sulphur, *see* Tables III and VIIIb, pages A 18 and A 33.
[3] For individual structural materials, *see* Tables III and VIIIe, pages A 18 and A 35.
[4] Total quantity is gross mine output; it includes material discarded in picking and washing. The quantity shown for 1955 is that sold and used (*see also* Table IXc).

TABLE II.—PRODUCTION FOR EACH YEAR FROM 1836 TO 1955, INCLUSIVE

1836–95 (incl.)	$95,355,010	1926	$67,188,842
1896	7,507,956	1927	60,729,358
1897	10,455,268	1928	65,372,583
1898	10,906,861	1929	68,245,443
1899	12,429,707	1930	55,391,993
1900	16,344,751	1931	34,883,181
1901	19,671,572	1932	28,798,406
1902	17,486,550	1933	32,602,672
1903	17,495,954	1934	42,305,297
1904	18,977,359	1935	48,821,239
1905	22,461,325	1936	54,081,967
1906	24,980,546	1937	74,475,902
1907	25,882,560	1938	64,485,551
1908	23,851,277	1939	65,681,547
1909	24,443,025	1940	75,701,145
1910	26,377,066	1941	78,479,719
1911	23,499,072	1942	75,551,093
1912	32,440,800	1943	65,892,395
1913	30,296,398	1944	54,923,803
1914	26,388,825	1945	63,343,949
1915	29,447,508	1946	72,319,951
1916	42,290,462	1947	113,314,314
1917	37,010,392	1948	151,436,039
1918	41,782,474	1949	131,100,468
1919	33,296,313	1950	148,289,687
1920	35,543,084	1951	175,613,693
1921	28,066,641	1952	171,309,429
1922	35,162,843	1953	152,628,683
1923	41,304,320	1954	153,383,860
1924	48,704,604	1955	174,710,606
1925	61,492,242		
		Total	$3,542,415,580

TABLE III.—QUANTITY AND VALUE OF MINE PRODUCTS FOR YEARS 1946 TO 1955

Description	1946		1947		1948		1949		1950	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Principal Metals		$		$		$		$		$
Gold—placer, crude ..... oz.	15,729	475,361	6,969	200,585	20,332	585,200	17,886	529,524	19,134	598,717
„ lode, fine ..... oz.	117,612	4,322,241	243,282	8,514,870	286,230	10,018,050	288,396	10,382,256	283,983	10,805,553
Silver ..... oz.	6,365,761	5,324,959	5,707,691	4,109,538	6,718,122	5,038,592	7,636,053	5,669,769	9,507,225	7,666,151
Copper ..... lb.	17,500,538	2,240,070	41,783,921	8,519,741	43,025,388	9,616,174	54,856,808	10,956,550	42,212,133	9,889,458
Lead ..... lb.	347,990,146	23,489,335	306,400,709	41,884,977	332,996,351	60,072,542	263,580,549	41,645,726	307,122,803	44,391,530
Zinc ..... lb.	270,718,128	21,143,086	268,450,926	30,147,039	296,012,941	41,234,603	276,324,451	36,604,700	324,263,778	48,882,765
Totals		56,995,052		93,376,750		126,565,161		105,788,525		122,234,174
Miscellaneous Metals										
Antimony ..... lb.	642,145	96,322	1,150,463	384,255	310,062	113,173	158,288	61,020	643,540	216,229
Bismuth ..... lb.	234,020	327,628	284,357	560,183	222,000	444,000	102,913	210,972	162,616	369,138
Cadmium ..... lb.	632,539	771,698	547,248	941,266	617,226	1,126,437	665,449	1,364,170	650,540	1,535,274
Indium ..... oz.	.....	.....	.....	.....	.....	.....	689	1,550	4,952	12,132
Iron ore ..... tons	.....	.....	.....	.....	.....	.....	5,472	27,579	.....	.....
Mercury ..... lb.	.....	.....	.....	.....	679	3,735	.....	.....	.....	.....
Platinum ..... oz.	.....	.....	1	59	242	21,175	99	7,468	111	9,239
Tin ..... lb.	874,186	480,802	714,198	517,794	691,332	688,567	619,117	633,047	796,403	828,259
Tungsten (WO_3) ..... lb.	.....	.....	496,023	680,792	1,409,297	1,409,297	.....	.....	281,160	281,160
Totals		1,676,450		3,084,349		3,806,384		2,305,806		3,251,431
Industrial Minerals										
Barite ..... tons	2,728	19,000	2,875	26,650	1,632	16,317	1,314	13,145	1,440	17,284
Diatomite ..... tons	40	1,027	59	1,472	24	817	36	963	4	108
Flux (quartz, limestone) ..... tons	55,732	71,531	102,918	174,655	83,389	248,977	108,531	213,773	144,325	268,411
Granules (slate and rock) ..... tons	1,116	19,917	1,156	19,686	4,958	68,937	5,941	79,661	7,886	104,590
Gypsum and products ..... tons	40,900	318,500	67,112	523,298	77,055	546,707	98,977	616,490	92,882	620,108
Iron oxides ..... tons	427	2,135	58	464	3,386	30,472	2,752	23,301	.....	.....
Mica ..... lb.	1,616,000	23,420	1,808,000	24,240	894,000	9,494	578,000	5,675	456,000	5,533
Sodium carbonate ..... lb.	210	2,310	163	1,793	.....	.....	47	517	.....	.....
Sulphur ..... tons	126,622	1,258,576	157,161	1,503,714	144,448	1,409,156	160,435	1,546,798	143,343	1,421,806
Totals		1,716,416		2,275,972		2,330,877		2,500,323		2,437,840
Structural Materials										
Brick—common ..... No.	3,300,000	94,000	4,318,000	122,660	3,810,000	111,300	3,220,000	95,075	3,980,500	117,770
„ face, paving, sewer ..... No.	2,077,683	84,353	1,232,812	64,849	2,584,752	129,268	509,560	24,793	974,380	52,823
„ firebrick, blocks	.....	283,317	.....	389,899	.....	392,458	.....	135,391	.....	282,962
Clays ..... tons	601	8,241	11,428	9,675	5,673	32,922	6,500	22,339	6,706	32,264
Structural tile, hollow blocks	.....	105,194	.....	158,276	.....	116,513	.....	145,512	.....	191,016
Drain-tile, sewer-pipe, flue-linings	.....	263,864	.....	361,975	.....	597,541	.....	265,098	.....	428,418
Pottery—glazed or unglazed	.....	2,811	.....	3,476	.....	5,138	.....	5,176	.....	5,860
Other clay products	.....	3,611	.....	9,332	.....	9,611	.....	9,676	.....	11,335
Cement	.....	1,739,966	.....	1,896,772	.....	2,441,304	.....	3,029,425	.....	3,088,296
Lime and limestone ..... tons	159,493	642,912	151,671	714,126	209,453	1,177,632	179,400	1,295,087	221,454	1,133,776
Rubble, riprap, crushed rock ..... *tons*	154,164	158,446	222,044	216,873	896,780	839,780	1,112,272	916,841	1,164,049	990,257
Sand and gravel	.....	1,713,138	.....	1,828,919	.....	3,060,535	.....	3,967,132	.....	3,723,487
Stone—building ..... tons	4,354	99,710	19,835	119,971	3,579	54,220	2,287	44,345	26,758	188,675
Totals		5,199,563		5,896,803		8,968,222		9,955,890		10,246,939
Fuel										
Coal[1] ..... tons	1,284,904	6,732,470	1,514,598	8,680,440	1,604,480	9,765,395	1,621,268	10,549,924	1,574,006	10,119,303
Provincial totals		72,319,951		113,314,314		151,436,039		131,100,468		148,289,687

TABLE III.—QUANTITY AND VALUE OF MINE PRODUCTS FOR YEARS 1946 TO 1955—*Continued*

Description	1951		1952		1953		1954		1955	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Principal Metals		$		$		$		$		$
Gold—placer, crude ..... oz.	23,691	717,911	17,554	494,756	14,245	403,230	8,684	238,967	7,666	217,614
„ lode, fine ..... oz.	261,274	9,627,947	251,393	8,615,238	253,553	8,727,294	258,388	8,803,279	242,477	8,370,306
Silver ..... oz.	8,215,884	7,768,118	8,796,720	7,315,088	8,376,953	7,017,709	9,825,153	8,153,108	7,902,145	6,942,113
Copper ..... lb.	43,249,658	11,980,155	42,005,512	13,054,893	49,021,013	14,869,544	50,150,087	14,599,693	44,328,031	16,932,549
Lead ..... lb.	273,456,604	50,316,015	284,949,396	45,936,692	296,559,781	39,338,655	332,474,456	45,482,505	302,567,640	45,161,245
Zinc ..... lb.	333,910,764	66,448,242	372,871,717	59,189,656	378,345,159	40,388,346	334,124,560	34,805,755	429,198,565	52,048,909
Totals		146,858,388		134,606,323		110,744,778		112,083,307		129,672,736
Miscellaneous Metals										
Antimony ..... lb.	1,310,836	622,647	2,333,239	1,028,025	1,551,043	570,474	1,302,333	382,104	2,021,721	667,776
Bismuth ..... lb.	191,471	451,872	142,246	312,941	71,298	157,569	225,351	493,519	160,767	356,903
Cadmium ..... lb.	1,164,933	3,122,021	726,172	1,561,270	787,158	1,550,701	680,734	1,123,211	1,593,591	2,677,233
Indium ..... oz.	582	1,368	404	889	6,752	14,922	477	1,281	104,774	232,389
Iron ore ..... tons	113,535	790,000	900,481	5,474,924	991,248	6,763,105	535,746	3,733,891	610,930	3,228,756
Mercury ..... lb.	.....	.....	.....	.....	.....	.....	.....	.....	75	250
Platinum ..... oz.	22	2,085	2	176	.....	.....	4	408	.....	.....
Tin ..... lb.	346,718	495,807	212,113	250,293	1,092,228	581,746	587,528	280,437	391,228	311,613
Tungsten (WO_3) ..... lb.	.....	.....	1,434,640	4,565,024	2,168,977	5,950,323	2,206,443	5,851,558	1,914,000	5,460,967
Totals		5,485,800		13,193,542		15,588,840		11,866,409		12,935,887
Industrial Minerals										
Asbestos	.....	.....	.....	23,000	.....	988,716	.....	2,920,751	.....	4,265,971
Barite ..... tons	1,248	16,224	848	13,408	3,560	52,845	5,056	115,337	9,465	238,825
Diatomite ..... tons	8	223	12	240	.....	.....	.....	.....	14	280
Flux (quartz, limestone) ..... tons	144,235	292,100	55,588	141,478	37,358	110,698	39,897	40,804	111,759	208,198
Granules (slate and rock) ..... tons	5,727	73,767	1,610	21,026	4,620	59,321	4,541	65,507	6,355	73,858
Gypsum and products ..... tons	124,729	263,072	91,112	235,453	172,665	387,655	175,480	421,734	149,719	383,934
Mica ..... lb.	606,000	7,462	314,000	3,001	604,000	11,338	284,000	5,326	505,300	2,861
Perlite ..... tons	.....	.....	.....	.....	1,112	11,120	.....	.....	.....	.....
Sulphur ..... tons	194,874	1,840,992	182,607	1,745,258	151,954	1,590,055	219,999	2,308,422	216,520	2,624,171
Totals		2,493,840		2,182,864		3,211,748		5,877,881		7,798,098
Structural Materials										
Brick—common ..... No.	1,353,000	41,820	830,815	28,248	1,382,883	51,381	1,289,911	35,550	4,853,940	232,139
„ face, paving, sewer ..... No.	3,127,888	153,575	2,566,540	121,254	4,307,894	226,459	5,651,262	316,676	3,901,866	248,913
„ firebrick, blocks	.....	380,742	.....	435,681	.....	426,783	.....	372,528	.....	578,578
Clays ..... tons	14,786	60,255	11,483	51,797	5,226	31,990	6,609	36,425	8,033	46,757
Structural tile, hollow blocks	.....	171,481	.....	60,273	.....	123,469	.....	122,903	.....	114,460
Drain-tile, sewer-pipe, flue-linings	.....	410,206	.....	468,110	.....	627,097	.....	753,297	.....	801,019
Pottery—glazed or unglazed	.....	4,695	.....	6,536	.....	30,012	.....	31,081	.....	38,035
Other clay products	.....	10,393	.....	11,296	.....	19,267	.....	32,697	.....	55,514
Cement	.....	3,311,439	.....	3,603,273	.....	5,071,260	.....	4,935,298	.....	5,474,875
Lime and limestone ..... tons	241,723	1,251,327	321,710	1,552,772	338,005	1,357,958	317,976	1,555,002	318,152	1,711,348
Rubble, riprap, crushed rock ..... tons	972,178	1,145,072	739,504	982,792	770,415	1,122,516	920,707	1,253,856	890,613	962,272
Sand and gravel	.....	3,355,693	.....	3,839,965	.....	4,388,594	.....	4,850,469	.....	4,886,890
Stone—building ..... tons	4,837	309,350	122,308	434,964	2,611	78,252	3,055	99,392	26,079	148,454
Totals		10,606,048		11,596,961		13,555,038		14,395,174		15,299,254
Fuel										
Coal[1] ..... tons	1,573,572	10,169,617	1,402,347	9,729,739	1,384,138	9,528,279	1,308,284	9,154,544	1,332,874	8,986,501
Natural gas ..... M c.f.	.....	.....	.....	.....	.....	.....	60,883	6,545	168,651	18,130
Provincial totals		175,613,693		171,309,429		152,628,683		153,383,860		174,710,606

[1] The quantity of coal is that sold and used.

TABLE IV.—MINERAL PRODUCTION VALUE, 1895–1955

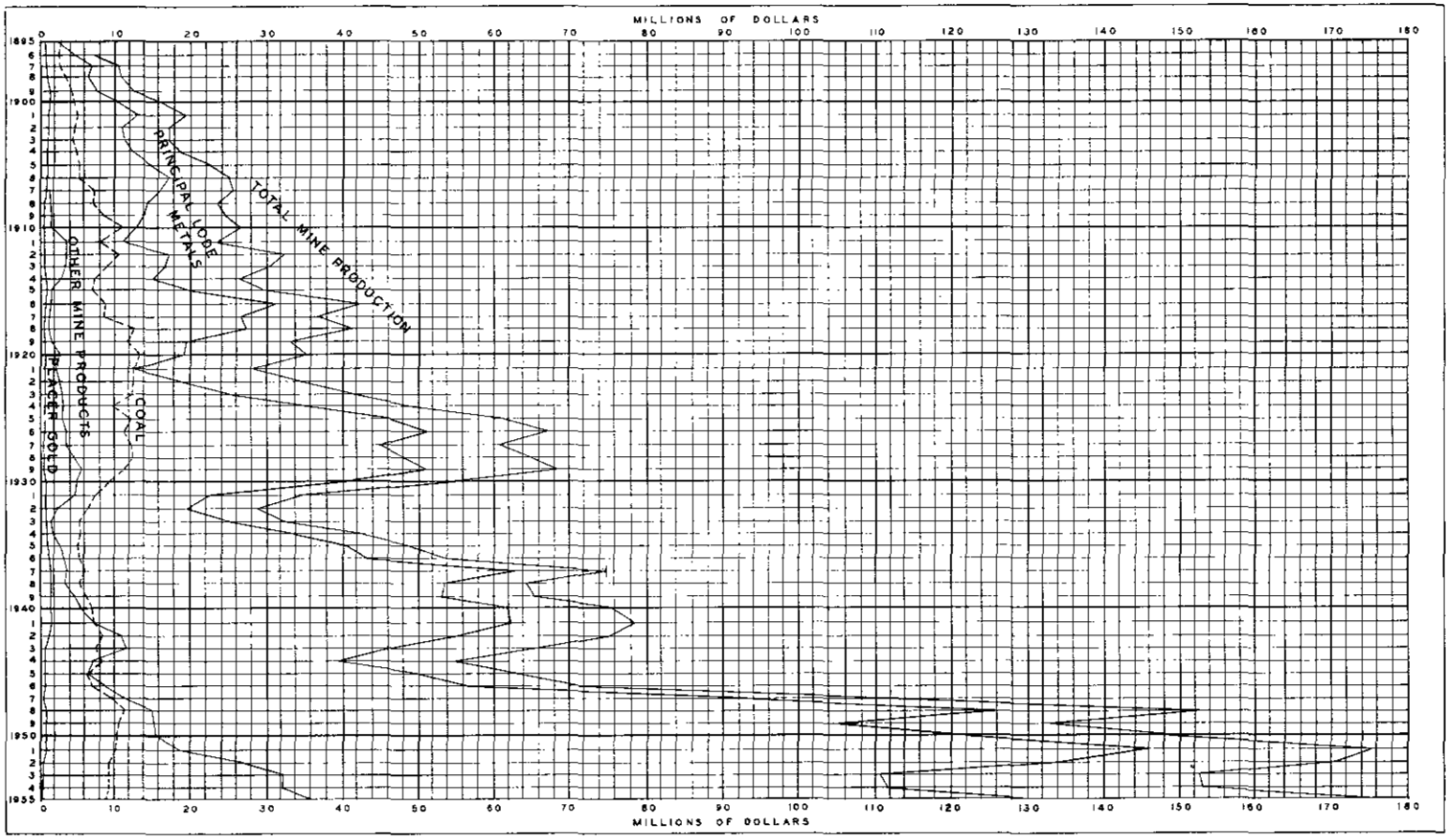


TABLE V.—PRINCIPAL LODE METALS, PRODUCTION, 1913–55

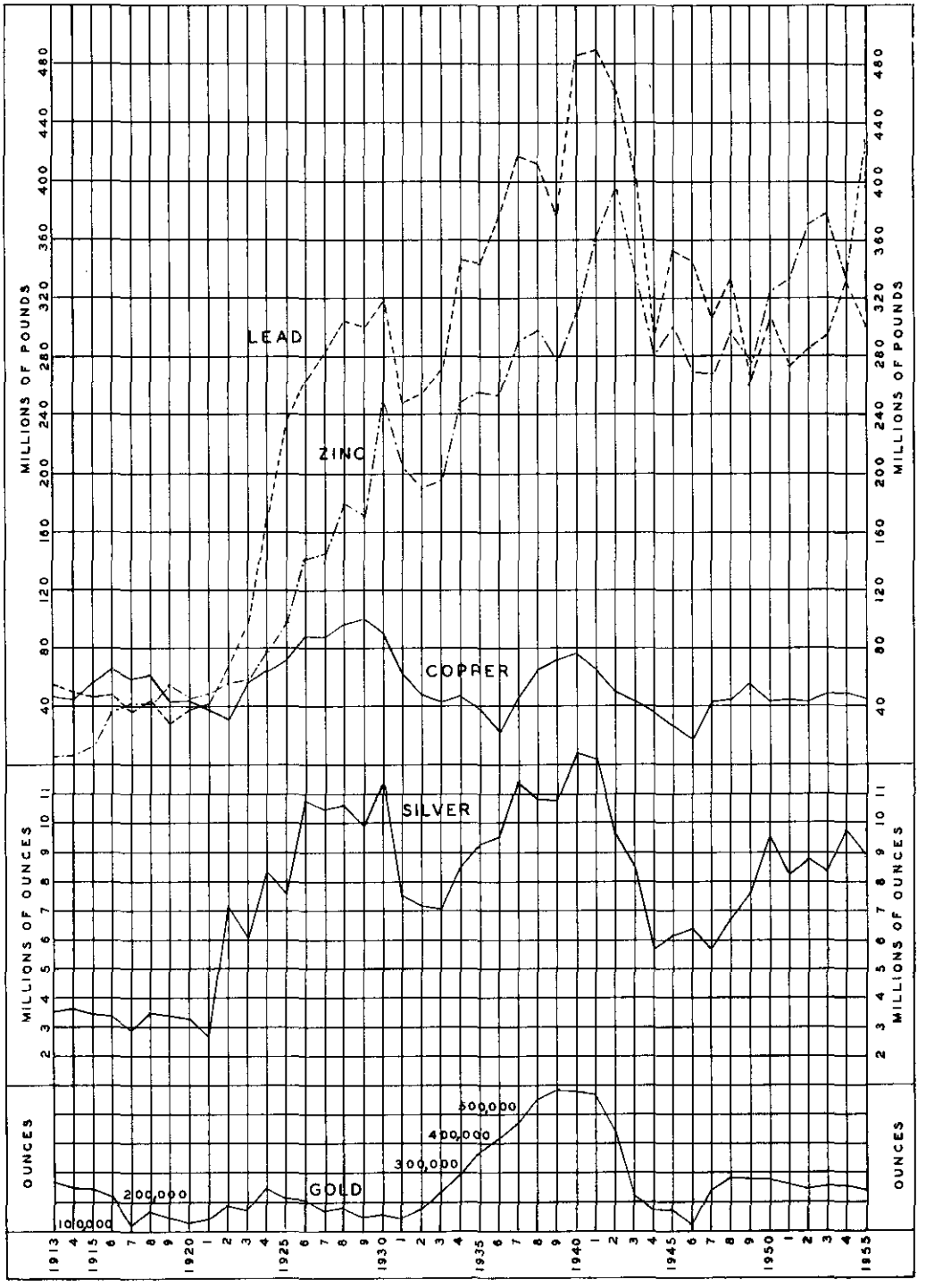


TABLE VI.—PRODUCTION OF PRINCIPAL METALS, 1858–1955

Year	Placer Gold		Gold		Silver		Copper		Lead		Zinc		Total Value
	Quantity[1]	Value	Quantity[2]	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
	Oz.	$	Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$	$
1858–86, incl.	3,105,775	52,798,364	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52,798,364
1887	40,810	693,709	.....	.....	17,690	17,331	.....	.....	204,800	9,216	.....	.....	720,256
1888	36,280	616,731	.....	.....	79,780	75,000	.....	.....	674,500	29,813	.....	.....	721,544
1889	34,640	588,923	.....	.....	53,192	47,873	.....	.....	165,100	6,498	.....	.....	643,294
1890	29,080	494,436	.....	.....	70,427	73,948	.....	.....	.....	.....	.....	.....	568,384
1891	25,280	429,811	.....	.....	4,500	4,000	.....	.....	.....	.....	.....	.....	433,811
1892	23,500	399,526	.....	.....	77,160	66,935	.....	.....	808,420	33,064	.....	.....	499,525
1893	20,950	356,131	1,170	23,404	227,000	195,000	.....	.....	2,135,023	78,996	.....	.....	653,531
1894	23,850	405,516	6,252	125,014	746,379	470,219	324,680	16,234	5,662,523	169,875	.....	.....	1,186,858
1895	28,330	481,683	39,270	785,400	1,496,522	977,229	952,840	47,642	16,475,464	532,255	.....	.....	2,824,209
1896	32,000	544,026	62,259	1,244,180	3,135,343	2,100,689	3,818,556	190,926	24,199,977	721,384	.....	.....	4,801,205
1897	30,210	513,520	106,141	2,122,820	5,472,971	3,272,836	5,325,180	266,258	38,841,135	1,390,517	.....	.....	7,565,951
1898	37,840	643,346	110,061	2,201,217	4,292,401	2,375,841	7,271,678	874,781	31,693,559	1,077,581	.....	.....	7,172,766
1899	79,110	1,344,900	138,315	2,857,573	2,939,413	1,663,708	7,722,591	1,351,453	21,862,436	878,870	.....	.....	8,096,504
1900	75,220	1,278,724	167,153	3,453,381	3,958,175	2,309,200	9,997,080	1,615,289	63,358,621	2,691,887	.....	.....	11,348,481
1901	57,060	970,100	210,384	4,348,605	4,396,447	2,462,008	27,603,746	4,446,963	51,582,906	2,010,260	.....	.....	14,237,936
1902	63,130	1,073,140	236,491	4,888,269	3,917,917	1,941,328	29,636,057	3,446,673	22,536,381	824,832	.....	.....	12,174,242
1903	62,380	1,060,420	232,831	4,812,616	2,996,204	1,521,472	34,359,921	4,547,535	18,089,283	689,744	.....	.....	12,631,787
1904	65,610	1,115,300	222,042	4,589,608	3,222,481	1,719,516	35,710,128	4,578,037	36,646,244	1,421,874	.....	.....	13,424,335
1905	57,020	969,300	238,660	4,933,102	3,439,417	1,971,818	37,692,251	5,876,222	56,580,703	2,399,022	.....	.....	16,149,464
1906	55,790	948,400	224,027	4,630,639	2,990,262	1,897,320	42,990,488	8,288,565	52,408,217	2,667,578	.....	.....	18,432,502
1907	48,710	828,000	196,179	4,055,020	2,745,448	1,703,825	40,832,720	8,166,544	47,738,703	2,291,458	.....	.....	17,044,847
1908	38,060	647,000	255,582	5,282,880	2,631,389	1,321,483	47,274,614	6,240,249	43,195,733	1,632,799	.....	.....	15,124,411
1909	28,060	477,000	238,224	4,924,090	2,532,742	1,239,270	45,597,245	5,918,522	44,396,346	1,709,259	8,500,000	400,000	14,668,141
1910	31,760	540,000	267,701	5,533,380	2,450,241	1,245,016	38,243,934	4,871,512	34,658,746	1,386,350	4,184,192	192,473	13,768,731
1911	25,060	426,000	228,617	4,725,513	1,892,364	958,293	36,927,656	4,571,644	26,872,397	1,069,521	2,634,544	129,092	11,880,063
1912	32,680	555,500	257,496	5,322,442	3,132,108	1,810,045	51,456,537	8,408,513	44,871,454	1,805,627	5,358,280	316,139	18,218,266
1913	30,000	510,000	272,254	5,627,490	3,465,856	1,968,606	46,460,305	7,094,489	55,364,677	2,175,832	6,758,768	324,421	17,700,838
1914	33,240	565,000	247,170	5,109,004	3,602,180	1,876,736	45,009,699	6,121,319	50,625,048	1,771,877	7,866,467	346,125	15,790,061
1915	45,290	770,000	250,021	5,167,934	3,366,506	1,588,991	56,918,405	9,835,500	46,503,590	1,939,200	12,982,440	1,460,524	20,762,149
1916	34,150	580,500	221,932	4,587,334	3,301,923	2,059,739	65,379,364	17,784,494	48,727,516	3,007,462	37,168,980	4,043,985	32,063,514
1917	29,180	496,000	114,523	2,367,190	2,929,216	2,265,749	59,007,565	16,038,256	37,307,465	2,951,020	41,848,513	3,166,259	27,284,474
1918	18,820	320,000	164,674	3,403,812	3,498,172	3,215,870	61,483,754	15,143,449	43,899,661	2,928,107	41,772,916	2,899,040	27,910,278
1919	16,850	286,500	152,426	3,150,645	3,403,119	3,592,673	42,459,339	7,939,896	29,475,968	1,526,855	56,737,651	3,540,429	20,036,998
1920	13,040	221,600	120,048	2,481,392	3,377,849	3,235,980	44,887,676	7,832,899	39,331,218	2,816,115	47,208,268	3,077,979	19,665,965
1921	13,720	233,200	135,663	2,804,154	2,673,389	1,591,201	39,036,993	4,879,624	41,402,288	1,693,354	49,419,372	1,952,065	13,153,598
1922	21,690	368,800	197,856	4,089,684	7,101,311	4,554,781	32,359,896	4,329,754	67,447,985	3,480,316	57,146,548	2,777,322	19,600,657
1923	24,710	420,000	179,245	3,704,994	6,032,986	3,718,129	57,720,290	8,323,266	96,663,152	6,321,770	58,343,462	3,278,903	25,767,062
1924	24,750	420,750	247,716	5,120,535	8,341,768	5,292,184	64,845,393	8,442,870	170,384,481	12,415,917	79,130,970	4,266,741	35,958,997
1925	16,476	280,092	209,719	4,335,269	7,654,844	5,286,818	72,306,432	10,153,269	237,899,199	18,670,329	98,257,099	7,754,450	46,480,227
1926	20,912	355,503	201,427	4,163,859	10,748,556	6,675,606	89,339,768	12,324,421	263,023,937	17,757,535	142,876,947	10,586,610	51,863,534

	Oz.	$	Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$	$
1927	9,191	156,247	178,001	3,679,601	10,470,185	5,902,043	89,202,871	11,525,011	282,996,423	14,874,292	145,225,443	8,996,135	45,133,329
1928	8,284	143,208	188,087	3,888,097	10,627,167	6,182,461	97,908,316	14,265,242	305,140,792	13,961,412	181,763,147	9,984,613	48,425,033
1929	6,983	118,711	145,339	3,004,419	9,918,800	5,256,270	101,483,857	18,375,682	302,346,268	15,269,696	172,096,841	9,268,792	51,293,570
1930	8,955	152,235	160,778	3,323,576	11,289,171	4,307,270	90,421,545	11,738,525	319,199,752	12,535,931	250,287,306	9,010,093	41,067,630
1931	17,176	291,992	146,039	3,018,894	7,524,320	2,247,514	63,194,299	5,289,363	248,783,508	6,742,282	205,071,247	5,237,520	22,827,565
1932	20,400	395,542	181,564	4,261,307	7,130,838	2,258,453	49,841,009	3,179,956	254,488,952	5,378,878	192,120,091	4,621,641	20,095,777
1933	23,928	562,787	223,529	6,392,929	7,006,406	2,650,720	42,608,002	3,176,341	271,606,071	6,495,731	195,963,751	6,291,416	25,569,924
1934	25,181	714,431	297,130	10,250,985	8,572,916	4,068,792	48,084,658	3,567,401	347,366,967	8,461,859	247,926,844	7,546,893	34,610,361
1935	30,929	895,058	365,244	12,852,936	9,251,544	5,994,075	38,791,127	3,023,768	344,268,444	10,785,930	256,239,446	7,940,860	41,492,627
1936	43,389	1,249,940	404,472	14,168,654	9,521,015	4,296,548	20,806,672	1,971,848	377,971,618	14,790,029	254,581,393	8,439,373	44,916,392
1937	54,153	1,558,245	460,781	16,122,727	11,308,685	5,075,451	46,057,584	6,023,411	419,118,371	21,416,949	291,192,278	14,274,245	64,471,028
1938	57,759	1,671,015	557,522	19,613,624	10,861,578	4,722,288	65,769,906	6,558,575	412,979,182	13,810,024	298,497,295	9,172,822	55,548,348
1939	49,746	1,478,492	587,180	21,221,272	10,771,585	4,361,199	73,254,679	7,392,862	378,743,763	12,002,390	278,409,102	8,544,375	55,000,590
1940	39,067	1,236,928	583,416	22,461,516	12,327,944	4,715,315	77,980,223	7,865,085	485,364,420	16,317,952	310,768,251	10,600,261	63,197,057
1941	43,775	1,385,962	571,026	21,984,501	12,175,700	4,658,545	66,435,583	6,700,693	490,185,657	16,480,042	363,302,195	12,392,238	63,601,981
1942	32,904	1,041,772	444,518	17,113,943	9,677,881	4,080,775	50,097,716	5,052,856	463,269,005	15,575,104	396,857,260	13,536,801	56,401,251
1943	14,600	462,270	224,403	8,639,516	8,526,310	3,858,496	42,307,510	4,971,132	405,285,476	15,214,417	335,137,014	13,405,481	46,551,312
1944	11,433	361,977	186,632	7,185,332	5,705,334	2,453,293	36,300,589	4,356,070	294,797,469	13,265,886	280,356,477	12,055,328	39,677,886
1945	12,589	398,591	175,373	6,751,860	6,157,307	2,893,934	25,852,366	3,244,472	353,497,689	17,674,884	301,737,902	19,431,921	50,395,662
1946	15,729	475,361	117,612	4,322,241	6,365,761	5,324,959	17,500,538	2,240,070	347,990,146	23,489,335	270,718,128	21,143,086	56,995,052
1947	6,969	200,585	243,282	8,514,870	5,707,691	4,109,538	41,783,921	8,519,741	306,400,709	41,884,977	268,450,926	30,147,039	93,376,750
1948	20,332	585,200	286,230	10,018,050	6,718,122	5,038,592	43,025,388	9,616,174	332,996,351	60,072,542	296,012,941	41,234,603	126,565,161
1949	17,886	529,524	288,396	10,382,256	7,636,053	5,669,769	54,856,808	10,956,550	263,580,549	41,645,726	276,324,451	36,604,700	105,788,525
1950	19,134	598,717	283,983	10,805,553	9,507,225	7,666,151	42,212,133	9,889,458	307,122,803	44,391,530	324,263,778	48,882,765	122,234,174
1951	23,691	717,911	261,274	9,627,947	8,215,884	7,768,118	43,249,658	11,980,155	273,456,604	50,316,015	333,910,764	66,448,242	146,858,388
1952	17,554	494,756	251,393	8,615,238	8,796,720	7,315,088	42,005,512	13,054,893	284,949,396	45,936,692	372,871,717	59,189,656	134,606,323
1953	14,245	403,230	253,553	8,727,294	8,376,953	7,017,709	49,021,013	14,869,544	296,559,781	39,338,655	378,345,159	40,388,346	110,744,778
1954	8,684	238,967	258,388	8,803,279	9,825,153	8,153,108	50,150,087	14,599,693	332,474,456	45,482,505	334,124,560	34,805,755	112,083,307
1955	7,666	217,614	242,477	8,370,306	7,902,145	6,942,113	44,238,031	16,932,549	302,567,640	45,161,245	429,198,565	52,048,909	129,672,736
Totals	5,193,495	95,764,719	14,721,151	421,095,172	386,292,041	225,352,853	2,835,394,382	450,904,188	11,719,223,118	795,756,879	8,999,949,689	672,156,466	2,661,030,277

[1] Ounces of crude gold. [2] Ounces of fine gold.

TABLE VIIA.—PRODUCTION, 1954 AND 1955, BY MINING DIVISIONS—SUMMARY

Mining Division	Year	Placer Gold		Principal Lode Metals	Miscellaneous Metals	Industrial Minerals	Structural Materials	Coal		Division Totals
		Quantity[1]	Value					Quantity	Value	
		Oz.	$	$	$	$	$	Tons	$	$
Alberni	1954	.....	.....	.....	.....	.....	89,865	.....	.....	89,865
	1955	.....	.....	.....	.....	.....	**96,470**	.....	.....	**96,470**
Atlin	1954	6,723	185,004	4,784,245	96,368	.....	2,924	.....	.....	5,068,541
	1955	**5,330**	**151,302**	**5,881,546**	**102,085**	.....	**5,662**	.....	.....	**6,140,595**
Cariboo	1954	1,564	43,038	1,644,015	.....	5,326	270,572	.....	.....	1,962,951
	1955	**2,081**	**59,073**	**1,434,841**	.....	**1,066**	**286,986**	.....	.....	**1,781,966**
Clinton	1954	10	275	68	.....	.....	48,285	.....	.....	48,628
	1955	.....	.....	.....	.....	.....	**500**	.....	.....	**500**
Fort Steele	1954	23	633	62,520,540	280,437	330,426	302,963	1,054,314	6,648,655	70,083,654
	1955	**35**	**994**	**61,847,483**	**311,613**	**697,531**	**282,493**	**1,050,149**	**6,564,544**	**69,704,658**
Golden	1954	2	55	2,941,347	36,841	319,037	41,000	.....	.....	3,338,280
	1955	.....	.....	**4,114,638**	**74,429**	**398,618**	**43,832**	.....	.....	**4,632,517**
Greenwood	1954	.....	.....	555,011	4,097	17,000	7,032	.....	.....	583,140
	1955	.....	.....	**543,890**	**3,750**	**72,333**	**28,070**	.....	.....	**648,043**
Kamloops	1954	19	523	971	.....	191,878	305,652	.....	.....	499,024
	1955	**1**	**28**	**3,539**	.....	**225,216**	**579,928**	.....	.....	**808,711**
Liard	1954	41	1,128	.....	.....	2,920,751	70,197	4,359	33,079	3,040,700[4]
	1955	**19**	**539**	.....	.....	**4,265,971**	**64,213**	**3,560**	**32,850**	**4,381,703**[4]
Lillooet	1954	118	3,247	3,825,770	.....	.....	41,607	.....	.....	3,870,624
	1955	**97**	**2,754**	**4,145,072**	**250**	.....	**26,470**	.....	.....	**4,174,546**
Nanaimo	1954	5	138	.....	3,733,891	23,804	1,626,716	182,070	2,029,099	7,413,648
	1955	.....	.....	.....	**3,228,756**	**8,654**	**1,690,189**	**174,326**	**1,769,682**	**6,697,281**
Nelson	1954	3	83	4,250,684	4,916,830	.....	89,657	.....	.....	9,257,254
	1955	.....	.....	**8,406,977**	**5,955,154**	.....	**160,971**	.....	.....	**14,523,102**
New Westminster	1954	45	1,238	.....	.....	8,505	3,129,853	.....	.....	3,139,596
	1955	**4**	**114**	.....	.....	**19,266**	**3,353,676**	.....	.....	**3,373,056**
Nicola	1954	.....	.....	.....	.....	.....	25,759	1,256	12,769	38,528
	1955	.....	.....	.....	.....	.....	**20,534**	**1,259**	**12,904**	**33,438**
Omineca	1954	54	1,486	1,850,594	1,135,894	.....	106,118	36,572	292,862	3,386,954
	1955	**35**	**994**	**554,275**	**22,695**	.....	**179,563**	**30,015**	**227,010**	**984,537**
Osoyoos	1954	.....	.....	1,738,265	.....	26,775	32,449	.....	.....	1,797,489
	1955	.....	.....	**1,332,851**	.....	**160,056**	**18,179**	.....	.....	**1,511,086**
Revelstoke	1954	1	28	1,114,455	24,132	.....	47,563	.....	.....	1,186,178
	1955	.....	.....	**1,675,888**	**36,488**	.....	**41,091**	.....	.....	**1,753,467**
Similkameen	1954	22	605	7,350,375	408	.....	85,314	29,713	138,080	7,574,782
	1955	**6**	**170**	**8,313,534**	.....	.....	**59,450**	**73,475**	**379,511**	**8,752,665**
Skeena	1954	.....	.....	1,815,016	.....	.....	199,366	.....	.....	2,014,382
	1955	**14**	**397**	**1,732,932**	.....	.....	**295,295**	.....	.....	**2,028,624**
Slocan	1954	.....	.....	7,407,227	149,703	.....	27,906	.....	.....	7,584,836
	1955	.....	.....	**9,698,464**	**187,043**	.....	**73,058**	.....	.....	**9,958,565**
Trail Creek	1954	.....	.....	11,246	.....	1,716,490	107,819	.....	.....	1,835,555
	1955	.....	.....	**8,602**	.....	**1,673,570**	**112,507**	.....	.....	**1,794,679**
Vancouver	1954	.....	.....	7,554,806	.....	317,889	1,938,238	.....	.....	9,810,933
	1955	.....	.....	**8,845,071**	**90,421**	**274,817**	**1,328,891**	.....	.....	**10,539,200**
Vernon	1954	54	1,486	5,499	.....	.....	130,179	.....	.....	137,164
	1955	**44**	**1,249**	.....	.....	.....	**322,975**	.....	.....	**324,224**
Victoria	1954	.....	.....	292,123	.....	.....	5,659,140	.....	.....	5,951,263
	1955	.....	.....	**143,541**	.....	.....	**6,228,251**	.....	.....	**6,371,792**
Not assigned	1954	.....	.....	2,182,083[2]	1,487,808[3]	.....	.....	.....	.....	3,669,891
	1955	.....	.....	**10,771,978**[2]	**2,923,203**[3]	.....	.....	.....	.....	**13,695,181**
Totals	1954	8,684	238,967	111,844,340	11,866,409	5,877,881	14,395,174	1,308,284	9,154,544	153,383,860
	1955	**7,668**	**217,614**	**129,455,122**	**12,935,887**	**7,798,098**	**15,299,254**	**1,332,874**	**8,986,501**	**174,710,606**

[1] Crude gold. [2] Includes estimated zinc and lead recovered at the Trail smelter from current and reclaimed slags and gold, silver, copper, and lead recovered from copper dross (matte) derived from British Columbia mines in several mining divisions. [3] Consists of all the antimony, bismuth, and indium recovered at the Trail smelter; part of the quantities of these metals may be derived from sources outside of British Columbia. [4] Includes value of natural gas.

NOTE.—Full details for placer gold are given in this table. The columns headed "Principal Lode Metals," "Miscellaneous Metals," "Industrial Minerals," and "Structural Materials" give the total value only, details being set forth in Tables VIIB, VIIC, VIID, and VIIE. The coal is that sold and used; details for coal are given in Tables IXB and IXC.

TABLE VIIb.—PRODUCTION, 1954 AND 1955, BY MINING DIVISIONS—PRINCIPAL LODE METALS

Division	Year	Lode Gold		Silver		Copper		Lead		Zinc	
		Quantity[1]	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
		Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$
Alberni	1954										
	1955										
Atlin	1954	20,665	704,057	592,707	491,840	4,554,340	1,325,859	4,253,916	581,936	16,132,797	1,680,553
	1955	**20,867**	**720,329**	**641,918**	**563,931**	**4,703,437**	**1,800,288**	**4,606,220**	**687,524**	**17,394,852**	**2,109,474**
Cariboo	1954	48,141	1,640,164	4,641	3,851						
	1955	**41,464**	**1,431,337**	**3,989**	**3,504**						
Clinton	1954	2	68								
	1955										
Fort Steele	1954	307	10,460	3,719,028	3,086,124			255,012,518	34,885,712	235,559,606	24,538,244
	1955	**335**	**11,564**	**2,849,594**	**2,503,397**			**214,250,159**	**31,978,979**	**225,559,026**	**27,353,543**
Golden	1954			222,114	184,315	27,780	8,087	15,403,294	2,107,171	6,160,829	641,774
	1955			**233,074**	**204,758**	**230,911**	**88,383**	**16,616,858**	**2,480,232**	**11,060,152**	**1,341,265**
Greenwood	1954	195	6,644	564,825	468,703	11,702	3,407	290,061	39,680	351,127	36,577
	1955	**217**	**7,491**	**516,448**	**453,705**	**14,689**	**5,622**	**252,260**	**37,652**	**325,061**	**39,420**
Kamloops	1954			8	7	3,311	964				
	1955			**518**	**455**			**14,956**	**2,232**	**7,029**	**852**
Liard	1954										
	1955										
Lillooet	1954	111,707	3,805,857	23,997	19,913						
	1955	**119,445**	**4,123,241**	**24,850**	**21,831**						
Nanaimo	1954										
	1955										
Nelson	1954	1,187	40,441	42,444	35,221			16,406,922	2,244,467	18,532,738	1,930,555
	1955	**33**	**1,139**	**57,636**	**50,634**			**14,175,926**	**2,115,899**	**51,449,702**	**6,239,305**
New Westminster	1954										
	1955										
Nicola	1954										
	1955										
Omineca	1954	2,919	99,450	966,117	801,703	37,533	10,927	3,521,770	481,778	4,384,526	456,736
	1955	**643**	**22,196**	**256,489**	**225,328**	**48,183**	**18,443**	**864,352**	**129,013**	**1,313,553**	**159,295**
Osoyoos	1954	50,097	1,734,401	4,656	3,864						
	1955	**38,521**	**1,329,745**	**3,536**	**3,106**						
Revelstoke	1954	2,117	72,126	293,267	243,359			3,715,772	508,318	2,790,168	290,652
	1955	**2,475**	**85,437**	**320,281**	**281,379**			**4,886,167**	**729,309**	**4,780,764**	**579,763**
Similkameen	1954	7,960	271,197	166,211	137,925	23,843,270	6,941,253				
	1955	**6,932**	**239,293**	**147,681**	**129,739**	**20,754,222**	**7,943,886**	**1,780**	**266**	**2,885**	**350**
Skeena	1954	73	2,487	2,030,426	1,684,888			924,771	126,509	10,864	1,132
	1955			**1,790,380**	**1,572,867**			**1,072,391**	**160,065**		
Slocan	1954	257	8,756	924,921	767,518			30,456,315	4,166,424	23,658,720	2,464,529
	1955	**253**	**8,734**	**846,858**	**743,973**			**36,168,405**	**5,398,496**	**29,250,939**	**3,547,261**
Trail Creek	1954	164	5,588	111	92	19,118	5,566				
	1955	**179**	**6,179**	**58**	**51**	**6,198**	**2,372**				
Vancouver	1954	11,569	394,156	94,586	78,489	17,751,513	5,167,820	549,388	75,156	17,655,613	1,839,185
	1955	**10,969**	**378,650**	**85,856**	**75,425**	**16,347,307**	**6,257,095**	**677,594**	**101,138**	**16,762,292**	**2,032,763**
Vernon	1954			4,076	3,382			12,941	1,770	3,335	347
	1955										
Victoria	1954			5,290	4,390	**988,366**	**287,733**				
	1955			**1,987**	**1,746**	**370,453**	**141,795**				
Not assigned[2]	1954	218	7,427	165,728	137,524	2,913,154	848,077	1,926,788	263,584	8,884,237	925,471
	1955	**144**	**4,971**	**120,982**	**106,284**	**1,762,631**	**674,665**	**8,980,572**	**1,340,440**	**71,292,310**	**8,645,618**
Totals	1954	258,388	8,803,279	9,825,153	8,153,108	50,150,087	14,599,693	332,474,456	45,482,505	334,124,560	34,805,755
	1955	**242,477**	**8,370,306**	**7,902,145**	**6,942,113**	**44,238,031**	**16,932,549**	**302,567,640**	**45,161,245**	**429,198,565**	**52,048,909**

[1] Fine gold. [2] Gold, silver, copper, and some lead "not assigned" were recovered at the Tacoma smelter from dross shipped from the Trail smelter. The zinc and most of the lead were recovered at the Trail smelter by "fuming" current and reclaimed slag.

TABLE VIIc.—PRODUCTION, 1954 AND 1955, BY MINING DIVISIONS—MISCELLANEOUS METALS

Division	Year	Antimony[1]		Bismuth		Cadmium[2]		Indium		Iron Ore		Mercury		Tin		Tungsten (WO_3)		Division Totals
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
		Lb.	$	Lb.	$	Lb.	$	Oz.	$	Tons	$	Lb.	$	Lb.	$	Lb.	$	$
Atlin	1954					58,405	96,368											96,368
	1955					**60,765**	**102,085**											**102,085**
Fort Steele	1954													333,788	280,437			280,437
	1955													**391,228**	**311,613**			**311,613**
Golden	1954					22,328	36,841											36,841
	1955					**44,303**	**74,429**											**74,429**
Greenwood	1954					2,483	4,097											4,097
	1955					**2,232**	**3,750**											**3,750**
Lillooet	1954																	
	1955											**75**	**250**					**250**
Nanaimo	1954									535,746	3,733,891							3,733,891
	1955									**610,930**	**3,228,756**							**3,228,756**
Nelson	1954					84,830	139,970									1,695,020	4,776,860	4,916,830
	1955					**294,159**	**494,187**									**1,914,000**	**5,460,967**	**5,955,154**
Omineca	1954					39,411	65,028									505,040	1,070,866	1,135,894
	1955					**13,509**	**22,695**											**22,695**
Revelstoke	1954					12,303	20,300									6,383	3,832	24,132
	1955					**21,719**	**36,488**											**36,488**
Similkameen	1954																	408[4]
	1955																	
Skeena	1954																	
	1955																	
Slocan	1954					90,729	149,703											149,703
	1955					**111,335**	**187,043**											**187,043**
Vancouver	1954																	
	1955					**53,822**	**90,421**											**90,421**
Not assigned[1 2 3]	1954	1,302,333[3]	382,104	225,351	493,519	370,245	610,904	477	1,281									1,487,808
	1955	**2,021,726**[3]	**667,776**	**160,767**	**356,903**	**991,747**	**1,666,135**	**104,774**	**232,389**									**2,923,203**
Totals	1954	1,302,333	382,104	225,351	493,519	680,734	1,123,211	477	1,281	535,746	3,733,891			333,788	280,437	2,206,443	5,851,558	11,866,409
	1955	**2,021,726**	**667,776**	**160,767**	**356,903**	**1,593,591**	**2,677,233**	**104,774**	**232,389**	**610,930**	**3,228,756**	**75**	**250**	**391,228**	**311,613**	**1,914,000**	**5,460,967**	**12,935,887**

[1] Antimony assigned to individual mining divisions is the reported content of concentrates exported to foreign smelters. Antimony "not assigned" is the antimony content of antimonial lead produced at the Trail smelter and antimony reported as recovered from Dore slag and flue dust exported.

[2] Cadmium assigned to individual mining divisions is the reported content of customs shipments to the Trail smelter and to foreign smelters. Cadmium "not assigned" is the remainder of the reported estimated recovery at the Trail refinery from British Columbia concentrates.

[3] Antimony, bismuth, and indium recovered at the Trail smelter may include some metal from sources outside British Columbia, in addition to metal contained in British Columbia ores and concentrates. The Trail output of each of the three metals is shown as "not assigned."

[4] Value of four ounces of platinum credited to the Lillooet Mining Division in 1954.

TABLE VIID.—PRODUCTION, 1954 AND 1955, BY MINING DIVISIONS—INDUSTRIAL MINERALS

Division	Year	Asbestos		Barite		Diatomite		Fluxes (Limestone, Quartz)		Granules (Roofing)		Gypsum and Products		Mica		Sulphur		Division Totals
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
		Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Lb.	$	Tons	$	$
Cariboo	1954													284,000	5,326			5,326
	1955					**14**	**280**							**80,600**	**786**			**1,066**
Fort Steele	1954											11,624	26,156			30,427	304,270	330,426
	1955															**32,826**	**697,531**	**697,531**
Golden	1954			5,056	115,337							60,200	203,700					319,037
	1955			**9,465**	**238,825**							**47,647**	**160,793**					**399,618**
Greenwood	1954							17,000	17,000									17,000
	1955							**72,333**	**72,333**									**72,333**
Kamloops	1954											103,656	191,878					191,878
	1955											**102,072**	**223,141**	**424,700**	**2,075**			**225,216**
Liard	1954	8,598	2,920,751															2,920,751
	1955	**17,187**	**4,265,971**															**4,265,971**
Nanaimo	1954							22,897	23,804									23,804
	1955							**11,157**	**8,654**									**8,654**
New Westminster	1954									1,080	8,505							8,505
	1955									**2,585**	**19,266**							**19,266**
Omineca	1954																	
	1955																	
Osoyoos	1954									1,785	26,775							26,775
	1955							**28,269**	**127,211**	**2,676**	**32,845**							**160,056**
Vancouver	1954									1,676	30,227					17,923	287,662	317,889
	1955									**1,094**	**21,747**					**16,338**	**253,070**	**274,817**
Not assigned	1954															171,649[1]	1,716,490	1,716,490
	1955															**167,356**[1]	**1,673,570**	**1,673,570**
Totals	1954	8,598	2,920,751	5,056	115,337			39,897	40,804	4,541	65,507	175,480	421,734	284,000	5,326	219,999	2,308,422	5,877,881
	1955	**17,187**	**4,265,971**	**9,465**	**238,825**	**14**	**280**	**111,759**	**208,198**	**6,355**	**73,858**	**149,719**	**383,934**	**505,300**	**2,861**	**216,520**	**2,624,171**	**7,798,098**

[1] Recovery at Trail smelter for use in Warfield fertilizer plants, and derived from several mining divisions.

TABLE VIIe.—PRODUCTION, 1954 AND 1955, BY MINING DIVISIONS—STRUCTURAL MATERIALS

Division	Year	Cement	Lime and Limestone	Building-stone	Rubble, Riprap, and Crushed Rock	Sand and Gravel	Brick (Common)	Face, Paving, and Sewer Brick	Fire-bricks, Blocks	Clays	Structural Tile (Hollow Blocks), Roof-tile, Floor-tile	Drain-tile and Sewer-pipe	Pottery (Glazed or Unglazed)	Other Clay Products	Division Totals
		$	$	$	$	$	$	$	$	$	$	$	$	$	$
Alberni	1954	.....	.....	.....	908	88,957	.....	.....	.....	.....	.....	.....	.....	.....	89,865
	1955	.....	.....	.....	**19**	**96,451**	.....	.....	.....	.....	.....	.....	.....	.....	**96,470**
Atlin	1954	.....	.....	.....	.....	2,924	.....	.....	.....	.....	.....	.....	.....	.....	2,924
	1955	.....	.....	.....	.....	**5,662**	.....	.....	.....	.....	.....	.....	.....	.....	**5,662**
Cariboo	1954	.....	.....	.....	41,419	229,153	.....	.....	.....	.....	.....	.....	.....	.....	270,572
	1955	.....	.....	.....	**26,778**	**260,208**	.....	.....	.....	.....	.....	.....	.....	.....	**286,986**
Clinton	1954	.....	.....	.....	.....	48,285	.....	.....	.....	.....	.....	.....	.....	.....	48,285
	1955	.....	.....	.....	.....	**500**	.....	.....	.....	.....	.....	.....	.....	.....	**500**
Fort Steele	1954	.....	.....	.....	20,469	282,494	.....	.....	.....	.....	.....	.....	.....	.....	302,963
	1955	.....	.....	.....	**23,731**	**258,762**	.....	.....	.....	.....	.....	.....	.....	.....	**282,493**
Golden	1954	.....	.....	.....	1,000	40,000	.....	.....	.....	.....	.....	.....	.....	.....	41,000
	1955	.....	.....	.....	**4,102**	**39,730**	.....	.....	.....	.....	.....	.....	.....	.....	**43,832**
Greenwood	1954	.....	.....	.....	1,110	5,922	.....	.....	.....	.....	.....	.....	.....	.....	7,032
	1955	.....	.....	.....	**5,433**	**22,637**	.....	.....	.....	.....	.....	.....	.....	.....	**28,070**
Kamloops	1954	.....	.....	.....	163,997	141,655	.....	.....	.....	.....	.....	.....	.....	.....	305,652
	1955	.....	.....	.....	**134,828**	**445,100**	.....	.....	.....	.....	.....	.....	.....	.....	**579,928**
Liard	1954	.....	.....	.....	500	78,697	.....	.....	.....	.....	.....	.....	.....	.....	79,197
	1955	.....	.....	.....	**78**	**64,135**	.....	.....	.....	.....	.....	.....	.....	.....	**64,213**
Lillooet	1954	.....	.....	.....	.....	41,607	.....	.....	.....	.....	.....	.....	.....	.....	41,607
	1955	.....	.....	.....	**6,000**	**20,470**	.....	.....	.....	.....	.....	.....	.....	.....	**26,470**
Nanaimo	1954	.....	1,367,768	45,000	4,822	209,126	.....	.....	.....	.....	.....	.....	.....	.....	1,626,716
	1955	.....	**1,557,646**	**30,000**	**5,491**	**97,052**	.....	.....	.....	.....	.....	.....	.....	.....	**1,690,189**
Nelson	1954	.....	.....	8,300	51,256	30,101	.....	.....	.....	.....	.....	.....	.....	.....	89,657
	1955	.....	.....	.....	**63,814**	**97,157**	.....	.....	.....	.....	.....	.....	.....	.....	**160,971**
New Westminster	1954	.....	97,596	.....	258,418	1,222,909	12,420	278,054	372,528	36,370	103,152	695,245	23,389	29,772	3,129,853
	1955	.....	**54,508**	.....	**219,072**	**1,204,767**	**219,069**	**233,427**	**505,024**	**46,757**	**93,877**	**739,306**	**31,339**	**42,778**	**3,389,924**
Nicola	1954	.....	.....	.....	18,029	7,730	.....	.....	.....	.....	.....	.....	.....	.....	25,759
	1955	.....	.....	.....	**4,000**	**16,534**	.....	.....	.....	.....	.....	.....	.....	.....	**20,534**
Omineca	1954	.....	.....	.....	5,000	101,118	.....	.....	.....	.....	.....	.....	.....	.....	106,118
	1955	.....	.....	.....	**4,633**	**174,930**	.....	.....	.....	.....	.....	.....	.....	.....	**179,563**
Osoyoos	1954	.....	.....	.....	.....	32,449	.....	.....	.....	.....	.....	.....	.....	.....	32,449
	1955	.....	.....	.....	.....	**18,179**	.....	.....	.....	.....	.....	.....	.....	.....	**18,179**
Revelstoke	1954	.....	.....	.....	135	47,428	.....	.....	.....	.....	.....	.....	.....	.....	47,563
	1955	.....	.....	.....	**900**	**40,191**	.....	.....	.....	.....	.....	.....	.....	.....	**41,091**
Similkameen	1954	.....	.....	.....	19,568	65,746	.....	.....	.....	.....	.....	.....	.....	.....	85,314
	1955	.....	.....	.....	**19,700**	**39,750**	.....	.....	.....	.....	.....	.....	.....	.....	**59,450**
Skeena	1954	.....	82,998	.....	17,362	99,006	.....	.....	.....	.....	.....	.....	.....	.....	199,366
	1955	.....	**93,675**	.....	**82,820**	**118,800**	.....	.....	.....	.....	.....	.....	.....	.....	**295,295**
Slocan	1954	.....	.....	.....	5,443	22,463	.....	.....	.....	.....	.....	.....	.....	.....	27,906
	1955	.....	.....	.....	**17,621**	**55,437**	.....	.....	.....	.....	.....	.....	.....	.....	**73,058**
Trail Creek	1954	.....	.....	.....	7,800	100,019	.....	.....	.....	.....	.....	.....	.....	.....	107,819
	1955	.....	.....	.....	**3,450**	**109,057**	.....	.....	.....	.....	.....	.....	.....	.....	**112,507**
Vancouver	1954	.....	.....	45,000	614,074	1,224,487	13,130	38,622	.....	.....	.....	.....	.....	2,925	1,938,238
	1955	.....	.....	**118,454**	**280,454**	**781,306**	**12,490**	**15,486**	**71,717**	.....	.....	.....	.....	**12,736**	**1,292,643**
Vernon	1954	.....	.....	1,092	19,655	109,432	.....	.....	.....	.....	.....	.....	.....	.....	130,179
	1955	.....	.....	.....	**53,000**	**269,975**	.....	.....	.....	.....	.....	.....	.....	.....	**322,975**
Victoria	1954	4,935,298	6,640	.....	2,891	618,761	10,000[1]	.....	.....	55	19,751	58,052[1]	7,692	.....	5,659,140
	1955	**5,474,875**	**5,519**	.....	**6,348**	**650,100**	**580**	.....	**1,837**	.....	**20,583**	**61,713**	**6,696**	.....	**6,228,251**
Totals	1954	4,935,298	1,555,002	99,392	1,253,856	4,850,469	35,550	316,676	372,528	36,425	122,903	753,297	31,081	32,697	14,395,174
	1955	**5,474,875**	**1,711,348**	**148,454**	**982,272**	**4,886,890**	**232,139**	**248,913**	**578,578**	**46,757**	**114,460**	**801,019**	**38,035**	**55,514**	**15,299,254**

[1] Estimated.

TABLE VIIIA.—PRODUCTION TO DATE BY MINING DIVISIONS—SUMMARY

Division	Placer Gold[1]		Principal Lode Metals	Miscellaneous Metals	Industrial Minerals	Structural Materials	Coal		Division Totals
	Quantity	Value					Quantity	Value	
	Oz.	$	$	$	$	$	Tons	$	$
Alberni	1,610	33,052	11,657,082	.....	9,398	671,406	.....	.....	12,370,938
Atlin	725,039	17,082,890	27,009,025	198,813	20,325	153,450	.....	.....	44,464,503
Cariboo	2,587,267	53,508,562	33,964,967	23,730	157,180	2,070,834	290	1,100	89,726,273
Clinton	10,063	240,004	847,454	900	162,867	72,445	.....	.....	1,323,670
Fort Steele	20,423	465,308	1,319,446,225	7,108,542	1,364,919	3,085,594	50,426,570	199,718,021	1,531,188,609
Golden	469	11,268	26,625,889	126,391	1,341,626	848,873	.....	.....	28,954,047
Greenwood	5,051	114,996	112,911,906	39,242	2,226,947	480,828	.....	.....	115,773,919
Kamloops	27,484	601,608	3,040,469	65,678	6,234,258	3,360,897	14,995	59,765	13,362,675
Liard	*50,070*	*1,244,851*	*5,314*	79	*8,198,438*	549,213	*78,943*	*510,920*	*10,533,490*[2]
Lillooet	91,539	1,883,708	99,284,391	48,350	5,129	574,912	.....	.....	101,796,490
Nanaimo	866	19,300	5,876,314	20,167,596	603,336	20,495,253	79,284,503	290,741,699	337,903,498
Nelson	3,492	86,403	100,700,501	21,533,778	64,126	2,106,920	.....	.....	124,491,728
New Westminster	11,467	239,680	126,458	87,724	66,414	36,557,552	.....	.....	37,077,828
Nicola	230	4,652	568,779	17	9,610	256,941	2,926,121	11,041,565	11,881,564
Omineca	52,276	1,383,977	13,926,271	15,230,026	11,460	999,564	392,980	2,371,523	33,922,821
Osoyoos	190	4,142	50,042,747	1,020	1,382,180	873,579	1,122	5,008	52,308,676
Revelstoke	7,256	155,246	7,010,713	84,186	.....	846,790	.....	.....	8,096,935
Similkameen	12,075	286,180	109,935,116	128,401	18,558	1,602,742	4,563,035	19,072,182	131,043,179
Skeena	4,603	105,569	204,342,646	269,575	1,240,215	4,132,547	.....	.....	210,090,552
Slocan	362	9,286	136,257,460	660,674	.....	486,250	.....	.....	137,413,670
Trail Creek[3]	848	24,176	92,584,542[3]	35,564[3]	24,252,775	1,017,106	.....	.....	117,914,163
Vancouver	182	5,306	177,654,349	381,455	4,974,741	18,382,305	.....	.....	201,398,156
Vernon	2,344	62,172	188,310	.....	3,978	1,389,936	.....	.....	1,644,396
Victoria	628	15,680	5,211,847	24,508	190,451	75,539,278	.....	.....	80,981,764
Not assigned[3]	1,577,661	18,176,703	26,046,883[3]	36,600,895[3]	.....	25,927,555	.....	.....	106,752,036
Totals	5,193,495	95,764,719	2,565,265,558	102,817,144	52,538,931	202,482,770	137,688,559	523,521,783	3,542,415,580

[1] Quantity of placer gold is given in crude ounces. The year of first recorded production for the major placer-producing mining divisions was: Atlin, 1898; Cariboo, 1858; Lillooet, 1874; Quesnel, 1858.

[2] Includes value of natural gas.

[3] *Re* "Trail Creek" and *re* "not assigned," *see* footnotes under Tables VIIIB and VIIIC.

NOTE.—Full details for placer gold are given in this table. The columns headed "Principal Lode Metals," "Miscellaneous Metals," "Industrial Minerals," and "Structural Materials" give the total value only, details being set forth in Tables VIIIB, VIIIC, VIIID, and VIIIE. The quantity of coal is gross mine output; *see* footnotes to Tables IXA, IXB, and IXC.

TABLE VIIIB.—PRODUCTION TO DATE BY MINING DIVISIONS—PRINCIPAL LODE METALS

Division	Lode Gold		Silver		Copper		Lead		Zinc		Division Totals
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
	Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$	$
Alberni	300,091	11,231,599	161,219	77,492	2,290,699	343,518	112,888	4,473	.....	.....	11,657,082
Atlin	315,241	11,143,234	2,100,261	1,767,920	15,692,012	5,077,769	15,485,333	2,216,157	57,488,195	6,803,945	27,009,025
Cariboo	935,868	33,897,725	105,067	63,382	82	17	24,560	3,724	505	19	33,964,867
Clinton	23,390	827,328	31,564	14,214	57,548	5,905	193	7	.....	.....	847,454
Fort Steele	3,349	85,008	186,234,004	101,416,405	28,592	6,193	10,486,824,862	696,335,894	7,465,733,453	521,602,725	1,319,446,225
Golden	100	2,503	2,338,912	1,626,811	327,066	108,404	168,113,450	14,049,975	163,849,076	10,838,196	26,625,889
Greenwood	1,133,188	24,375,130	28,893,162	16,357,413	441,252,412	70,513,094	12,568,003	850,869	13,114,983	815,400	112,911,906
Kamloops	47,867	1,608,294	303,405	180,995	6,411,583	1,179,668	520,651	42,281	433,539	29,231	3,040,469
Liard	114	4,120	204	146	.....	.....	5,810	1,048	.....	.....	5,314
Lillooet	2,820,271	98,880,417	706,987	401,391	400	41	62,463	2,542	.....	.....	99,284,391
Nanaimo	84,009	1,919,998	570,270	336,232	22,123,948	3,620,084	.....	.....	.....	.....	5,876,314
Nelson	1,328,548	41,543,426	7,352,476	4,246,036	14,702,422	1,648,622	154,202,754	17,468,758	266,314,645	35,793,659	100,700,501
New Westminster	4,416	112,407	13,259	6,072	26,489	6,379	28,425	1,119	12,755	481	126,458
Nicola	8,525	234,914	267,345	126,522	549,975	106,230	2,235,428	90,516	320,683	10,597	568,779
Omineca	22,481	685,679	7,762,304	6,012,796	6,603,734	1,496,112	21,018,997	2,549,601	25,449,783	3,182,083	13,926,271
Osoyoos	1,618,906	49,252,054	583,990	383,265	2,781,401	398,879	256,957	8,151	6,839	398	50,042,747
Revelstoke	31,267	882,919	3,360,961	2,109,725	31,360	8,357	25,593,487	2,302,182	13,887,250	1,707,530	7,010,713
Similkameen	174,046	5,986,802	4,058,104	2,438,914	574,523,594	101,494,977	246,806	10,459	72,275	3,964	109,935,116
Skeena	2,392,484	60,207,439	63,011,245	38,962,619	689,106,270	98,025,648	54,580,001	4,711,095	16,388,781	2,435,845	204,342,646
Slocan	14,391	407,789	65,678,385	41,026,268	229,696	43,512	693,996,515	48,505,235	515,182,126	46,274,656	136,257,460
Trail Creek[1] [2]	2,949,591	62,585,684	4,168,515	2,416,862	140,473,135	21,356,494	18,484,672	919,716	158,016,197	5,305,786	92,584,542
Vancouver	418,177	13,269,246	4,532,738	2,692,940	886,568,422	139,368,768	15,112,658	1,402,573	158,330,295	20,920,822	77,654,349
Vernon	5,223	176,048	12,823	8,084	654	100	24,913	2,932	10,816	1,146	188,310
Victoria	37,663	812,730	809,602	448,049	22,915,846	3,647,297	210,097	19,848	3,568,709	283,923	5,211,847
Not assigned[3]	51,845	962,679	3,235,239	2,232,300	8,697,042	2,448,120	24,798,735	4,257,724	141,768,784	16,146,060	26,046,883
Totals	14,721,151	421,095,172	386,292,041	225,352,853	2,835,394,382	450,904,188	11,719,223,118	795,756,879	8,999,949,689	672,156,466	2,565,265,558

[1] Includes zinc and lead recovered at the Trail smelter from current and reclaimed slags, prior to 1953. From 1953 this recovery is listed as "not assigned."

[2] Includes gold, silver, copper, and lead recovered at the Tacoma smelter from dross shipped by the Trail smelter, prior to 1953. From 1953 this recovery is listed as "not assigned."

[3] Includes all metals recovered from dross and slag (*see* notes 1 and 2) in 1954 and 1955.

TABLE VIIIc.—PRODUCTION TO DATE BY MINING DIVISIONS—MISCELLANEOUS METALS

Division	Antimony[1]		Bismuth		Cadmium[2]		Chromite		Cobalt		Indium		Iron Ore		Magnesium		Manganese	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Lb.	$	Lb.	$	Lb.	$	Tons	$	Lb.	$	Oz.	$	Tons	$	Lb.	$	Tons	$
Atlin					119,170	198,453												
Cariboo																		
Clinton							126	900										
Fort Steele					2,418	5,155									204,632	88,184		
Golden	40,062	14,906			66,731	111,485												
Greenwood					4,715	7,847												
Kamloops							670	31,395					17,109	59,883				
Liard																		
Lillooet	13,466	4,321																
Nanaimo													3,207,858	20,167,596				
Nelson					553,691	991,767												
New Westminster																		
Nicola			12	17														
Omineca	104,489	15,217			66,475	114,426			1,730	420								
Osoyoos																		
Revelstoke	9,394	3,455			42,289	75,044												
Similkameen																		
Skeena					120,349	248,835							1,200	6,000				
Slocan	31,865	8,133			346,606	644,381											541	8,160
Trail Creek													550	1,925				
Vancouver					163,133	381,455												
Victoria																	1,167	24,508
Not assigned[1 2 3]	31,560,363	7,248,979	4,275,701	6,838,144	16,389,066	22,243,354					119,101	270,418						
Totals	31,759,643	7,295,011	4,275,713	6,838,161	17,875,643	25,022,202	796	32,295	1,730	420	119,101	270,418	3,226,717	20,235,404	204,632	88,184	1,708	32,668

[1] Antimony assigned to individual mining divisions is the reported content of concentrates exported to foreign smelters. Antimony "not assigned" is the antimony content of antimonial lead or of other antimony products recovered at the Trail smelter.

[2] Cadmium assigned to individual mining divisions is that reported by operators of individual mines from concentrates shipped to the Trail smelter and to foreign smelters. Cadmium "not assigned" is the remainder of the reported estimated recovery at the Trail refinery from British Columbia concentrates.

[3] The antimony, bismuth, and indium recovered at the Trail smelter are not assigned to mining divisions. In addition to the quantities of these metals from British Columbia sources, some may be from sources outside British Columbia.

Year of first recorded production: Antimony, 1907; bismuth, 1929; cadmium, 1929; chromite, 1918; cobalt, 1928; indium, 1942; iron ore, 1885; magnesium, 1941; manganese, 1918.

TABLE VIIIc.—PRODUCTION TO DATE BY MINING DIVISIONS—MISCELLANEOUS METALS—*Continued*

Division	Mercury		Molybdenite		Nickel		Palladium		Platinum		Selenium		Tin		Tungsten (WO_3)		Division Totals
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
	Lb.	$	Lb.	$	Lb.	$	Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$	$
Atlin															273	360	198,813
Cariboo									593	2,299					27,698	21,431	23,730
Clinton																	900
Fort Steele													9,068,490	7,015,203			7,108,542
Golden																	126,391
Greenwood																	39,242
Kamloops	10,987	5,795															65,678
Liard									2	79							79
Lillooet	1,783	3,555	2,448	2,440					3	113					32,353	37,921	48,350
Nanaimo																	20,167,596
Nelson			25,058	18,378											8,896,985	20,523,633	21,533,778
New Westminster					281,453	87,724											87,724
Nicola																	17
Omineca	4,150,892	10,400,259	1,600	1,840					3	154					2,210,892	4,697,710	15,230,026
Osoyoos			1,020	1,020													1,020
Revelstoke															7,784	5,687	84,186
Similkameen									1,276	128,401							128,401
Skeena			13,022	13,020							731	1,389			366	331	269,575
Slocan																	660,674
Trail Creek							749	30,462	53	3,177							35,564
Vancouver																	381,455
Victoria																	24,508
Not assigned																	36,600,895
Totals	4,163,662	10,409,609	43,148	36,698	281,453	87,724	749	30,462	1,396	134,223	731	1,389	9,068,490	7,015,203	11,176,351	25,287,073	102,817,144

Year of first recorded production: Mercury, 1895; molybdenite, 1914; nickel, 1936; palladium, 1930; platinum, 1887; selenium, 1931; tin, 1941; tungsten, 1937.

TABLE VIIId.—PRODUCTION TO DATE BY MINING DIVISIONS—INDUSTRIAL MINERALS

Division	Arsenious Oxide		Asbestos		Barite		Bentonite		Diatomite		Fluorspar		Flux (Quartz and Limestone)		Granules (Roofing)		Gypsum and Gypsite		Hydromagnesite	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Lb.	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$
Alberni																				
Atlin																			1,450	20,325
Cariboo									1,383	31,295					48	168				
Clinton																	983	6,676	803	7,211
Fort Steele					8	80											112,827	298,824		
Golden					77,081	655,880											198,458	684,470		
Greenwood											40,165	783,578	1,693,552	1,443,369						
Kamloops																	1,210,325	6,029,128		
Liard			28,907	8,198,438																
Lillooet																				
Nanaimo													559,415	603,336						
Nelson													7,601	8,174	2	51				
New Westminster															7,208	66,414				
Nicola																	2,297	9,610		
Omineca	16,997	340																		
Osoyoos	22,002,423	272,861											187,395	982,176	6,358	79,905				
Similkameen							791	16,858									250	1,700		
Skeena													601,019	1,050,722						
Vancouver															28,868	411,325				
Vernon																				
Victoria													50	760	9,702	159,471				
Totals	22,019,420	273,201	28,907	8,198,438	77,089	655,960	791	16,858	1,383	31,295[1]	40,165	783,578	3,049,032	4,088,537	52,186	717,334	1,525,140	7,030,408	2,253	27,536

[1] Includes 30 tons of volcanic ash, worth $300.

Year of first recorded production: Arsenious oxide, 1917; asbestos, 1952; barite, 1940; bentonite, 1926; diatomite, 1928; fluorspar, 1918; flux (quartz and limestone), 1911; granules, 1930; gypsum and gypsite, 1911; hydromagnesite, 1904.

TABLE VIIID.—PRODUCTION TO DATE BY MINING DIVISIONS—INDUSTRIAL MINERALS—*Continued*

Division	Iron Oxide and Ochre		Magnesium Sulphate		Mica		Natro-alunite		Perlite		Phosphate Rock		Sodium Carbonate		Sulphur		Talc		Division Totals
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
	Tons	$	Tons	$	Lb.	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	$
Alberni							522	9,398											9,398
Atlin																			20,325
Cariboo					9,263,800	125,717													157,180[1]
Clinton			1,923	39,085									9,524	109,895					162,867
Fort Steele											3,842	16,894			67,984[2]	1,049,121			1,364,919
Golden	27	920															5	346	1,341,626
Greenwood																			2,226,947
Kamloops			8,742	193,967	424,700	2,075							968	9,088					6,234,258
Liard																			8,198,438
Lillooet																	296	5,129	5,129
Nanaimo																			603,336
Nelson	7,292	55,901																	64,126
New Westminster																			66,414
Nicola																			9,610
Omineca									1,112	11,120									11,460
Osoyoos			3,229	21,300	1,588,800	25,938													1,382,180
Similkameen																			18,558
Skeena					634,250	10,815									41,624	178,678			1,240,215
Vancouver	10,669	97,389													531,964	4,466,027			4,974,741
Vernon					160,500	3,978													3,978
Victoria	120	840															1,504	29,380	190,451
Not assigned															2,440,247[3]	24,252,775			24,252,775
Totals	18,108	155,050	13,894	254,352	12,072,050	168,523	522	9,398	1,112	11,120	3,842	16,894	10,492	118,983	3,081,819	29,946,601	1,805	34,865	52,538,931

[1] Includes 30 tons of volcanic ash, worth $300.
[2] Recovery in 1953, 1954, and 1955 for use in fertilizer plant at Marysville.
[3] Recovery at Trail smelter for use in Warfield fertilizer plants, and derived from ores from several mining divisions.
Year of first recorded production: Iron oxide and ochre, 1918; magnesium sulphate, 1915; mica, 1932; natro-alunite, 1912; perlite, 1953; phosphate rock, 1927; sodium carbonate, 1921; sulphur, 1916; talc, 1916.

TABLE VIIIE.—PRODUCTION TO DATE BY MINING DIVISIONS—STRUCTURAL MATERIALS

Division	Cement	Lime and Limestone	Building-stone	Rubble, Riprap, and Crushed Rock	Sand and Gravel	Brick (Common)	Face, Paving, and Sewer Brick	Fire-bricks, Blocks	Clays	Structural Tile (Hollow Blocks), Roof-tile, Floor-tile	Drain-tile and Sewer-pipe	Pottery (Glazed or Un-glazed)	Other Clay Products	Division Totals
	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Alberni	.....	.....	.....	34,133	623,867	.....	.....	.....	.....	.....	.....	.....	.....	658,000
Atlin	.....	1,108	.....	63,971	94,479	.....	.....	.....	.....	.....	.....	.....	.....	159,558
Cariboo	.....	7,500	.....	209,695	1,916,962	1,193	184	4,651	15,807	.....	.....	.....	9,242	2,165,234
Clinton	.....	.....	.....	1,606	71,839	.....	.....	.....	.....	.....	.....	.....	.....	73,445
Fort Steele	.....	5,350	71,941	379,846	2,777,307	7,800	.....	.....	.....	.....	.....	.....	.....	3,242,244
Golden	.....	1,000	24,000	83,781	855,989	.....	.....	.....	.....	.....	.....	.....	.....	964,770
Greenwood	.....	102,442	30,500	125,583	317,912	114,361	.....	.....	6,922	.....	.....	.....	.....	697,720
Kamloops	.....	12,000	18,000	1,213,439	2,229,816	72,379	.....	.....	.....	.....	.....	.....	.....	3,545,634
Liard	.....	.....	.....	23,842	552,809	.....	.....	.....	.....	.....	.....	.....	.....	576,651
Lillooet	.....	100	2,000	275,111	511,701	.....	.....	.....	.....	.....	.....	.....	.....	788,912
Nanaimo	.....	18,993,586	2,960,337	48,284	1,274,405	1,104,295	38,939	.....	35,758	.....	.....	.....	.....	24,455,604
Nelson	.....	34,543	356,679	232,546	1,665,894	19,110	2,864	.....	.....	.....	.....	.....	.....	2,311,636
New Westminster	.....	543,628	.....	4,555,298	10,446,341	1,326,222	2,098,846	8,350,171	706,188	2,203,550	7,216,567	71,224	146,199	38,474,234
Nicola	.....	.....	8,000	69,561	219,780	.....	.....	.....	.....	.....	.....	.....	.....	297,341
Omineca	.....	3,077	.....	220,364	896,590	5,274	.....	.....	.....	.....	.....	.....	.....	1,125,305
Osoyoos	.....	32,070	14,850	133,877	754,212	.....	.....	.....	.....	.....	.....	.....	.....	935,009
Revelstoke	.....	1,000	5,575	258,273	705,137	.....	.....	.....	.....	.....	.....	.....	.....	969,985
Similkameen	10,500	11,571	24,000	444,544	1,175,022	.....	.....	.....	1,363	.....	.....	.....	11,992	1,678,992
Skeena	.....	1,180,762	144,000	902,632	1,320,447	.....	.....	.....	4,925	.....	.....	.....	8,324	3,561,090
Slocan	.....	1,000	115,143	64,284	362,023	.....	.....	.....	.....	.....	.....	.....	.....	542,450
Trail Creek	.....	28,000	38,400	161,542	937,345	.....	.....	.....	.....	.....	.....	.....	.....	1,165,287
Vancouver	335,718	40,885	3,582,976	6,294,059	12,933,230	110,650	74,850	373,975	17,633	.....	.....	54,701	59,031	23,877,708
Vernon	.....	46,499	81,052	139,609	1,023,047	131,467	6,202	1,011	5	18,224	4,325	.....	20	1,451,461
Victoria	65,560,266	720,203	.....	406,559	7,692,462	1,802,909	23,052	1,837	.....	581,673	630,955	99,330	11,003	77,530,249
Not assigned	.....	315,498	505,018	282,455	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,234,251[1]
Totals	65,906,484	22,081,822	7,982,471	16,624,894	51,358,616	4,695,660	3,054,937	8,731,645	788,601	2,803,447	7,851,847	225,255	245,811	202,482,770[2]

[1] Includes $315,498 for limestone, $505,018 for building-stone, $282,455 for rubble and crushed rock, and $3,150,828 for clay products, none of which can be allotted to specific mining divisions. The balance of $6,980,451 cannot at present be allotted to mining divisions nor class of material.

[2] Includes items noted in foot-note No. 1.

TABLE IXA.—QUANTITY (GROSS[1]) AND VALUE OF COAL PER YEAR TO DATE

Year	Tons (2,000 Lb.)	Value	Year	Tons (2,000 Lb.)	Value
1836–59	41,871	$149,548	1908	2,362,514	$7,356,866
1860	15,956	56,988	1909	2,688,672	8,574,884
1861	15,427	55,096	1910	3,515,944	11,108,335
1862	20,292	72,472	1911	2,573,444	8,071,747
1863	23,906	85,380	1912	3,388,795	10,786,812
1864	32,068	115,528	1913	2,879,251	9,197,460
1865	36,757	131,276	1914	2,426,399	7,745,847
1866	28,129	100,460	1915	2,209,290	7,114,178
1867	34,988	124,956	1916	2,783,849	8,900,675
1868	49,286	176,020	1917	2,686,561	8,484,343
1869	40,098	143,208	1918	2,888,170	12,833,994
1870	33,424	119,372	1919	2,698,022	11,975,671
1871	55,458[2]	164,612	1920	3,020,387	13,450,169
1872	55,458[2]	164,612	1921	2,877,995	12,836,013
1873	55,459[2]	164,612	1922	2,890,625	12,880,060
1874	91,334	244,641	1923	2,848,146	12,678,548
1875	123,362	330,435	1924	2,226,037	9,911,935
1876	155,895	417,576	1925	2,737,607	12,168,905
1877	172,540	462,156	1926	2,609,640	11,650,180
1878	191,348	522,538	1927	2,748,286	12,269,135
1879	270,257	723,903	1928	2,829,906	12,633,510
1880	299,708	802,785	1929	2,521,402	11,256,260
1881	255,760	685,171	1930	2,113,586	9,435,650
1882	315,997	846,417	1931	1,912,501	7,684,155
1883	238,895	639,897	1932	1,719,172	6,523,644
1884	441,358	1,182,210	1933	1,416,516	5,375,171
1885	409,468	1,096,788	1934	1,508,741	5,725,133
1886	365,832	979,908	1935	1,330,524	5,048,864
1887	462,964	1,240,080	1936	1,508,048	5,722,502
1888	548,017	1,467,903	1937	1,618,051	6,139,920
1889	649,411	1,739,490	1938	1,466,559	5,565,069
1890	759,518	2,034,420	1939	1,655,217	6,280,956
1891	1,152,590	3,087,291	1940	1,867,966	7,088,265
1892	925,495	2,479,005	1941	2,018,635	7,660,000
1893	1,095,690	2,934,882	1942	2,170,737	8,237,172
1894	1,134,509	3,038,859	1943	2,040,253	7,742,030
1895	1,052,412	2,824,687	1944	2,165,676	8,217,966
1896	1,002,268	2,693,961	1945	1,700,914	6,454,360
1897	999,372	2,734,522	1946	1,639,277	6,732,470
1898	1,263,272	3,582,595	1947	1,923,573	8,680,440
1899	1,435,314	4,126,803	1948	1,809,018	9,765,395
1900	1,781,000	4,744,530	1949	1,917,296	10,549,924
1901	1,894,544	5,016,398	1950	1,756,667	10,119,303
1902	1,838,621	4,832,257	1951	1,824,384	10,169,617
1903	1,624,742	4,332,297	1952	1,650,619	9,729,739
1904	1,887,981	4,953,024	1953	1,576,105	9,528,279
1905	2,044,931	5,511,861	1954	1,447,608	9,154,544
1906	2,126,965	5,548,044	1955	1,484,066	8,986,501
1907	2,485,961	7,637,713	Totals	137,688,559	$523,521,783

TABLE IXB.—COAL PRODUCTION (GROSS[1]) BY DISTRICTS AND MINING DIVISIONS

District and Mining Division	Total to Date			1954		1955	
	Period	Quantity	Value	Quantity	Value	Quantity	Value
		Tons	$	Tons	$	Tons	$
Vancouver Island District							
Nanaimo Mining Division	1836–1955	79,284,503	290,741,699	205,920	2,029,099	209,784	1,769,682
Nicola-Princeton District							
Kamloops Mining Division	1893–1945	14,995	59,765				
Nicola Mining Division	1907–1955	2,926,121	11,041,565	1,256	12,769	1,259	12,904
Osoyoos Mining Division	1926–1927	1,122	5,008				
Similkameen Mining Division	1909–1955	4,563,035	19,072,182	29,713	138,080	73,475	379,511
District totals	1893–1955	7,505,273	30,178,520	30,969	150,849	74,734	392,415
Northern District							
Cariboo Mining Division	1942–1944	290	1,100				
Liard Mining Division	1923–1955	78,943	510,920	4,359	33,079	3,650	32,850
Omineca Mining Division	1918–1955	392,980	2,371,523	36,572	292,862	31,460	227,010
District totals	1918–1955	472,213	2,883,543	40,931	325,941	35,110	259,860
East Kootenay District							
Fort Steele Mining Division	1898–1955	50,426,570	199,718,021	1,169,788	6,648,655	1,164,438	6,564,544
Provincial totals	1836–1955	137,688,559	523,521,783	1,447,608	9,154,544	1,484,066	8,986,501

[1] Gross mine output, including washery loss and coal used in making coke (*see* Table X and discussion under "Fuel," page A 14).

[2] A combined total for 1871, 1872, and 1873 has previously been noted in Annual Reports and the above breakdown is estimated.

TABLE IXc.—QUANTITY[3] AND VALUE OF COAL SOLD AND USED,[4] 1946–55

Year	District and Mining Division	Total Sales[4*]	Used under Companies' Boilers[4†]	Used in Making Coke[4‡]	Total Sold and Used[4]		District Totals, 1955	
		Tons	Tons	Tons	Tons	$	Tons	$
	Vancouver Island	.....	.....	.....	.....	.....	**174,326**	**1,769,682**
1946	Nanaimo	502,406	4,396	.....	506,802	3,474,182		
1947	"	450,968	3,786	.....	454,754	3,625,348		
1948	"	365,328	2,801	.....	368,129	3,219,868		
1949	"	451,074	3,925	.....	454,999	4,055,572		
1950	"	472,690	4,329	.....	477,019	4,060,337		
1951	"	391,687	3,425	.....	395,112	3,486,615		
1952	"	267,346	2,986	.....	270,332	2,749,206		
1953	"	204,931	1,798	.....	206,729	2,059,828		
1954	"	181,534	536	.....	182,070	2,029,099		
1955	"	**173,861**	**465**	.....	**174,326**	**1,769,682**		
	Nicola-Princeton	.....	.....	.....	.....	.....	**74,734**	**392,415**
1946	Nicola	1,711	81	.....	1,792	8,957		
1947	"	1,997	261	.....	2,258	15,493		
1948	"	1,777	.....	.....	1,777	15,281		
1949	"	1,672	.....	.....	1,672	14,809		
1950	"	1,125	.....	.....	1,125	9,926		
1951	"	899	.....	.....	899	8,640		
1952	"	1,139	.....	.....	1,139	11,498		
1953	"	1,040	.....	.....	1,040	10,400		
1954	"	1,256	.....	.....	1,256	12,769		
1955	"	**1,259**	.....	.....	**1,259**	**12,904**		
1946	Similkameen	43,556	.....	.....	43,556	214,098		
1947	"	49,324	.....	.....	49,324	329,179		
1948	"	49,859	.....	.....	49,859	299,387		
1949	"	49,906	.....	.....	49,906	298,293		
1950	"	16,784	.....	.....	16,784	87,483		
1951	"	3,941	.....	.....	3,941	28,094		
1952	"	6,306	.....	.....	6,306	48,760		
1953	"	7,047	.....	.....	7,047	51,012		
1954	"	29,713	.....	.....	29,713	138,080		
1955	"	**73,475**	.....	.....	**73,475**	**379,511**		
	Northern	.....	.....	.....	.....	.....	**33,665**	**259,860**
1946	Liard	2,501	78	.....	2,579	14,540		
1947	"	5,958	59	.....	6,017	35,012		
1948	"	8,570	60	.....	8,630	52,721		
1949	"	12,364	.....	.....	12,364	76,697		
1950	"	12,250	.....	.....	12,250	82,258		
1951	"	3,199	.....	.....	3,199	26,095		
1952	"	3,854	.....	.....	3,854	42,606		
1953	"	4,815	**20**	.....	4,835	**50,895**		
1954	"	4,359	.....	.....	4,359	33,079		
1955	"	**3,650**	.....	.....	**3,650**	**32,850**		
1946	Omineca	12,087	51	.....	12,138	67,928		
1947	"	10,751	59	.....	10,810	63,375		
1948	"	10,920	66	.....	10,986	85,981		
1949	"	11,468	63	.....	11,531	92,865		
1950	"	13,037	62	.....	13,099	**104,790**		
1951	"	27,904	.....	.....	27,904	206,799		
1952	"	37,270	.....	.....	37,270	285,732		
1953	"	42,079	.....	.....	42,079	324,986		
1954	"	36,572	.....	.....	36,572	292,862		
1955	"	**30,015**	.....	.....	**30,015**	**227,010**		
	East Kootenay	.....	.....	.....	.....	.....	**1,050,149**	**6,564,544**
1946	Fort Steele	744,941	21,161	106,122	872,224	2,952,765		
1947	"	973,358	24,163	175,665	1,173,186	4,612,033		
1948	"	990,530	20,227	154,342	1,165,099	6,092,157		
1949	"	842,979	19,025	228,792	1,090,796	6,011,688		
1950	"	825,315	15,196	213,218	1,053,729	5,774,509		
1951	"	889,669	15,977	236,871	1,142,517	6,413,374		
1952	"	822,071	15,813	245,528	1,083,412	6,591,942		
1953	"	878,865	12,729	230,814	1,122,408	7,031,158		
1954	"	820,081	15,310	218,923	1,054,314	6,648,655		
1955	"	**803,125**	**16,560**	**230,464**	**1,050,149**	**6,564,544**		
1946	Provincial totals	1,307,202	25,767	106,122	1,439,091	6,732,470		
1947	"	1,492,356	28,328	175,665	1,696,349	8,680,440		
1948	"	1,426,984	23,154	154,342	1,604,480	9,765,395		
1949	"	1,369,463	23,013	228,792	1,621,268	10,549,924		
1950	"	1,341,201	19,587	213,218	1,574,006	10,119,303		
1951	"	1,317,299	19,402	236,871	1,573,572	10,169,617		
1952	"	1,137,986	18,799	245,528	1,402,313	9,729,739		
1953	"	1,138,777	14,547	230,814	1,384,138	9,528,279		
1954	"	1,073,515	15,846	218,923	1,308,284	9,154,544		
1955	"	**1,085,385**	**17,025**	**230,464**	**1,332,874**	**8,986,501**	**1,332,874**	**8,986,501**

[3] For differences between gross mine output and coal sold refer to table "Production and Distribution by Collieries and by Districts" in section headed "Coal" or "Coal-mining" in Annual Reports of the Minister of Mines.

[4] The totals "sold and used" include:—

* Sales to retail and wholesale dealers, industrial users, and company employees.

† Coal used in company boilers, including steam locomotives.

‡ Coal used in making coke.

See also discussion under "Fuel," page A 14.

TABLE X.—COKE AND BY-PRODUCTS PRODUCTION FOR YEARS 1895 TO 1925 AND 1926 TO 1955

Year	Coal Used in Making Coke		Coke Made in Bee-hive Ovens		Coke Made in By-product Ovens		Coke Made in Gas Plants		Total Coke Made		Gas Sold and Used	Tar Produced	Other By-products[1]	Total Production Value of Coke Industry
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value				
	Tons	$	Tons	$	Tons	$	Tons	$	Tons	$	$	$	$	$
1895–1925	7,955,795	25,673,600	4,920,457	25,673,600	.....	.....	.....	.....	4,920,457	25,673,600	.....	.....	.....	25,673,600
1926	299,839	1,338,565	105,227	795,841	42,209	244,469	42,468	221,600	189,904	1,261,910	1,009,613	50,035	45,772	2,367,330
1927	269,482	1,290,760	95,281	595,504	35,900	327,215	39,464	178,682	170,645	1,101,401	1,222,379	44,402	18,080	2,386,262
1928	210,207	940,668	68,734	429,590	32,322	263,781	41,711	187,882	142,767	881,253	1,313,407	45,313	14,036	2,254,009
1929	226,363	950,243	75,426	574,279	33,339	308,867	46,573	214,732	155,338	1,097,878	1,461,445	61,084	39,203	2,659,610
1930	225,325	1,002,684	73,708	558,801	31,904	298,004	45,751	232,917	151,363	1,089,722	1,547,092	65,770	11,935	2,714,519
1931	211,334	924,279	73,248	548,550	27,717	236,537	41,836	210,470	142,801	995,557	1,541,454	66,506	32,603	2,636,120
1932	151,750	710,432	33,090	247,615	25,436	217,221	44,645	237,174	103,171	702,010	1,589,656	54,771	14,109	2,360,546
1933	107,400	554,152	6,097	44,813	24,263	213,750	34,156	214,454	64,516	473,017	1,473,433	45,610	3,666	1,995,726
1934	141,384	571,167	24,840	154,105	23,512	213,653	51,184	198,217	99,536	565,975	1,439,287	43,939	4,756	2,053,957
1935	127,776	494,492	27,066	160,565	14,911	109,684	46,111	160,694	88,088	430,943	1,430,057	44,876	3,081	1,908,957
1936	125,810	436,595	34,009	191,843	.....	.....	48,859	138,787	82,868	330,630	1,422,783	38,872	.....	1,792,285
1937	166,124	570,250	48,393	277,726	.....	.....	59,141	330,821	107,534	608,547	1,746,047	46,698	.....	2,401,292
1938	176,877	623,649	54,602	315,294	.....	.....	58,643	345,790	113,245	661,084	1,770,839	44,324	.....	2,476,247
1939	171,242	569,945	50,153	286,491	7,196	37,015	55,395	325,435	112,744	648,941	1,768,977	44,108	.....	2,462,026
1940	184,160	577,706	37,845	220,211	29,124	151,931	60,726	303,421	127,695	675,563	1,810,083	54,379	3,060	2,543,085
1941	235,809	717,584	64,707	392,473	86,656	467,440	8,378	43,758	159,741	903,671	1,925,270	63,569	1,716	2,894,226
1942	255,862	866,795	66,824	439,464	96,428	608,521	6,528	54,307	169,780	1,102,292	2,165,888	86,113	22,028	3,376,321
1943	260,334	983,910	42,766	291,843	43,895	274,402	93,714	647,482	180,375	1,213,727	2,453,592	96,249	18,321	3,781,889
1944	212,883	1,439,891	36,966	301,201	47,401	347,245	88,430	565,393	172,797	1,213,839	2,562,610	56,476	19,046	3,851,971
1945	230,868	1,211,584	13,464	117,369	59,098	434,876	91,682	577,479	164,244	1,129,724	2,721,690	83,828	20,756	3,955,998
1946	251,954	1,441,415	20,542	178,556	53,525	423,025	101,094	648,297	175,161	1,249,878	3,079,009	88,947	53,097	4,470,931
1947	284,049	1,682,602	44,517	427,330	59,638	531,114	91,755	579,635	195,910	1,538,079	3,390,713	124,885	25,780	5,079,457
1948	235,297	1,440,415	47,461	559,735	57,112	630,390	57,678	455,096	162,251	1,645,221	4,520,886	153,130	19,489	6,338,726
1949	323,899	1,979,138	66,407	690,045	89,268	1,018,288	67,449	496,933	223,124	2,205,266	4,148,124	194,728	27,406	6,575,524
1950	333,955	2,027,470	23,703	269,728	127,477	997,200	92,704	686,871	243,884	1,953,799	4,298,161	277,138	27,944	6,557,042
1951	332,416	1,949,117	32,598	387,796	138,051	1,552,764	72,215	571,161	242,864	2,511,721	4,263,754	277,786	22,132	7,075,393
1952	323,922	1,972,918	35,110	440,756	142,156	1,729,924	64,906	525,384	242,172	2,696,064	4,625,747	252,070	25,639	7,599,520
1953	310,431	2,005,551	.....	.....	177,790	2,090,147	60,407	525,411	238,197	2,615,558	4,857,116	238,771	21,046	7,732,491
1954	302,052	2,052,641	.....	.....	168,982	2,032,902	67,108	566,660	236,090	2,599,562	5,113,334	226,824	20,586	7,960,306
1955	314,994	2,122,303	.....	.....	177,031	2,180,516	70,387	594,482	247,418	2,774,998	5,407,842	292,984	18,369	8,494,193
Totals	14,959,593	59,122,521	6,223,241	35,571,124	1,852,341	17,940,881	1,751,098	11,039,425	9,825,777	64,551,430	78,080,288	3,264,185	533,656	146,429,559

[1] "Other by-products" total includes ammonium sulphate, $52,492; ammonia liquor, $103,850; light oils, $16,571; motor fuel, $7,009; naphthalene, $4,077; creosote, $34; benzol (thinning), $312; solvent naphtha, $644; cinders, $323,721; pitch, $5,131; sulphuric acid, $6,658; tar-paint, $2,330; and miscellaneous, $10,827.

TABLE XI.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1955

Dividends Paid during 1954 and 1955

	1954	1955
Bralorne Mines Ltd.	.....	$187,050
Britannia Mining and Smelting Co. Ltd.	$579,899	.....
Bulkley Valley Collieries Ltd.	6,000	.....
Canadian Exploration Ltd.	.....	4,722,000
Consolidated Mining and Smelting Co. of Canada, Ltd.	22,113,331	28,665,451
Crow's Nest Pass Coal Co. Ltd.	248,472	248,472
Granby Consolidated Mining Smelting and Power Co. Ltd.	225,116	225,116
Island Mountain Mines Co. Ltd.	735,501[1]	157,607[1]
Kelowna Mines Hedley Ltd.	180,000	.....
Pioneer Gold Mines of B.C. Ltd.	218,969	175,175
Silver Standard Mines Ltd.	192,974	42,883
Torbrit Silver Mines Ltd.	150,000	240,000
Violamac Mines (B.C.) Ltd.	400,000	.....
Yale Lead and Zinc Mines Ltd.	.....	92,840
Others	318,000	314,989
Totals	$25,368,262	$35,071,583

[1] First and second "liquidating" payments.

Dividends Paid Yearly, 1917 to 1955, Inclusive

Year	Amount Paid	Year	Amount Paid
1917	$3,269,494	1937	$15,085,293
1918	2,704,469	1938	12,068,875
1919	2,494,283	1939	11,865,698
1920	1,870,296	1940	14,595,530
1921	736,629	1941	16,598,110
1922	3,174,756	1942	13,627,104
1923	2,983,570	1943	11,860,159
1924	2,977,276	1944	11,367,732
1925	5,853,419	1945	10,487,395
1926	8,011,137	1946	15,566,047
1927	8,816,681	1947	27,940,213
1928	9,572,536	1948	37,672,319
1929	11,263,118	1949	33,651,096
1930	10,543,500	1950	34,399,330
1931	4,650,857	1951	40,921,238
1932	2,786,958	1952	32,603,956
1933	2,471,735	1953	22,323,089
1934	4,745,905	1954	25,368,262
1935	7,386,070	1955	35,071,583
1936	10,513,705		
		Total	$529,899,423

TABLE XI.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1955—*Continued*

Lode-gold Mines[1]

Company or Mine	Locality	Class	Amount Paid
Arlington	Erie	Gold	$94,872
Athabasca	Nelson	Gold	25,000
Bayonne	Tye Siding	Gold	25,000
Bralorne Mines Ltd.	Bridge River	Gold	16,886,600
Belmont-Surf Inlet	Princess Royal Island	Gold	1,437,500
Cariboo Gold Quartz Mining Co. Ltd.	Wells	Gold	1,679,976
Cariboo-McKinney Con. M. & M. Co.	Camp McKinney	Gold	565,588
Canadian Pacific Exploration (Porto Rico)	Nelson	Gold	37,500
Centre Star	Rossland	Gold-copper	472,255
Fairview Amalgamated	Oliver	Gold	5,254
Fern Gold Mining & Milling Co. Ltd.	Nelson	Gold	9,375
Gold Belt Mining Co. Ltd.	Sheep Creek	Gold	668,595[2]
Goodenough (leasers)	Ymir	Gold	13,731
Hedley Mascot Gold Mines Ltd.	Hedley	Gold	1,290,553
Island Mountain Mines Ltd.	Wells	Gold	2,411,382[2]
I.X.L.	Rossland	Gold	134,025
Jewel-Denero	Greenwood	Gold	11,751
Kelowna Exploration Co. Ltd. (Nickel Plate)	Hedley	Gold	2,040,000
Kelowna Mines Hedley Ltd.	Hedley	Gold	780,000[3]
Kootenay Belle Gold Mines Ltd.	Sheep Creek	Gold	357,856
Le Roi Mining Co.	Rossland	Gold-copper	1,475,000
Le Roi No. 2 Ltd.	Rossland	Gold-copper	1,574,640
Lorne (later Bralorne)	Bridge River	Gold	20,450
Motherlode	Sheep Creek	Gold	163,500
Mount Zeballos Gold Mines Ltd.	Zeballos	Gold	165,000
Nickel Plate (Hedley Gold Mining Co. Ltd.)	Hedley	Gold	3,423,191
Pioneer Gold Mines of B.C. Ltd.	Bridge River	Gold	9,868,712
Poorman	Nelson	Gold	25,000
Premier Gold Mining Co. Ltd.	Premier	Gold	18,858,075[4]
Privateer Mine Ltd.	Zeballos	Gold	1,914,183
Queen (prior to Sheep Creek Gold Mines Ltd.)	Sheep Creek	Gold	98,674
Relief Arlington Mines Ltd. (Second Relief)	Erie	Gold	308,000[2]
Reno Gold Mines Ltd.	Sheep Creek	Gold	1,433,640[2]
Sheep Creek Gold Mines Ltd.	Sheep Creek	Gold	3,609,375[5]
Silbak Premier Mines Ltd.	Premier	Gold	2,425,000[4]
Spud Valley Gold Mines Ltd.	Zeballos	Gold	168,000
Sunset No. 2	Rossland	Gold-copper	115,007
Surf Inlet Consolidated Gold Mines Ltd.	Surf Inlet	Gold	120,279
War Eagle	Rossland	Gold-copper	1,245,250
Ymir Gold	Ymir	Gold	300,000
Ymir Yankee Girl	Ymir	Gold	415,002[2]
Miscellaneous mines		Gold	108,623
Total, lode-gold mines			$76,541,414

[1] The gold-copper properties of Rossland are included in this table.

[2] Includes "return of capital" and "liquidating" payments.

[3] Former Kelowna Exploration Company Limited; changed in January, 1951.

[4] Up to and including 1936, dividends paid by Premier Gold Mining Company Limited were derived from operations of the company in British Columbia. Subsequent dividends paid by Premier Gold Mining Company Limited have been derived from the operations of subsidiary companies in British Columbia and elsewhere and are not included in the figure given. In 1936, Silbak Premier, a subsidiary of Premier Gold Mining Company, took over the former gold operations of that company in British Columbia. Dividends paid by Silbak Premier are given above.

[5] In several years, preceding 1953, company revenue has included profits from operation of the Lucky Jim zinc-lead mine.

TABLE XI.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1955—*Continued*

Silver-Lead-Zinc Mines

Company or Mine	Locality	Class	Amount Paid
Antoine	Rambler	Silver-lead-zinc	$10,000
Base Metals Mining Corporation Ltd. (Monarch and Kicking Horse)	Field	Silver-lead-zinc	586,143[1]
Beaverdell-Wellington	Beaverdell	Silver-lead-zinc	97,200
Beaver Silver Mines Ltd.	Greenwood	Silver-lead-zinc	48,000
Bell	Beaverdell	Silver-lead-zinc	388,297
Bosun (Rosebery-Surprise)	New Denver	Silver-lead-zinc	25,000
Canadian Exploration Ltd.	Salmo	Silver-lead-zinc	4,722,000
Capella	New Denver	Silver-lead-zinc	5,500
Consolidated Mining and Smelting Co. of Canada, Ltd.	Trail	Silver-lead-zinc	406,551,244[2]
Couverapee	Field	Silver-lead-zinc	5,203
Duthie Mines Ltd.	Smithers	Silver-lead-zinc	50,000
Florence Silver	Ainsworth	Silver-lead-zinc	35,393
Goodenough	Cody	Silver-lead-zinc	45,668
H.B. Mining Co.	Hall Creek	Silver-lead-zinc	8,904
Highland Lass Ltd.	Beaverdell	Silver-lead-zinc	132,464
Highland-Bell Ltd.	Beaverdell	Silver-lead-zinc	1,398,025
Horn Silver	Similkameen	Silver-lead-zinc	6,000
Idaho-Alamo	Sandon	Silver-lead-zinc	400,000
Iron Mountain (Emerald)	Salmo	Silver-lead-zinc	20,000
Jackson	Retallack	Silver-lead-zinc	20,000
Last Chance	Three Forks	Silver-lead-zinc	213,000
Lone Bachelor	Sandon	Silver-lead-zinc	50,000
Lucky Jim	Three Forks	Silver-lead-zinc	80,000
Mercury	Sandon	Silver-lead-zinc	6,000
Meteor	Slocan City	Silver-lead-zinc	10,257
Monitor and Ajax	Three Forks	Silver-lead-zinc	70,500
Mountain Con	Cody	Silver-lead-zinc	71,387
McAllister	Three Forks	Silver-lead-zinc	45,088
Noble Five	Cody	Silver-lead-zinc	72,859
North Star	Kimberley	Silver-lead-zinc	497,901
No. One	Sandon	Silver-lead-zinc	6,754
Ottawa	Slocan City	Silver-lead-zinc	110,429
Payne	Sandon	Silver-lead-zinc	1,438,000
Providence	Greenwood	Silver-lead-zinc	142,328[3]
Queen Bess	Alamo	Silver-lead-zinc	25,000
Rambler-Cariboo	Rambler	Silver-lead-zinc	467,250
Reeves MacDonald Mines Ltd.	Remac	Silver-lead-zinc	1,169,000
Reco	Cody	Silver-lead-zinc	334,992
Ruth Mines Ltd.	Sandon	Silver-lead-zinc	125,490
St. Eugene	Moyie	Silver-lead-zinc	566,000
Silversmith and Slocan Star[4]	Sandon	Silver-lead-zinc	1,267,600
Silver Standard Mines Ltd.	Hazelton	Silver-lead-zinc	1,715,333
Spokane-Trinket	Ainsworth	Silver-lead-zinc	10,365
Standard Silver Lead	Silverton	Silver-lead-zinc	2,734,688
Sunset and Trade Dollar	Retallack	Silver-lead-zinc	88,000
Torbrit Silver Mines Ltd.	Alice Arm	Silver-lead-zinc	390,000
Utica	Kaslo	Silver-lead-zinc	64,000
Violamac Mines (B.C.) Ltd.	New Denver	Silver-lead-zinc	850,000
Wallace Mines Ltd. (Sally)	Beaverdell	Silver-lead-zinc	135,000
Washington	Rambler Station	Silver-lead-zinc	20,000
Western Exploration Co. Ltd.	Silverton	Silver-lead-zinc	30,867
Whitewater	Retallack	Silver-lead-zinc	592,515
Yale Lead and Zinc Mines Ltd.	Ainsworth	Silver-lead-zinc	92,840
Miscellaneous mines		Silver-lead-zinc	70,239
Total, silver-lead-zinc mines			$428,118,723

[1] Includes $466,143 "return of capital" distribution prior to 1949.
[2] Earnings of several company mines, and customs smelter at Trail.
[3] Includes $10,504 paid in 1944 but not included in the yearly figure.
[4] These two properties were amalgamated as Silversmith Mines Limited in August, 1939.

TABLE XI.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1955—*Continued*

Copper Mines

Company or Mine	Locality	Class	Amount Paid
Britannia M. & S. Co.[1]	Britannia Beach	Copper	$18,803,772
Canada Copper Corporation	Greenwood	Copper	615,399
Cornell	Texada Island	Copper	8,500
Granby Cons. M.S. & P. Co.[2]	Copper Mountain	Copper	29,760,168
Marble Bay	Texada Island	Copper	175,000
Hall Mines	Nelson	Copper	233,280
Miscellaneous mines		Copper	261,470
Total, copper mines			$49,857,589

[1] Britannia Mining and Smelting Company Limited is a subsidiary of the Howe Sound Company, which is the holding company for Britannia and for other mines in Canada, Mexico, and the United States. Dividends paid by the Howe Sound Company, therefore, cannot be credited to British Columbia. Dividends in the above table for Britannia have been paid by that company, none being paid subsequent to 1930, until 1939. In making comparison with yearly totals, the amounts shown as paid by the Howe Sound Company have been deducted for the years shown, so the total in the annual report concerned will show the higher figure.

[2] The Granby Consolidated Mining Smelting and Power Company dividends commenced in 1904 and cover all company activities in British Columbia to date, the present operations being conducted at Allenby and Copper Mountain. The dividends as set out in the table in the Minister of Mines Annual Report for 1942 were incorrect; the correct total is as above. The figure now includes all dividends, capital distributions, and interim liquidating payments, the latter being $4,500,000, paid, in 1936, prior to reorganization.

Coal Mines

Company or Mine	Locality	Class	Amount Paid
Wellington Collieries Ltd.	Nanaimo	Coal	$16,000,000
Bulkley Valley Collieries Ltd.	Telkwa	Coal	24,000
Crow's Nest Pass Coal Co. Ltd.	Fernie	Coal	15,725,310
Canadian Collieries (D.) Ltd.	Nanaimo	Coal	563,272
Total, coal mines			$32,312,582

Aggregate of All Classes

Lode-gold mining	$76,541,414
Silver-lead-zinc mining and smelting	428,118,723
Copper-mining	49,857,589
Coal-mining	32,312,582
Miscellaneous, structural, and placer gold	5,958,159
Total	$592,788,467

NOTE.—The term "miscellaneous" noted in each class of dividend covers all payments of $5,000 and under, together with payments made by companies or individuals requesting that the item be not disclosed.

In compiling the foregoing table of dividends paid, the Department wishes to acknowledge the kind assistance given by companies, individuals, and trade journals in giving information on the subject.

TABLE XII.—PRINCIPAL ITEMS OF EXPENDITURE, REPORTED FOR MINING OPERATIONS OF ALL CLASSES

Class	Salaries and Wages	Fuel and Electricity	Process Supplies
Lode-mining	$38,931,020	$2,206,289[1]	$18,332,380[1]
Placer-mining	132,116	11,300	42,406
Coal-mining	5,798,913	673,682	4,321,565
Miscellaneous metals and industrial minerals	3,043,748	795,286	904,980
Structural materials industry	3,984,449	1,945,992	1,041,726
Totals, 1955	**$51,890,246**	**$5,632,549[1]**	**$24,643,057[1]**
Totals, 1954	48,702,746	7,128,669	19,654,724
1953	55,543,490	8,668,099	20,979,411
1952	62,256,631	8,557,845	27,024,500
1951	52,561,952	7,283,051	24,724,101
1950	42,738,035	6,775,998	17,500,663
1949	41,023,786	7,206,637	17,884,408
1948	38,813,506	6,139,174	11,532,121
1947	32,160,338	5,319,470	13,068,948
1946	26,190,200	5,427,458	8,367,705
1945	22,620,975	7,239,726	5,756,628
1944	23,131,874	5,788,671	6,138,084
1943	26,051,467	7,432,585	6,572,317
1942	26,913,160	7,066,109	6,863,398
1941	26,050,491	3,776,747	7,260,441
1940	23,391,330	3,474,721	6,962,162
1939	22,357,035	3,266,000[2]	6,714,347
1938	22,765,711	3,396,106	6,544,500
1937	21,349,690	3,066,311	6,845,330
1936	17,887,619	2,724,144	4,434,501
1935	16,753,367	2,619,639	4,552,730
Grand totals, 1935–55	$701,153,649	$117,989,709	$254,024,076

[1] A major operator reported fuel, electricity, and process supplies for 1955 as a combined figure under the heading "Process Supplies." For that reason the lode-mining item "Fuel and Electricity" is unduly small and "Process Supplies" unduly large.

[2] Estimated.

NOTE.—"Process supplies" include explosives, chemicals, drill-steel, lubricants, etc.

TABLE XIII.—AVERAGE NUMBER EMPLOYED IN THE MINING INDUSTRY, 1901–55

Year	Placer-mining	Lode-mining			In Concentrators	In Smelters	Coal-mining			Structural Materials		Miscellaneous	Total[1]
		Under	Above	Total			Under	Above	Total	Quarries and Pits	Plants		
1901	.....	2,736	1,212	3,948	.....	.....	3,041	931	3,974	.....	.....	.....	7,922
1902	.....	2,219	1,126	3,345	.....	.....	3,101	910	4,011	.....	.....	.....	7,356
1903	.....	1,662	1,088	2,750	.....	.....	3,137	1,127	4,264	.....	.....	.....	7,014
1904	.....	2,143	1,163	3,306	.....	.....	3,278	1,175	4,453	.....	.....	.....	7,759
1905	.....	2,470	1,240	3,710	.....	.....	3,127	1,280	4,407	.....	.....	.....	8,117
1906	.....	2,680	1,303	3,983	.....	.....	3,415	1,390	4,805	.....	.....	.....	8,788
1907	.....	2,704	1,239	3,943	.....	.....	2,862	907	3,769	.....	.....	.....	7,712
1908	.....	2,567	1,127	3,694	.....	.....	4,432	1,641	6,073	.....	.....	.....	9,767
1909	.....	2,184	1,070	3,254	.....	.....	4,713	1,705	6,418	.....	.....	.....	9,672
1910	.....	2,472	1,237	3,709	.....	.....	5,903	1,855	7,758	.....	.....	.....	11,467
1911	.....	2,435	1,159	3,594	.....	.....	5,212	1,661	6,873	.....	.....	.....	10,467
1912	.....	2,472	1,364	3,837	.....	.....	5,275	1,855	7,130	.....	.....	.....	10,967
1913	.....	2,773	1,505	4,278	.....	.....	4,950	1,721	6,671	.....	.....	.....	10,949
1914	.....	2,741	1,433	4,174	.....	.....	4,267	1,465	5,732	.....	.....	.....	9,906
1915	.....	2,709	1,435	4,144	.....	.....	3,708	1,283	4,991	.....	.....	.....	9,135
1916	.....	3,357	2,036	5,393	.....	.....	3,694	1,366	5,060	.....	.....	.....	10,453
1917	.....	3,290	2,198	5,488	.....	.....	3,760	1,410	5,170	.....	.....	.....	10,658
1918	.....	2,626	1,764	4,390	.....	.....	3,658	1,769	5,247	.....	.....	.....	9,637
1919	.....	2,513	1,746	4,259	.....	.....	4,145	1,821	5,966	.....	.....	.....	10,225
1920	.....	2,074	1,605	3,679	.....	.....	4,191	2,158	6,349	.....	.....	.....	10,028
1921	.....	1,355	975	2,330	.....	.....	4,722	2,163	6,885	.....	.....	.....	9,215
1922	.....	1,510	1,239	2,749	.....	.....	4,712	1,932	6,644	.....	.....	.....	9,393
1923	.....	2,102	1,516	3,618	.....	.....	4,342	1,807	6,149	.....	.....	.....	9,767
1924	.....	2,353	1,680	4,033	.....	.....	3,894	1,524	5,418	.....	.....	.....	9,451
1925	.....	2,298	2,840	5,138	.....	.....	3,828	1,615	5,443	.....	.....	.....	10,581
1926	299	2,606	1,735	4,341	808	2,461	3,757	1,565	5,322	493	324	124	14,172
1927	415	2,671	1,916	4,587	854	2,842	3,646	1,579	5,225	647	138	122	14,880
1928	355	2,707	2,469	5,176	911	2,748	3,814	1,520	5,334	412	368	120	15,424
1929	341	2,926	2,052	4,978	966	2,948	3,675	1,353	5,028	492	544	268	15,565
1930	425	2,316	1,260	3,576	832	3,197	3,389	1,256	4,645	843	344	170	14,032
1931	688	1,463	834	2,297	581	3,157	2,957	1,125	4,082	460	526	380	12,171
1932	874	1,355	900	2,255	542	2,036	2,628	980	3,608	536	329	344	10,524
1933	1,134	1,786	1,335	3,121	531	2,436	2,241	853	3,094	376	269	408	11,369
1934	1,122	2,796	1,729	4,525	631	2,890	2,050	843	2,893	377	187	360	12,985
1935	1,291	2,740	1,497	4,237	907	2,771	2,145	826	2,971	536	270	754	13,737
1936	1,124	2,959	1,840	4,799	720	2,678	2,015	799	2,814	931	288	825	14,179
1937	1,371	3,603	1,818	5,421	1,168	3,027	2,286	867	3,153	724	327	938	16,129
1938	1,303	3,849	2,266	6,115	919	3,158	2,088	874	2,962	900	295	369	16,021
1939	1,252	3,905	2,050	5,955	996	3,187	2,167	809	2,976	652	311	561	15,890
1940	1,004	3,923	2,104	6,027	1,048	2,944	2,175	699	2,874	827	334	647	15,705
1941	939	3,901	1,823	5,724	1,025	3,072	2,229	494	2,723	766	413	422	15,084
1942	489	2,920	1,504	4,424	960	3,555	1,892	468	2,360	842	378	262	13,270
1943	212	2,394	1,699	4,093	891	2,835	2,240	611	2,851	673	326	567	12,448
1944	255	1,896	1,825	3,721	849	2,981	2,150	689	2,839	690	351	628	12,814
1945	209	1,933	1,750	3,683	822	2,834	1,927	503	2,430	921	335	586	11,820
1946	347	1,918	1,817	3,735	672	2,813	1,773	532	2,305	827	555	679	11,933
1947	360	3,024	2,238	5,262	960	3,461	1,694	731	2,425	977	585	869	14,899
1948	348	3,143	2,429	5,572	1,126	3,884	1,594	872	2,466	1,591	656	754	16,397
1949	303	3,034	2,724	5,758	1,203	3,763	1,761	545	2,306	2,120	542	626	16,621
1950	327	3,399	2,415	5,814	1,259	3,759	1,745	516	2,261	1,916	616	660	16,612
1951	205	3,785	3,695	7,480	1,307	4,044	1,462	463	1,925	1,783	628	491	17,863
1952	230	4,171	3,923	8,094	1,516	4,120	1,280	401	1,681	1,530	557	529	18,257
1953	132	3,145	2,589	5,734	1,371	3,901	1,154	396	1,550	1,909	559	634	15,790
1954	199	2,644	2,520	5,164	1,129	3,119	1,076	358	1,434	1,861	638	584	14,128
1955	**103**	**2,564**	**2,553**	**5,117**	**1,091**	**3,304**	**1,100**	**378**	**1,478**	**1,646**	**641**	**722**	**14,102**

[1] The average number employed in the industry is the sum of the averages for individual companies. The average for each company is obtained by taking the sum of the numbers employed each month and dividing by 12, regardless of the number of months worked.

TABLE XIV.—LODE-METAL MINES—TONNAGE, NUMBER OF MINES, NET AND GROSS VALUE OF PRINCIPAL METALS,[4] 1901–55

Year	Tonnage[1]	Number of Shipping Mines	Number of Mines Shipping over 100 Tons	Gross Value as Reported by Shipper[2]	Freight and Treatment[2]	Net Value to Shipper[3]	Gross Value of Lode Metals Produced[4]
1901	926,162	119	78	.....	.....	.....	$14,100,282
1902	1,009,016	124	75	.....	.....	.....	11,581,153
1903	1,288,466	125	74	.....	.....	.....	12,103,237
1904	1,461,609	142	76	.....	.....	.....	12,909,035
1905	1,706,679	146	79	.....	.....	.....	15,980,164
1906	1,963,872	154	77	.....	.....	.....	18,484,102
1907	1,805,614	147	72	.....	.....	.....	17,316,847
1908	2,083,606	108	59	.....	.....	.....	15,847,411
1909	2,057,713	89	52	.....	.....	.....	15,451,141
1910	2,216,428	83	50	.....	.....	.....	14,728,731
1911	1,770,755	80	45	.....	.....	.....	11,454,063
1912	2,688,532	86	51	.....	.....	.....	17,662,766
1913	2,663,809	110	58	.....	.....	.....	17,190,838
1914	2,175,971	98	56	.....	.....	.....	15,225,061
1915	2,720,669	132	59	.....	.....	.....	19,992,149
1916	*3,229,942*	*169*	81	.....	.....	.....	*31,483,014*
1917	2,797,368	193	87	.....	.....	.....	26,788,474
1918	2,912,516	175	80	.....	.....	.....	27,590,278
1919	2,146,920	144	74	.....	.....	.....	19,750,498
1920	2,215,445	121	60	.....	.....	.....	19,444,365
1921	1,586,428	80	35	.....	.....	.....	12,920,398
1922	1,592,163	98	38	.....	.....	.....	19,227,857
1923	2,447,672	77	28	.....	.....	.....	25,347,092
1924	3,413,912	86	37	.....	.....	.....	35,538,247
1925	3,849,269	102	40	.....	.....	.....	46,200,135
1926	4,775,327	138	55	.....	.....	$38,558,613	51,508,031
1927	5,416,411	132	52	.....	.....	27,750,364	44,977,082
1928	6,241,672	110	49	.....	.....	29,070,075	48,281,825
1929	6,977,903	106	48	.....	.....	34,713,887	51,174,859
1930	6,804,276	68	32	.....	.....	21,977,688	40,915,395
1931	5,549,622	44	22	.....	.....	10,513,931	22,535,573
1932	4,354,904	75	29	.....	.....	7,075,393	19,700,235
1933	4,063,775	109	47	.....	.....	13,976,358	25,007,137
1934	5,141,744	145	69	.....	.....	20,243,278	33,895,930
1935	4,927,204	177	72	.....	.....	25,407,914	40,597,569
1936	4,381,173	168	70	.....	.....	30,051,207	43,666,452
1937	6,145,244	185	113	$48,617,920	$4,663,843	43,954,077	62,912,788
1938	7,377,117	211	92	40,222,237	4,943,754	35,278,483	53,877,333
1939	*7,212,171*	*217*	*99*	*45,133,788*	*4,416,919*	*40,716,869*	*53,522,098*
1940	*7,949,736*	*216*	*92*	*50,004,909*	*6,334,611*	*43,670,298*	*62,848,642*
1941	8,007,937	200	96	52,354,870	5,673,048	46,681,822	62,216,019
1942	6,894,844	126	76	50,494,041	5,294,637	45,199,404	55,359,479
1943	5,786,864	48	32	37,234,070	3,940,367	33,293,703	46,089,042
1944	4,879,851	51	31	29,327,114	2,877,706	26,449,408	39,315,910
1945	4,377,722	36	27	34,154,917	2,771,292	31,383,625	49,997,071
1946	3,705,594	50	32	48,920,971	2,904,130	46,016,841	56,519,691
1947	5,011,271	75	33	81,033,093	4,722,010	76,311,087	93,176,165
1948	5,762,321	97	51	118,713,859	18,585,183	100,128,727	125,979,961
1949	*6,125,460*	*118*	*54*	*99,426,678*	*19,613,185*	*79,814,604*	*105,259,001*
1950	6,802,482	112	58	108,864,792	22,113,431	86,751,361	121,635,457
1951	6,972,400	119	64	142,590,427	25,096,743	117,493,684	146,140,477
1952	9,174,617	95	58	140,070,389	30,444,575	106,601,451	134,111,567
1953	9,660,281	80	48	94,555,069	27,815,152	66,739,892	110,341,548
1954	8,513,865	63	40	106,223,833	29,135,673	77,088,160	111,844,340
1955	**9,126,902**	**53**	**34**	**119,039,285**	**30,696,044**	**88,343,241**	**129,455,122**

[1] Includes mercury ores, tungsten ores, iron ores, and silica (flux).

[2] Data not collected before 1937.

[3] *Previous to 1937 the shipper reported "Net Value at Shipping Point," no indication being given as to how the net* value was computed. From 1937 on, the shipper has reported "Gross Value," from which deduction of freight and treatment gives "Net Value."

[4] Gross value as represented by valuing gold, silver, copper, lead, and zinc at yearly average prices.

TABLE XV.—LODE-METAL PRODUCERS IN 1955

Property or Operator	Location of Mine	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Contents					
					Gold	Silver	Copper	Lead	Zinc	Cadmium
NORTHERN BRITISH COLUMBIA										
Atlin Mining Division			Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Big Bull and Tulsequah Chief	Tulsequah	Tulsequah Mines Ltd., Trail	196,700	Zinc concentrates, 18,062 tons; lead concentrates, 4,276 tons; copper and gold concentrates, 13,912 tons; bullion	20,867	670,916	5,350,522	5,345,187	24,410,825	86,807
Liard Mining Division										
Nil										
CENTRAL BRITISH COLUMBIA										
Cariboo Mining Division										
Cariboo Gold Quartz	Wells	Cariboo Gold Quartz Mining Co. Ltd., Vancouver	108,652	Bullion	41,464	3,989				
Clinton Mining Division										
Nil										
Omineca Mining Division										
American Boy	Hazelton	J. Gallo, lessee, Hazelton	21	Crude ore	1	1,567		7,871	7,502	
Silver Standard	Hazelton	Silver Standard Mines Ltd., Vancouver	10,048	Lead concentrates, 935 tons; zinc concentrates, 1,286 tons	642	362,196	48,816	901,974	1,537,854	19,299
COAST AND ISLANDS										
Alberni Mining Division										
Nil										
Nanaimo Mining Division										
Iron Hill	Quinsam Lake	Utah Co. of the Americas, Campbell River	643,032	Iron-ore concentrates, 343,653 tons						
Prescott, Paxton, Lake	Texada Island	Texada Mines Ltd., Vananda	421,936	Iron-ore concentrates, 267,277 tons						
New Westminster Mining Division										
Nil										

Skeena Mining Division										
Toric	Kitsault River	Torbrit Silver Mines Ltd., Toronto	151,863	Silver-lead concentrates, 1,655 tons; silver bullion		1,819,593		1,128,833		
Vancouver Mining Division										
Britannia	Britannia Beach	Britannia Mining and Smelting Co. Ltd., Britannia Beach	878,661	Copper concentrates and precipitates, 27,708 tons; zinc concentrates, 16,372 tons; iron pyrite concentrates, 55,662 tons	10,969	89,872	16,624,387	1,355,188	19,381,812	76,889
Victoria Mining Division										
Blue Grouse	Cowichan Lake	Cowichan Copper Co. Ltd., Lake Cowichan	3,749	Crude ore		2,092	407,943			
SOUTH CENTRAL BRITISH COLUMBIA										
Greenwood Mining Division										
Copper Queen	Greenwood	W. E. McArthur, Sr., Greenwood	162	Crude ore	24	253	16,309			
Dynamo	Greenwood	M. Butorac, Trail	16	Crude ore		61		2,476	1,159	
Highland-Bell	Beaverdell	Highland-Bell Ltd., Vancouver	13,229	Lead concentrates, 421 tons; zinc concentrates, 312 tons; jig concentrates, 113 tons	193	526,682		263,061	381,266	3,188
Kamloops Mining Division										
Ex No. 1	Squilax	Trans-Mountain Mines, c/o Royal Bank of Canada, Kamloops	40	Crude ore		529		15,743	8,269	
Lillooet Mining Division										
Bralorne	Bridge River	Bralorne Mines Ltd., Vancouver	166,831	Bullion; gold concentrates, 2,807 tons	65,525	14,177				
Pioneer	Bridge River	Pioneer Gold Mines of B.C. Ltd., Vancouver	89,063	Bullion	53,920	10,880				
Nicola Mining Division										
Nil										
Osoyoos Mining Division										
Fairview	Oliver	Cons. Mining & Smelting Co. of Canada, Ltd., Trail	28,269	Silica flux						
Nickel Plate	Hedley	Kelowna Mines Hedley Ltd., Vancouver	90,572	Gold precipitates, 3.67 tons	38,521	3,536				
Oregon (French)	Hedley	Kelowna Mines Hedley Ltd., Vancouver	3,250	Gold precipitates and contents included in Nickel Plate						

TABLE XV.—LODE-METAL PRODUCERS IN 1955—*Continued*

Property or Operator	Location of Mine	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Contents					
					Gold	Silver	Copper	Lead	Zinc	Cadmium
SOUTH CENTRAL BRITISH COLUMBIA—*Continued*										
Similkameen Mining Division			Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Copper Mountain	Copper Mountain	Granby Cons. M.S. & P. Co. Ltd., Copper Mountain	1,966,999	Copper concentrates, 49,565 tons	6,930	155,091	21,249,879			
Keystone	Coquihalla	Golden Ledge Syndicate Ltd.	89	Crude ore[1]						
Vernon Mining Division										
Nil										
SOUTHEASTERN BRITISH COLUMBIA										
Fort Steele Mining Division										
Sullivan	Kimberley	Cons. Mining & Smelting Co. of Canada, Ltd., Trail	2,836,577	Lead concentrates, 143,940 tons; zinc concentrates, 273,908 tons; tin concentrates, 337 tons	335	2,907,749	249,082	225,526,483	265,363,560	
Golden Mining Division										
Mineral King and Paradise	Invermere	Sheep Creek Gold Mines Ltd., Nelson	161,962	Lead concentrates, 3,981 tons; zinc concentrates, 9,742 tons		126,709	144,980	4,933,145	11,377,570	59,765
Silver Giant	Spillimacheen	Giant Mascot Mines Ltd., Vancouver	169,269	Lead concentrates, 8,973 tons; zinc concentrates, 864 tons		111,122	198,934	12,558,284	1,511,133	3,525
Nelson Mining Division										
H.B.	Salmo	Cons. Mining & Smelting Co. of Canada, Ltd., Trail	247,303	Lead concentrates, 1,901 tons; zinc concentrates, 12,925 tons		26,184		2,525,368	13,683,921	166,680
Emerald-Feeney-Dodger	Salmo	Canadian Exploration Ltd., Vancouver	162,506	Tungsten concentrates, 95,700 units WO_3						
Jersey	Salmo	Canadian Exploration Ltd., Vancouver	357,099	Lead concentrates, 7,097 tons; zinc concentrates, 23,266 tons		24,848		10,763,578	35,134,642	197,245
Goodenough (Protection)	Ymir	J. Turk, Ymir	46	Crude ore	33	277		5,412	6,298	
Reeves MacDonald	Remac	Reeves MacDonald Mines Ltd., Vancouver	65,071	Lead concentrates, 925 tons; zinc concentrates, 9,776 tons (includes some zinc concentrates produced in 1953)		7,504		1,627,671	10,222,865	56,302

Revelstoke Mining Division										
Spider	Camborne	Sunshine Lardeau Mines Ltd., Vancouver	28,345	Lead concentrates, 3,832 tons; zinc concentrates, 4,625 tons	2,475	326,828		5,143,334	5,608,261	31,027
Slocan Mining Division										
Bluebell	Riondel	Cons. Mining & Smelting Co. of Canada, Ltd., Trail	241,788	Lead concentrates, 17,085 tons; zinc concentrates, 27,777 tons		345,905	345,241	24,972,006	28,353,216	129,773
Caledonia	Retallack	G. E. McCready, Kaslo	112	Crude ore, 8 tons; lead concentrates, 6 tons; zinc concentrates, 20 tons	2	1,130		18,583	25,162	86
Chieftain	Burton	R. Harding, Silverton	3	Crude ore	1	72		61	34	
Dixie Fraction	Woodbury Creek	J. G. Isaacs and L. Pittman, Kaslo	109	Crude ore		158		9,935	769	
Hercules	Kaslo	Triumph Mines, Inc., c/o C. Lind, Kaslo	6	Crude ore	1	136		159	102	
Hewitt	Silverton	H. Lyon and E. Merrill, lessees, Silverton	26	Crude ore		1,923		9,178	7,198	
Highlander	Ainsworth	Yale Lead & Zinc Mines Ltd., Ainsworth	56,530	Lead concentrates, 4,141 tons; zinc concentrates, 987 tons	5	94,834		4,949,118	1,278,956	
Hinckley	*Silverton*	*W. D. Pengelly, Silverton*	14	Crude ore	1	1,078		15,220	1,508	
Jackson	Retallack	Jackson Basin Mining Co. Ltd., Vancouver	595	Crude ore		614		11,660	147,326	
Noble Five, Slocan Sovereign	Sandon	Cody-Reco Mines Ltd., Toronto, Ont.	1,500	Tonnage estimated; zinc concentrates, 150 tons		1,915		3,559	155,683	1,033
Noonday-Curley	Silverton	M. Arishenkoff, lessee, Shoreacres	10	Crude ore		304		931	890	
Shady Fraction	Sandon	N. Sibilleau, Sandon	1	Crude ore		121		2,080	89	
Silver Bear	Kaslo	A. V. Fiala, Ainsworth	6	Crude ore		368		852	913	
Keystone-Charleston	Retallack	Slocan-Charleston Mining Co. Ltd., Seattle, Wash.	602	Lead concentrates, 20 tons; zinc concentrates, 48 tons	1	2,146		29,949	56,038	443
Standard, Enterprise, Mammoth	Silverton	Western Exploration Co. Ltd., Silverton	541	Crude ore and 212 tons of zinc concentrates from 1952 stockpile	3	6,406		38,179	330,411	2,504
Star	Ainsworth	D. H. Norcross and A. Endersby, Jr., Nelson	55	Oxidized lead ore and crude lead ore	1	273		7,843	6,337	
Tariff	Ainsworth	T. Lane and F. Dumas, Ainsworth	17	Crude ore		233		12,050	3,361	
Trinket	Ainsworth	T. Hawes, Ainsworth	6	Crude ore		25		4,091	590	
Utica	Kaslo Creek	J. A. Cooper, Kaslo	115	Crude ore		16,260		32,909	38,165	
Van Roi	Silverton	Lessees from Slocan Van Roi Mines Ltd., Vancouver	1,457	Crude ore, 23 tons; lead concentrates, 205 tons, and zinc concentrates, 161 tons, from ore milled at Western Exploration Co.	6	18,380		337,506	207,396	1,624
V. & M.	Slocan	A. Archibald *et. al.*, Slocan City	3	Crude ore	3	398		51	19	
Victor	Sandon	Violamac Mines Ltd., New Denver	22,253	Crude ore, 288 tons; lead concentrates, 4,072 tons; zinc concentrates, 3,056 tons	226	450,351		6,500,206	3,797,249	23,588
Yale Lead & Zinc	Ainsworth	Lessee, W. E. Lane, Ainsworth	9	Clean-up material	3	455		7,287	3,082	
Trail Creek Mining Division										
Snowdrop	Rossland	Snowdrop Mining Co. Ltd., Rossland	2	Crude ore	135	25				
Velvet	Rossland	Velvet lessees, Rossland	495	Tonnage estimated; 45 tons of concentrates produced	44	36	6,648			

[1] Contents not available, sample only.

TABLE XVI.—LODE-METAL MINES EMPLOYING AN AVERAGE OF TEN OR MORE MEN DURING 1955[1]

Name of Mine or Operator	Days Operating		Tons		Average Number Employed	
	Mine	Mill	Mined	Milled	Mine	Mill
Shipping Mines						
Big Bull and Tulsequah Chief (Tulsequah Mines Ltd.)	365	365	196,700	196,700	199	20
Cariboo Gold Quartz Mining Co. Ltd.	282	365	108,652	108,652	243	18
Silver Standard Mines Ltd.	278	175	10,048	10,048	79	6
Torbrit Silver Mines Ltd.	365	365	151,863	151,863	108	24
Britannia Mining & Smelting Co. Ltd.	255	274	878,661	878,661	656	215
Highland-Bell Ltd.	273	273	13,229	13,229	48	5
Bralorne Mines Ltd.	365	365	166,831	166,831	403	21
Pioneer Gold Mines of B.C. Ltd.	365	365	96,725	89,063	242	23
Nickel Plate and French mine (Kelowna Mines Hedley Ltd.)	204	273	93,822[2]	93,822[2]	59	44
Copper Mountain (Granby Cons. M.S. & P. Co. Ltd.)	365	365	1,966,999	1,966,999	379	145
Bluebell (Cons. M. & S. Co. of Canada, Ltd.)	264	356	241,788	241,788	267	20
Highlander (Yale Lead & Zinc Mines Ltd.)	280	343	56,530	56,530	56	14
Jackson (Jackson Basin Mining Co. Ltd.)	304	.....	595	.....	13	.....
Standard, Enterprise, and Mammoth (Western Exploration Co. Ltd.)	228	212	700	541	25	13
Victor (Violamac Mines Ltd.)	365	.....	22,253	21,965	82	.....
H.B. (Cons. M. & S. Co. of Canada, Ltd.)	237	237	247,303	247,303	109	11
Jersey and Emerald-Dodger-Feeney (Canadian Exploration Ltd.)	261	245	519,605	519,605	297	42
Reeves MacDonald Mines Ltd.	55	59	65,071	65,071	32	6
Sullivan (Cons. M. & S. Co. of Canada, Ltd.)	255	263	2,836,577	2,836,577	1,115	385
Mineral King and Paradise (Sheep Creek Gold Mines Ltd.)	306	347	161,962	161,962	83	12
Silver Giant (Giant Mascot Mines Ltd.)	365	365	169,269	169,269	102	15
Spider (Sunshine Lardeau Mines Ltd.)	305	341	29,055	28,345	53	12
Blue Grouse (Cowichan Copper Co. Ltd.)	283	.....	3,749	.....	31	.....
Argonaut Mine Division of Utah Co. of the Americas	365	365	643,032	643,032	87	19
Texada Mines Ltd.	365	365	420,721	421,936	79	10
Non-shipping Mines						
Noranda Exploration Co. Ltd. (Gabbro and Yreka)	.....	.....	.....	.....	19	.....
Northwestern Explorations, Ltd. (exploration, Cranbrook area)	.....	.....	.....	.....	17	.....
Canam Copper Co. Ltd.	.....	.....	.....	.....	34	.....
Silbak Premier Mines Ltd.	.....	.....	.....	.....	11	.....
Granduc	.....	.....	.....	.....	45	.....

[1] The average number employed includes wage-earners and salaried employees. The average is obtained by adding the monthly figures and dividing by 12, irrespective of the number of months worked.

[2] Includes ore mined and milled from French mine.

Departmental Work

OFFICES

The Department of Mines offices in Victoria are on the fourth floor of the Douglas Building. The analytical laboratories are housed in the one-story building that originally housed the Legislative Assembly and now faces Superior Street.

ADMINISTRATION BRANCH

The Administration Branch is responsible for the administration of the Provincial laws regarding the acquisition of rights to mineral and to coal, petroleum and natural gas, and deals with other departments of the Provincial service for the Department or for any branch. P. J. Mulcahy is Chief Gold Commissioner and K. B. Blakey is Deputy Chief Gold Commissioner. Under the terms of the "Petroleum and Natural Gas Act, 1954," which became effective on April 1st, 1954, P. J. Mulcahy was appointed Chief Commissioner, and K. B. Blakey was appointed Deputy Chief Commissioner.

Gold Commissioners, Mining Recorders, and Sub-Mining Recorders, whose duties are laid down in the "Mineral Act" and the "Placer-mining Act," administer these Acts and other Acts relating to mining. Mining Recorders, in addition to their own functions, may also exercise the powers conferred upon Gold Commissioners with regard to mineral claims within the mining division for which they have been appointed. Similar duties may be performed by Mining Recorders with regard to placer claims but not in respect of placer-mining leases. Recording of location and of work upon a mineral claim as required by the "Mineral Act" and upon a placer claim or a placer-mining lease as required by the "Placer-mining Act" must be made at the office of the Mining Recorder for the mining division in which the claim or lease is located. Information concerning claims and leases and concerning the ownership and standing of claims and leases in any mining division may be obtained from the Mining Recorder for the mining division in which the property is situated or from the Department's offices at Victoria, and Room 104, 739 West Hastings Street, Vancouver. Sub-Mining Recorders, who act as forwarding agents, are appointed at various places throughout the Province. They are authorized to accept documents and fees, and forward them to the office of the Mining Recorder for the correct mining division. Officials and their offices in various parts of the Province are listed in the table on pages A 52 and A 53.

Central Records Offices (Victoria and Vancouver)

The transcripts of all recordings made in Mining Recorders' offices throughout the Province are sent to the office of the Chief Gold Commissioner in Victoria twice each month, and include the names of lessees of reverted Crown-granted mineral claims. These records and maps showing the approximate positions of mineral claims held by record and of placer-mining leases may be consulted by the public during office hours at Victoria and at the office of the Gold Commissioner at Vancouver, Room 104, 739 West Hastings Street. The maps conform in geographical detail, size, and number to the reference and mineral reference maps issued by the Department of Lands, and the approximate positions of mineral claims held by record and of placer-mining leases are plotted from details supplied by the locators. Provision has been made to supply the general public, on request to the office of the Chief Gold Commissioner, with copies of the maps. The charge for these maps is $1 plus 5 per cent tax for each sheet.

A marked upsurge in staking took place in 1955, 12,567 mineral claims being recorded, more than twice the number recorded in 1954. The major centre of interest, in this respect, was in the Highland Valley area in the Kamloops Mining Division.

Mining Divisions Amalgamated since 1949

Date	Mining Divisions Amalgamated	New Name	Mining Recorder's Office
Oct. 1, 1949	Revelstoke and Lardeau	Revelstoke	Revelstoke.
Dec. 1, 1949	Kamloops and Ashcroft	Kamloops	Kamloops.
Apr. 1, 1951	Skeena and Portland Canal	Skeena	Prince Rupert.
Mar. 1, 1952	Stikine and Peace River	Liard	Victoria.
Aug. 2, 1954	Slocan and Ainsworth	Slocan	Kaslo.
May 1, 1955	Cariboo and Quesnel	Cariboo	Quesnel.

List of Gold Commissioners, Mining Recorders, and Sub-Mining Recorders in the Province

Mining Division	Location of Office	Gold Commissioner	Mining Recorder	Sub-Mining Recorder
Alberni	Alberni	T. G. O'Neill	T. G. O'Neill.	
Sub-office	Lake Cowichan			W. W. Deans.
Sub-office	Nanaimo			W. H. Cochrane.
Sub-office	Quatsino			Axel Hansen.
Sub-office	Tofino			R. R. Barr.
Sub-office	Zeballos			W. Gilchrist.
Atlin	Atlin	W. E. McLean	W. E. McLean.	
Sub-office	Lower Post			J. Dowsett.
Sub-office	Pouce Coupe			H. O. Callahan.
Sub-office	Telegraph Creek			Mrs. S. E. Brand.
Sub-office	Tulsequah			H. L. Abbott.
Cariboo	Quesnel	F. E. P. Hughes	F. E. P. Hughes.	
Sub-office	Barkerville			D. H. Bruce.
Sub-office	Fort McLeod			J. E. McIntyre.
Sub-office	Fort St. James			N. Henry.
Sub-office	Likely			C. W. Speed.
Sub-office	McBride			R. J. Mercer.
Sub-office	Prince George			S. M. Carling.
Sub-office	Williams Lake			Mrs. J. Pigeon.
Clinton	Clinton	W. H. Cope	W. H. Cope.	
Sub-office	Haylmore			W. Haylmore.
Sub-office	Williams Lake			Mrs. J. Pigeon.
Fort Steele	Cranbrook	E. L. Hedley	E. L. Hedley.	
Sub-office	Fernie			B. J. H. Ryley.
Golden	Golden	W. T. McGruder	W. T. McGruder.	
Sub-office	Invermere			T. N. Weir.
Greenwood	Grand Forks	R. MacGregor	R. MacGregor.	
Sub-office	Greenwood			G. A. Hartley.
Sub-office	Oliver			L. M. McKinnon.
Kamloops	Kamloops	D. Dalgleish	D. Dalgleish.	
Sub-office	Ashcroft			W. A. Munro.
Sub-office	Chu Chua			G. M. Fennell.
Sub-office	Likely			C. W. Speed.
Sub-office	Salmon Arm			H. S. Tatchell.
Liard	Victoria	R. H. McCrimmon.		
Sub-office	Atlin			W. E. McLean.
Sub-office	Burns Lake			W. H. M. Collison.
Sub-office	Fort Nelson			A. Fisher.
Sub-office	Fort St. James			N. Henry.
Sub-office	Fort St. John			R. W. Sangster.
Sub-office	Lower Post			J. Dowsett.
Sub-office	Pouce Coupe			H. O. Callahan.
Sub-office	Prince George			S. M. Carling.
Sub-office	Telegraph Creek			Mrs. S. E. Brand.
Lillooet	Lillooet	E. B. Offin	E. B. Offin.	
Sub-office	Haylmore			W. Haylmore.
Nanaimo	Nanaimo	W. H. Cochrane	W. H. Cochrane.	
Sub-office	Alberni			T. G. O'Neill.
Sub-office	Alert Bay			D. J. Phillips.
Sub-office	Courtenay			G. W. McFarland.
Sub-office	Powell River			J. V. Gaspard.
Sub-office	Quatsino			Axel Hansen.
Nelson	Nelson	K. D. McRae	K. D. McRae	F. S. MacKay.
Sub-office	Creston			R. S. Allen.
Sub-office	Salmo			M. C. Donaldson.
New Westminster	New Westminster	J. F. McDonald	G. C. Kimberley.	
Sub-office	Chilliwack			E. L. Anderson.
Sub-office	Hope			J. H. Richmond.

List of Gold Commissioners, Mining Recorders, and Sub-Mining Recorders in the Province—*Continued*

Mining Division	Location of Office	Gold Commissioner	Mining Recorder	Sub-Mining Recorder
Nicola	Merritt	D. Dalgleish (Kamloops)	T. S. Dobson.	
Omineca	Smithers	G. H. Beley	G. H. Beley.	
Sub-office	Burns Lake			W. H. M. Collison.
Sub-office	Dorreen			W. E. Horwill.
Sub-office	Fort St. James			N. Henry.
Sub-office	Fort St. John			R. W. Sangster.
Sub-office	Hazelton			C. H. Drake.
Sub-office	Manson Creek			T. C. Hamilton.
Sub-office	Prince George			S. M. Carling.
Sub-office	Takla Landing			Mrs. G. M. Henry.
Sub-office	Telkwa			T. J. Thorp.
Sub-office	Terrace			D. Warren.
Sub-office	Vanderhoof			L. D. Sands.
Osoyoos	Penticton	T. S. Dalby	T. S. Dalby.	
Sub-office	Keremeos			L. S. Coleman.
Sub-office	Oliver			L. M. McKinnon.
Revelstoke	Revelstoke	W. G. Fleming	W. G. Fleming.	
Sub-office	Beaton			J. T. Slater.
Similkameen	Princeton	B. Kennelly	B. Kennelly.	
Skeena	Prince Rupert	T. H. W. Harding	T. H. W. Harding.	
Sub-office	Alice Arm			A. D. York.
Sub-office	Burns Lake			W. H. M. Collison.
Sub-office	Leduc Glacier			J. J. Crowhurst.
Sub-office	Queen Charlotte			H. R. Beaven.
Sub-office	Stewart			Mrs. F. Macleod.
Sub-office	Telegraph Creek			Mrs. S. E. Brand.
Sub-office	Terrace			D. Warren.
Slocan	Kaslo	C. Macdonald	B. F. Palmer.	
Sub-office	New Denver			T. P. McKinnon.
Sub-office	Poplar			A. Robb.
Sub-office	Slocan			W. E. Graham.
Trail Creek	Rossland	W. L. Draper	W. L. Draper.	
Vancouver	Vancouver	J. Egdell	Mrs. F. Sherman (Deputy).	
Sub-office	Alert Bay			D. J. Phillips.
Sub-office	Powell River			J. V. Gaspard.
Vernon	Vernon	G. F. Forbes	G. F. Forbes.	
Sub-office	Kelowna			E. R. Oatman.
Victoria	Victoria	R. H. McCrimmon	R. H. McCrimmon.	
Sub-office	Lake Cowichan			W. W. Deans.

GOLD COMMISSIONERS' AND MINING RECORDERS' OFFICE STATISTICS, 1955

Mining Division	Free Miners' Certificates				Lode-mining					Placer-mining				Revenue		
	Individual	Company	Special	Provincial (Placer)	Mineral Claims Recorded	Certificates of Work	Certificates of Improvements	Bills of Sale, etc.	Leases of Reverted Crown-granted Mineral Claims	Placer Claims Recorded	Placer Leases Granted	Certificates of Work, Placer Leases	Bills of Sale, etc.	Free Miners' Certificates	Mining Receipts	Total
Alberni	81	4	.....	.....	362	198	4	61	5	.....	2	1	3	$899.50	$3,170.25	$4,069.75
Atlin	289	1	2	.....	621	219	.....	72	16	8	13	153	26	1,465.75	10,397.25	11,863.00
Cariboo	814	12	8	.....	622	269	.....	56	34	5	61	307	69	4,345.50	19,858.20	24,203.70
Clinton	41	.....	.....	.....	80	79	10	3	.....	.....	1	25	4	173.25	3,211.50	3,384.75
Fort Steele	328	.....	3	.....	294	145	.....	30	7	.....	11	13	9	1,583.75	2,907.25	4,491.00
Golden	182	4	1	.....	317	344	1	85	14	.....	14	47	27	1,141.00	7,501.75	8,642.75
Greenwood	129	.....	1	.....	430	230	.....	22	148	.....	.....	2	.....	558.50	7,598.00	8,156.50
Kamloops	631	5	15	3	3,476	1,064	23	494	38	.....	.....	2	1	3,352.50	19,121.23	22,473.73
Liard	291	.....	4	.....	425	322	32	36	.....	.....	6	14	6	2,293.00	9,841.50	12,134.50
Lillooet	215	2	.....	.....	284	263	10	50	10	.....	6	28	5	1,136.25	3,415.15	4,551.40
Nanaimo	157	3	2	.....	180	168	.....	27	20	.....	.....	.....	.....	907.00	3,489.00	4,396.00
Nelson	545	12	8	2	911	379	36	45	35	3	1	1	.....	3,958.75	6,101.25	10,060.00
New Westminster	324	6	.....	14	454	254	.....	174	3	.....	1	13	.....	1,877.25	11,651.75	13,529.00
Nicola	46	.....	.....	.....	359	145	.....	17	.....	.....	.....	.....	.....	165.50	1,827.50	1,993.00
Omineca	428	2	5	.....	832	754	23	153	43	3	16	50	9	2,044.75	16,426.55	18,471.30
Osoyoos	162	1	.....	2	196	147	.....	27	10	.....	.....	1	.....	907.25	2,528.75	3,436.00
Revelstoke	88	3	.....	.....	138	82	8	45	44	.....	4	11	18	600.25	9,662.40	10,262.65
Similkameen	160	3	5	.....	211	144	.....	33	23	1	5	9	2	992.50	3,266.00	4,258.50
Skeena	323	5	6	.....	343	776	.....	375	137	.....	1	.....	5	1,937.50	18,009.25	19,490.00
Slocan	320	5	3	.....	769	389	2	90	54	.....	.....	.....	2	1,811.75	7,193.00	9,004.75
Trail Creek	156	1	7	.....	174	36	.....	.....	25	.....	1	.....	.....	890.00	1,695.00	2,585.00
Vancouver	1,845	138	18	4	78	208	.....	12	7	.....	.....	.....	.....	20,392.00	2,100.50	22,492.50
Vernon	278	2	2	10	244	54	.....	44	3	.....	.....	11	13	1,232.00	2,449.00	3,681.00
Victoria	493	17	1	.....	767	80	.....	79	5	.....	12	21	20	3,947.75	4,211.75	8,159.50
Totals for Province, 1955	8,326	226	91	35	12,567	6,749	149	2,030	681	20	155	709	219	$58,613.00	$177,183.28	$235,796.98
Totals for Province, 1954	5,844	205	100	59	5,296	7,165	41	1,513	454	33	245	637	220	46,523.00	140,791.24	187,314.24

Coal, Petroleum, and Natural Gas

The Administration Branch has been responsible for the administration of the "Petroleum and Natural Gas Act, 1954," and for the "Coal Act, 1944," since April 1st, 1953. Information concerning applications for permits and leases issued under the "Petroleum and Natural Gas Act" and concerning the ownership and standing of them may be obtained upon application to the office of the Chief Commissioner, Department of Mines, Victoria, B.C. Similar information may be obtained respecting licences and leases issued under the "Coal Act." A series of maps showing the locations of permits and leases under the "Petroleum and Natural Gas Act" is provided, and copies may be obtained upon application to the office of the Department of Mines, Victoria, B.C., accompanied by payment of $3 per sheet. Monthly reports listing additions and revisions to permit-location maps and giving information listing changes in title to permits, licences, and leases and related matters are available from the office of the Chief Commissioner upon application and payment of a fee of $1 per annum.

Petroleum and Natural-gas Statistics, 1955

Permits—	
Issued	50
Renewed	273
Assigned	92
Leases—	
Issued	96
Renewed	4
Assigned	2

Petroleum and Natural-gas Revenue, 1955

Permits—		
Fees	$86,825.00	
Rent	2,873,036.15	
Cash in lieu of work	505,434.26	
		$3,465,295.41
Leases—		
Fees	$2,450.00	
Rent	75,838.13	
		78,288.13
Tender bonus		605,306.64
Assignment fees		1,740.00
Operators' licences		8,870.00
Royalties—		
Gas	$2,611.67	
Oil	16.65	
		2,628.32
Miscellaneous		1,782.50
		$4,163,911.00

Coal Revenue, 1955

Licences—		
Fees	$775.00	
Rent	5,750.35	
		$6,525.35
Leases—		
Fees	$700.00	
Rent	2,982.53	
Cash in lieu of work	700.00	
		4,382.53
Miscellaneous		20.00
		$10,927.88

Mining Laws and Laws Related to the Mineral Industry

Synopses of mining laws and of laws related to mining are available on application. The titles of the various Acts and the price charged for each are listed below. Upon payment of the price, plus 5 per cent tax, a copy of any Act may be obtained from the office of the Queen's Printer, Victoria.

	Price
Department of Mines Act	$0.15
Mineral Act	.25
Placer-mining Act	.25
Metalliferous Mines Regulation Act	.50
Coal-mines Regulation Act	.70
Mines Right-of-way Act	.15
Iron and Steel Bounties Act	.15
Indian Reserves Mineral Resources Act	.15
Prospectors' Grub-stake Act	.15
Taxation Act	.75
Forest Act	.80
Greater Vancouver Water District Act	.80
Security Frauds Prevention Act	.30
Coal Sales Act	.15
Coal Act	.15
Petroleum and Natural Gas Act	.25
[1]Drilling and Production Regulations under Petroleum and Natural Gas Act, 1954 (including tax)	.40
[1]Geophysical Regulations, Petroleum and Natural Gas Act, 1954 (including tax)	.25
[1]Permit and Lease Grid System, Petroleum and Natural Gas Act, 1954 (including tax)	1.00
[1]Schedule of Wells Drilled for Oil and Natural Gas (including tax)	1.25

[1] Obtained from Chief Commissioner, Petroleum and Natural Gas, Victoria.

ANALYTICAL AND ASSAY BRANCH

By G. C. B. Cave, Chief Analyst

Rock Samples

During 1955 the chemical laboratory in Victoria issued reports on 2,278 samples from prospectors* and Departmental engineers. A laboratory examination of a prospector's sample generally consists of the following: (1) A spectrographic analysis to determine if any base metals are present in interesting percentages; (2) assays for precious metals, and for base metals shown by the spectrographic analysis to be present in interesting percentages. The degree of radioactivity is measured on all samples submitted by prospectors and Departmental engineers; these radiometric assays are not listed below in the table.

The laboratory reports were distributed in the following manner among prospectors who were not grantees, prospectors who were grantees under the "Prospectors' Grub-stake Act," and Departmental engineers:—

	Samples	Spectrographic Analyses	Assays
Prospectors (not grantees)	1,418	1,368	2,960
Prospectors (grantees)	272	273	592
Departmental engineers	588	391	1,356
Totals	2,278	2,032	4,908

Mineralogical specimens submitted for identification and rocks for classification are examined by the Mineralogical Branch of the Department.

Coal, Petroleum, and Gas Samples

A total of eighty-seven samples was analysed. Of these, four were samples of coal for proximate analysis and calorific value; sixty-three were samples of formation water from wells being drilled for oil and gas in the Province; three were samples of suspected oil seepages; five were gas samples, four of which were of mine air to be analysed for carbon dioxide, carbon monoxide, and oxygen, and one was of gas seepage; and twelve were samples of diesel exhaust gas to be analysed for aldehydes and nitrogen oxides.

Police and Coroners' Exhibits

For the Attorney-General's Department and the Royal Canadian Mounted Police, sixty-seven cases of a chemico-legal nature were undertaken. They involved a scientific examination of 141 exhibits.

Seven of the sixty-seven cases required analysis for narcotics under the "Opium and Narcotic Drug Act," sixteen were toxicological analyses for possible poisons in viscera, fifteen were determinations of the alcoholic content of blood, twelve were for analysis of liquor for alcoholic content, and eight samples required the identification of marker dyestuff in gasoline for the "Coloured Gasoline Tax Act." The remaining nine cases were of a diversified nature and required examinations of metal, paint, explosives, and soil. Expert evidence was presented in Court on seven occasions.

Miscellaneous Samples

For the Purchasing Commission, specification tests were made on nine samples of anti-freeze, on eight samples of fibre and cloth, on six samples of soap, on three samples of jelly powder, and on three spoons for the thickness of the plating.

* A reasonable number of samples are assayed, without charge, for a prospector who makes application for free assays and who satisfies the Chief Analyst that prospecting is his principal occupation during the summer months. A form for use in applying for free assays may be obtained from the office of any Mining Recorder.

For the Taxation Branch of the Department of Finance, five samples of gasoline were analysed for marker dyestuff, and the dyestuff in ten envelopes was weighed.

For the Department of Agriculture, sixteen samples of soil were analysed for twelve constituents, one sample of limestone was analysed for lime and magnesia, one sample of limestone was analysed spectrographically and for lime, and one sample of tinsel was analysed spectrographically for all constituents.

For the Department of Lands and Forests, 180 samples of foliage were analysed for their fluorine content. The preparation of samples prior to their analysis was completed in 1954. One sample of ammonia reagent was analysed for ammonia.

For the Department of Public Works, one sample of gravel and a water extract therefrom were analysed spectrographically and chemically.

For the Department of Health, sixteen samples of duplicator-machine fluid were analysed for methyl alcohol.

For H.M.C.S. " Naden " hospital, Esquimalt, one sample of blood was analysed for alcohol.

For the British Columbia Research Council, spectrographic analyses were made on three mineral samples and on four metal samples. A chemical assay was made on one metal sample.

For the Department of Mining and Metallurgy, University of British Columbia, spectrographic analyses were made on three mineral samples.

Research

A study of analytical methods for the inorganic analysis of oilfield waters was commenced, in order to select more rapid methods which are at least as accurate as the classical methods. Calcium and magnesium were chosen for study first. Recently developed volumetric methods for these two metals were found to provide more accurate results than the routine gravimetric methods, and took less than one-quarter the time required for the gravimetric methods. Accordingly, these methods were adopted for routine work. The determination of bromide and iodide is now being studied.

Spectrographic analyses for trace metals in oilfield waters was begun on a routine basis this year. A quantitative spectrographic method was established to determine the concentrations of thirteen trace metals in feldspar.

Examinations for Assayers

Provincial Government examinations for certificates of competency and licence to practise assaying in British Columbia were held in May and in December. In May five candidates were examined; three passed and two failed. In December three candidates were examined, and all three passed.

INSPECTION BRANCH

Organization and Staff

Inspectors and Resident Engineers

H. C. Hughes, Chief Inspector ..... Victoria
Robert B. Bonar, Senior Inspector of Mines ..... Victoria
J. D. Lineham, Senior Inspector and Acting Chief Conservation Engineer ..... Victoria
L. Wardman, Electrical Inspector ..... Victoria
J. A. Mitchell, Senior Inspector of Mines ..... Victoria
J. W. Patterson, Inspector and Resident Engineer ..... Lillooet
Robert B. King, Inspector and Resident Engineer ..... Vancouver

A. R. C. James, Inspector and Resident Engineer.....Prince Rupert
J. E. Merrett, Inspector and Resident Engineer.....Cranbrook
E. R. Hughes, Inspector and Resident Engineer.....Princeton
J. W. Peck, Inspector and Resident Engineer.....Nelson
D. R. Morgan, Inspector and Resident Engineer.....Fernie
R. R. McLeod, District Petroleum and Natural Gas Engineer.....Dawson Creek

The Inspectors are stationed at the places listed and inspect coal mines, metalliferous mines, and quarries in their respective districts. They also examine prospects and mining properties.

J. A. Mitchell supervises the Department's programme as regards roads and trails and grub-stakes.

J. D. Lineham is responsible for the administration of regulations governing the drilling, completion, and abandonment of all wells drilled for oil and gas in British Columbia.

R. R. McLeod undertakes inspection work in connection with drilling, completion, and abandonment of all wells drilled for oil and gas in the Peace River area.

Instructors, Mine-rescue Stations

Arthur Williams.....Cumberland Station
T. H. Cunliffe.....Princeton Station
Joseph J. Haile.....Fernie Station
H. W. Aitchison.....Nelson Station

Board of Examiners for Coal-mine Officials

H. C. Hughes, Chairman.....Victoria
Robert B. Bonar, Secretary.....Victoria
E. R. Hughes, Member.....Princeton

R. B. Bonar, E. R. Hughes, and the Inspectors for the district in which an examination is being held form the Board for granting certificates of competency to coal-miners. In the absence of the Inspector, the mine-rescue instructor is authorized to act in his stead.

An Inspector is empowered to grant provisional certificates to coal-miners for a period not exceeding sixty days between regular examinations.

MINERALOGICAL BRANCH

Field work by officers of the Mineralogical Branch includes geological mapping and examination of mineral deposits, and studies related to groundwater and engineering geology. The results are published partly in the Annual Report of the Minister of Mines and partly in a series of bulletins. The Mineralogical Branch supplies information regarding mineral deposits and the mineral industry, in response to inquiries received in great number. The activities of the Branch also include identification of rock and mineral specimens submitted by prospectors and others, including, if required, the identification of rocks and mineral submitted by prospectors to the Analytical Branch. Since April 1st, 1953, the Mineralogical Branch has been responsible for preparing and logging samples representing the bit cuttings from wells drilled for petroleum and natural gas and cores from the wells.

Professional Staff

On December 31st, 1955, the professional staff included the following engineers classified as geologists or mineral engineers: H. Sargent, Chief of the Mineralogical Branch; M. S. Hedley, S. S. Holland, W. R. Bacon, J. W. McCammon, N. D. McKechnie, G. E. P. Eastwood, J. T. Fyles, A. Sutherland Brown, S. S. Cosburn, H. W. Nasmith, A. F. Shepherd, R. A. Stuart, C. G. Hewlett, and J. E. Hughes.

Technical editing of the Annual Report of the Minister of Mines and of other publications was directed by M. S. Hedley. Copy for printing was prepared under the direction of Mrs. C. C. Savage, who serves as editor for English. Messrs. Hedley and Holland assisted in directing and supervising field work. Most of the other members of the professional staff are assigned to mapping the geology of the selected areas and of mineral deposits. The following have special assignments: J. W. McCammon, industrial minerals and structural materials; H. W. Nasmith, groundwater and engineering geology; S. S. Cosburn, preparation and logging of well samples; A. F. Shepherd, records and library.

Staff Changes

Mr. Stuart was on leave of absence throughout 1955 and resigned in December.

Field Work

Twelve field assistants were employed for the 1955 season to work under members of the professional staff who had the following assignments.

W. R. Bacon examined the Harrison property on Lindquist Lake in June, and spent the major part of the season mapping the bedrock geology in the area bounded by the Summit Lake-Salmon Glacier valley, the Alaska boundary, and 56° 15′ north latitude. The mapping was 1 inch to one-half mile. The area mapped includes the Granduc property and the route under study for an access tunnel to the property.

A. Sutherland Brown completed mapping in the Rocher Déboulé Range which was begun in 1953. This work included study of mineral deposits and their relation to the Rocher Déboulé granodiorite stock. Reconnaissance in the Cariboo Mountains (Bowron Lake Game Reserve), begun in 1954, was continued.

S. S. Cosburn spent six weeks on reconnaissance in the Lone Mountain area and visiting wells being drilled for oil and gas in northeastern British Columbia.

G. E. P. Eastwood continued mapping in the Lardeau area at 1 inch to 1,000 feet. Much of the work has been in a strip designed to cross the Lardeau group; this part of the work in 1955 was in the area east of the north end of Trout Lake, along Lardeau and Gainer Creeks. Mapping was also done between Beaton and Trout Lake and on Pool Creek.

J. T. Fyles and C. G. Hewlett concluded the field study of the stratigraphy and structure of the lead-zinc belt in the Salmo-Pend d'Oreille River area of southeastern British Columbia. More detailed study of some of the mineral deposits in the area is required in order to complete this programme of work begun in 1951.

S. S. Holland spent the early part of the field season studying the application of a method of prospecting for uranium and niobium. Heavy mineral concentrates obtained by panning stream gravels are sprinkled on a stainless-steel plate. The plate is heated to fuse the heavy mineral grains with a sodium fluoride flux. When cool the plate is examined under an ultra-violet light; golden-yellow fluorescence indicates the presence of uranium and bluish-white fluorescence indicates the presence of niobium. On the North Thompson River, uranium was detected on Foghorn Creek below the Rexspar property but not downstream on the main river.

Mr. Holland examined mineral prospects in the McDame Creek-Dease River area, including an occurrence of the beryllium mineral, helvite, on Needlepoint Mountain, some 25 miles by road from the Cassiar asbestos mine, and occurrences of beryl in the Horseranch Range east of Dease River. He also examined a uranium prospect near Surprise Lake east of Atlin, a uranium-niobium prospect on Granite Creek in the Wolverine Mountains, and an occurrence of secondary uranium mineral in rhyolite on Nithi Mountain 6 miles from Fraser Lake.

J. E. Hughes continued mapping stratigraphy and structure in the area traversed by the John Hart Highway between Commotion Creek and the West Pine bridge.

J. W. McCammon devoted the 1955 field season to reconnaissance geological examinations of dam-site areas on the upper Fraser River, the West Road (Blackwater), and the lower Nechako Rivers. For the first month of the season Mr. Nasmith and Mr. McCammon worked together on the project. Nineteen dam-sites were examined. The geology was plotted on air photos and on topographic maps supplied by the Water Rights Branch of the British Columbia Department of Lands and Forests.

The examinations were made to check rock conditions that might affect dams about 100 feet high. Bedrock was mapped to a minimum height of 200 feet above high-water level and at least half a mile upstream and downstream from the proposed sites. At several sites the extent of outcrop was well below the limits set. In such cases all rock showing was examined.

H. W. Nasmith spent the first month of the 1955 field season collaborating with J. W. McCammon in mapping proposed dam-sites on the Fraser River, referred to more specifically in the preceding note. Thereafter Mr. Nasmith continued studies of groundwater and glacial geology in the southern part of the Okanagan Valley. Features formed during the melting of glacial ice were examined in detail in areas near Summerland and between Okanagan Falls and Oliver, and studies relating to municipal water-supplies and to engineering problems were made. A study to determine the effect of excess irrigation-water on the chemical quality of the water from a spring was started at Westbank.

PETROLEUM AND NATURAL GAS CONSERVATION BRANCH

This Branch was established officially on April 1st, 1956, although it has functioned, nominally under the Inspection Branch, since the administration of the " Petroleum and Natural Gas Act " was transferred to the Department of Mines on April 1st, 1953.

The main responsibility of the Branch is the enforcement of the " Regulations Governing the Drilling, Production, and Working of Wells and the Conservation of Petroleum and Natural Gas," and part of the Geophysical Regulations. These regulations were made pursuant to the provisions of the " Petroleum and Natural Gas Act, 1954."

The chief purpose of the regulations is to protect the interests of the Crown and of the operator by ensuring that all operations are conducted in accordance with acceptable practices so as to prevent waste and effect conservation of this expendable natural resource. The regulations also protect the public and the land-owner against such hazards as fire, uncontrolled flow of oil, gas, or water, and the results of careless well abandonments.

In addition to the enforcement of the regulations, the Branch is responsible for the collection and consolidation of technical information and data gained from each drilling operation. This material is compiled and recorded for use by the Department when field studies will be required. Well information is also reproduced and is available to anyone interested, within the limits provided by Regulation 34; that is, two years following the date of completion or abandonment of an exploratory well or thirty days in the case of a development well.

The staff, on April 1st, consisted of two engineers—J. D. Lineham, Chief of the Branch and Chief Conservation Engineer in Victoria, and R. R. McLeod, Petroleum and Natural Gas Engineer stationed at Dawson Creek. Clerical and stenographic work is done by some members of the staff of the Central Records Office and the stenographic pool. In view of the increased activity it is expected that two additional engineers and other personnel will be required this year.

GRUB-STAKING PROSPECTORS

Under authority of the " Prospectors' Grub-stake Act," as amended in March, 1944, the Department of Mines has provided grub-stakes each year since 1943 to a limited

number of applicants able to qualify. The maximum grub-stake is $300, but an additional amount up to $200 may be added for travelling expenses to and from the prospecting area.

To qualify at the present time the Department requires that the applicant shall be a physically fit male British subject, holder of a valid free miner's certificate, who has been resident in the Province during the year preceding his application for a grub-stake, or who has been honourably discharged from Her Majesty's services, who is between the ages of 18 and 70, and who can identify common rocks and minerals.

It is required that in order to obtain the maximum grub-stake he agree to spend at least sixty days actually prospecting for lode occurrences in one area of his choice in British Columbia considered favourable by officers of the Department of Mines. If he prospects a lesser time, the grant will be reduced proportionately. In the past, rebates have been recovered from grantees to whom payments have exceeded the proper amount for the time and effort devoted to prospecting.

The grantee must not accept pay from any other source for services rendered during the period credited to the grub-stake. At the end of the season he shall provide the Department with a diary and maps outlining his activities while working under the grub-stake. Any discoveries made, staked, and recorded are exclusively his own property.

Statistical information covering the grub-stake programme since its inception is given in the following table:—

GRUB-STAKE STATISTICS

Field Season	Approximate Expenditure	Men Grub-staked	Samples and Specimens Received at Department Laboratory	Mineral Claims Recorded
1943	$18,500	90	773	87
1944	27,215	105	606	135
1945	27,310	84	448	181
1946	35,200	95	419	162
1947	36,230	91	469	142
1948	35,975	92	443	138
1949	31,175	98	567	103
1950	26,800	78	226	95
1951	19,385	63	255	137
1952	19,083	50	251	95
1953	17,850	41	201	141
1954	19,989	48	336	123
1955	21,169	47	288	183

Samples and specimens received from grub-staked prospectors are spectrographed, assayed, and tested for radioactivity. Mineralogical identifications are made on request.

Of the forty-seven grantees in 1955, twenty were given grants for the first time, and only four of these proved unsatisfactory. Two grantees who had received previous grub-stakes were also struck from the list for unsatisfactory work. Generally speaking, however, the 1955 performance was very satisfactory and several new discoveries were recorded. Two groups in particular did excellent work, and one of these groups has more than one worth-while discovery to its credit. Options have been taken on at least three of the discoveries recorded.

Since the start of the programme, D. H. Rae has given invaluable service interviewing applicants and supervising grantees in the field. It is necessary that he work long hours, and that he make many arduous trips by every means of travel each year in all kinds of country and weather in order to visit as many of the grantees as possible, for the purpose of providing whatever aid or advice they may require.

The following notes have been largely compiled by Mr. Rae from information provided in the diaries of the grantees, and from his own observations while in the field.

Atlin Mining Division.—In the Taku area some prospecting was done on the south slope of Mount Manville, up the Stuhini valley, and up Ryans Creek. No discoveries of apparent importance were reported.

In the Stikine River area, prospecting was done in the vicinity of Mount Kirk, Helveker Creek, behind Jacksons Landing, and in the Contact Creek, Anuk River, and Jack Wilson Creek areas. Large pieces of float well mineralized with galena and chalcopyrite were found but were not traced to their source. At the end of the season the same man prospected the Iskut and Inhini Rivers area, but his work there was stopped by inclement weather.

A well-organized group worked northwesterly from a base camp on Jennings Lake and followed McNaughton Creek as far as the Alaska Highway. They reported no discoveries of interest. It appears that the rocks are largely granodiorite.

A reconnaissance was made from Crescent Lake just north of the Whiting River at the Alaska boundary through to Disella Lake in the Teslin River watershed. One copper occurrence was reported, but it was considered of little importance.

Liard Mining Division.—The group based at Jennings Lake prospected easterly from there into the Blue River watershed. There was much coarse granodiorite close to Jennings Lake, but no mineral occurrences were found. At the headwaters of the Blue River, outcrops of basic rocks, principally dunites and peridotites, were thoroughly prospected, and outcrops of chromite were found over an extensive area. Claims were staked and later optioned to a mining company which intends to do exploratory work on the property in 1956.

Another grantee located claims to the north of this occurrence, but information regarding the nature of the mineral has not been made available.

Following float discovered last year in his first year of prospecting, a grantee discovered copper minerals in place in the Toad River area and promptly optioned the property to one of the larger mining companies. Farther up the Toad River and in the Racing River area another prospector has been successful in locating copper minerals.

Copper mineralization has also been discovered in the Smith River area but at present does not appear particularly important. An occurrence of hematite in sedimentary rocks was discovered in the vicinity of the airport.

Vancouver and Skeena Mining Divisions.—In the early part of the season, prospectors using their boats as a base of operations worked along the coast-line around Blenkinsop Bay, Minstrel Island, Wakeman Sound, Wolfe Cove, Bullock Channel, Poison Cove River, Emily Lake, and Kynoch Lagoon. These areas are underlain mainly by granite and granodiorite. No discoveries of ore minerals were reported.

Skowquiltz Creek area was prospected for a distance of 3 miles upstream. Some metamorphic rocks and granite were observed, and much magnetite was found in the stream gravels.

Omineca Mining Division.—A well-organized and hard-working group of prospectors which has several discoveries to its credit continued to prospect in the Wolverine Range, in the vicinity of Manson Creek, in the vicinity of Discovery Creek north of the Omineca River, around Mission Mountain and Murray Ridge in the vicinity of Trembleur and Stuart Lakes, and near Tchentlo and Tsayta Lakes. It was reported that some indications of nickel were found and will be further investigated in 1956.

South of the Canadian National Railway the same group prospected shear zones on Sinkut Mountain, the serpentine belt on Bobtail Mountain, and mineralization and rock alteration along the margin of diorite and granodiorite intrusives in the Hallett Lake area. It again met with success near the east end of François Lake where a radioactive quartz porphyry dyke was discovered on Nithi Mountain. A wide area showing autunite and torbernite, apparently in commercial amounts, was uncovered. Claims were staked and the property optioned for further investigation.

Another prospector, a grantee for the first time, discovered strongly mineralized chalcopyrite-bornite zones near Twenty Mile Creek, 10 miles north of the Germansen–Silver Lake road. Further work is contemplated here in 1956.

The discoverers of the Gordon and Davies groups near Nina Lake in the Osilinka valley continued prospecting in the vicinity of these groups and found float which led to other well-mineralized zones which were investigated.

Another prospector spent a very discouraging season combating bad weather and rugged mountain country northwest of Dorreen. His work was largely confined to the Lorne Creek watershed. Nothing of interest was discovered.

Quesnel Mining Division.—On the north side of Horsefly Lake near the east end a limestone belt was investigated, and 20 miles south of the east end of the lake some difficult terrain was prospected. Interesting float was found in the latter area, but nothing was found in place. Further work will be done here next season.

Clinton Mining Division. — Some prospecting was done near Quartz Mountain, Lorna Lake, Tyaughton Lake, Spruce Lake, and in the Poison Mountain area. Some time was also spent in the area close to the Taylor Windfall mine. A few claims were located but probably on old discoveries. At the south end of Chilco Lake, work was carried on for part of the season without interesting results.

Kamloops Mining Division.—In the North Thompson area near Lempriere, prospecting was done in an area underlain by mica schist, gneiss, and limestone. Pegmatite dykes were prospected in the valleys of Gravel Creek, Serpentine Creek, Bone Creek, and Thunder River. Small beryl and tourmaline crystals were found in a dyke in the Thunder River valley. An occurrence of nepheline syenite was reported at Paradise Lake.

Similkameen Mining Division.—The Pasayten River valley and adjoining area, from where the river joins the Similkameen south to Peeve Creek, was under investigation during the season.

Vernon Mining Division.—Inconclusive work was done in the area between Vernon and Lumby.

Greenwood Mining Division.—Sutherland Creek in the old Union mine area, the terrain close to the Rock Candy mine, Tenderloin Mountain area, and the ground adjacent to Lynch Creek were prospected during the season. Some good samples were brought in, but nothing of economic importance was reported.

Nelson Mining Division.—In the vicinity of Creston, intensive prospecting was carried on throughout the season in the Sanca valley up to a point 8 miles from Kootenay Lake, in the Cultus Creek area, along the west side of Kootenay Lake, 14 miles up Summit Creek, and 6 miles up Corn Creek. Claims were located mostly on old showings, which may be of interest at the present time. The Goat River valley was also given some attention.

Slocan Mining Division.—Near Nakusp a great deal of work was done over a wide area. Arrowpark Creek, Fosthall Creek, Scalping Knife Mountain, Caribou Creek, and Burton Creek areas were included. Some pegmatite dykes were investigated, several mineralized limestone outcrops were reported, and some interesting radioactive material was found on Snow Creek. Further work is to be done in this area.

Golden Mining Division.—On Holt Creek southwest of Moberly, on Gorman and Lang Creeks, and in the area close to Gorman Lake, careful prospecting was done throughout the season but was not productive.

New Westminster Mining Division.—Some prospecting was done in difficult country and under very bad weather conditions in the Dewdney valley and up Cedarflat Creek. Nothing of interest was reported.

Alberni Mining Division.—On the west coast of Vancouver Island, boat-based prospectors investigated areas where float quartz, limonite, and graphite were found. The head of Pipestem Inlet and Cataract Creek areas were also prospected. Work was also done in the area of Effingham Inlet and Vernon Bay. Nothing of interest was reported.

In the Zeballos area, work was continued some 6 miles northwest of the town of Zeballos. Additional finds were not reported.

Nanaimo Mining Division.—Further prospecting was done in the Humpback Bay and Rock Bay areas and on Thurlow Island. Nothing of interest was found.

MUSEUMS

The Department has a large exhibit of mineral rock specimens in the Douglas Building, Victoria; collections are also displayed in the joint office in Vancouver and in the offices of the Inspectors of Mines in Nelson and Prince Rupert.

Information regarding collections of specimens of rocks and minerals available to prospectors and schools in British Columbia will be found on page 187.

Specimens from the collection in Victoria, accumulated in a period of nearly sixty years, are displayed in cases on the fourth floor of the Douglas Building. The collection includes specimens from many of the mines and prospects in the Province, and also specimens of type rocks and special minerals from British Columbia and elsewhere.

British Columbia material includes specimens collected by officers of the Department of Mines and specimens donated by property-owners. The collection also includes type specimens purchased from distributers. Other valued specimens or groups of specimens have been donated or loaned to the museum.

PUBLICATIONS

Annual Reports of the Minister of Mines, bulletins, and other publications of the Department, with prices charged for them, are listed on pages 183 to 186.

Publications may be obtained from the offices of the Department in Victoria and elsewhere in the Province. They are also available for reference use in the Department's library (Mineralogical Branch) at Victoria, in the joint office in Vancouver, and in the offices of the Inspectors of Mines in Nelson and Prince Rupert, as well as in public libraries listed on page 189.

MAPS SHOWING MINERAL CLAIMS, PLACER CLAIMS, AND PLACER-MINING LEASES

From the details supplied by the locators, the approximate positions of mineral claims held by record and of placer-mining leases are shown on maps that may be inspected in the Central Records Offices of the Department of Mines in Victoria and in Vancouver. Copies of these maps may be obtained on request. The boundaries of surveyed claims and leases are shown on the reference maps and other maps of the British Columbia *Department of Lands and Forests.*

JOINT OFFICES OF THE BRITISH COLUMBIA DEPARTMENT OF MINES AND THE DEPARTMENT OF MINES AND TECHNICAL SURVEYS, CANADA.

The Provincial Department's Inspector and Resident Engineer, the Gold Commissioner and Mining Recorder for the Vancouver Mining Division, and the officers of the Federal Geological Survey occupy one suite of offices. All official information relating to mining is now available to the public in the one suite of offices in Vancouver.

The services offered to the public include technical information on mining, the identification of mineral specimens, distribution of Federal and Provincial mining publications, a reference library, a display of rocks and minerals, and a central records office.

Topographic Mapping and Air Photography

Topographic mapping and air photography continue to be carried on by the Surveys and Mapping Branch of the British Columbia Department of Lands and Forests and by the Canadian Government Departments of Mines and Technical Surveys and of National Defence.

In addition, the Legal Surveys Division of the British Columbia Surveys and Mapping Branch makes various types of cadastral surveys which, in the 1955 season, consisted of approximately 26,000 acres of Crown lands surveyed in the Peace River District for settlement purposes; 72 miles of control and right-of-way survey along highways in their final location, these covering part of the Cariboo Highway between Lac la Hache and Williams Lake, the Southern Trans-Provincial Highway from Cranbrook to Wardner, and part of the highway on the Sechelt Peninsula; and various lots for alienation and reserve varying in size from half an acre to 640 acres and totalling 335 parcels. During the year this Division replaced, by permanent monuments, 284 old lot corners.

Interim maps based on air photographs and existing ground control are compiled by the Air Division of the British Columbia Surveys and Mapping Branch. On a scale of 2 inches to 1 mile, they include planimetric and cadastral information and also show the centres of vertical air photographs used, but do not show contours. During 1955 some 43,000 square miles were covered with this type of map, with a further 40,000 square miles in hand at the end of the year. As a result, with the exception of Queen Charlotte Islands and the area adjacent to Mount Waddington, the entire south half of the Province is either mapped in this manner or is in the process of being mapped where adequate maps are not already available.

During 1955 the Topographic Division of the British Columbia Surveys and Mapping Branch completed its project of obtaining ground control in the northeastern part of the Province for the purpose of providing horizontal control to enable the co-ordinating of permits located under the "Petroleum and Natural Gas Act, 1954." This season's work covered 8,000 square miles, utilizing sixty-two tower stations. Five ties were made to the 60th parallel. The key reference point of the petroleum and natural-gas permits in the western section—namely, the old Hudson's Bay Company post at Nelson Forks—was also fixed.

The Canadian Government Departments of Mines and Technical Surveys and of National Defence, working in close co-operation together during 1955 in the Province, completed the field work for nineteen half-sheets of the 1:50,000 topographic series and one and three-quarter sheets of the 1:250,000 topographic series.

Already an integral part of current mapping, increased use is being made of air photographs as recorded in loans by the Air-photo Library in Victoria. During 1955 some 26,000 square miles of new photography of various scales involving nearly 17,500 photographs was added to the said library. The total of all air photographs, Federal and Provincial, now on hand in the Air-photo Library in Victoria is 415,285.

In the Annual Report of the Deputy Minister of Lands for 1955, coverage by air photographs and by topographic and interim maps is indicated on a series of base maps. Further information concerning these or the corresponding Federal mapping may be obtained from the Director, Surveys and Mapping Branch of the Department of Lands and Forests.

Department of Mines and Technical Surveys

The Canadian Government Department of Mines and Technical Surveys, created by an Act of Parliament introduced in November, 1949, took over most of the branches and functions related to mining of the former Department of Mines and Resources. The Mines Branch, Geological Survey of Canada, and Surveys and Mapping Branch are the three branches of the Department of the most direct interest to the mining industry. Brief reference to the work of the Surveys and Mapping Branch in British Columbia is made in the preceding note headed " Topographic Mapping and Air Photography." A note on the Geological Survey of Canada follows this paragraph and is followed by a note on the Mines Branch.

GEOLOGICAL SURVEY OF CANADA

By an arrangement made at the time the Province of British Columbia entered Confederation, geological investigations and mapping in the Province are carried on by the Geological Survey of Canada. Several geological parties are in the field each year. Many excellent reports and maps covering areas of British Columbia have been issued by the Geological Survey of Canada, and they have made available a great amount of information that has been of much benefit to the mining and prospecting activities in British Columbia.

A branch office of the Geological Survey of Canada is maintained in Vancouver. Maps and reports on British Columbia can be obtained there. J. E. Armstrong is in charge of this office, having relieved W. E. Cockfield in September, 1955. Dr. Cockfield, in charge of the Vancouver office since 1929, died on January 4th, 1956.

Field Work by the Geological Survey of Canada in British Columbia, 1955

J. D. Aitken completed the geological mapping of the Atlin map-area (104N).

S. Duffell completed the geological mapping of the Terrace may-area (103I, E. ½).

J. E. Armstrong completed the geological mapping of the Tertiary, Pleistocene, and Recent sedimentary deposits of the Canadian portion of the Lower Fraser Valley (Flood to Gulf of Georgia).

J. A. Roddick completed the geological mapping of the Coquitlam 4-mile map-area (92G, E. ½).

H. W. Little continued the geological mapping of the Kettle River map-area (82E, E. ½).

J. E. Reesor continued the geological mapping of the Lardeau map-area (82K, E. ½).

W. E. Cockfield undertook various geological investigations logically handled from the British Columbia office of the Geological Survey.

H. W. Tipper continued the geological mapping of the Anahim Lake map-area (93C, W. ½).

W. L. Fry continued a detailed study of the Tertiary palæobotany and stratigraphy of southwestern and south central British Columbia, paying particular attention to the Princeton and Coalmont areas.

E. C. Halstead completed a groundwater survey of Matsqui and Sumas.

E. Hall continued to assist the Engineering and Water Resources Branch, Department of Northern Affairs and National Resources, by examining drill cuttings and cores at prospective dam-sites on the Columbia River, and by other geological means.

H. Frebold commenced a detailed study of the Jurassic fauna and stratigraphy of southern British Columbia, examining sections in the Harrison Lake, Lillooet, and Ashcroft areas.

G. B. Leech completed most of the geological mapping of the Canal Flats map-area (82 J/4).

E. J. W. Irish commenced the geological mapping of the Charlie Lake map-area (94A).

B. A. Latour investigated the coal reserves of the Crowsnest Basin.

R. B. Rowe examined various niobium (columbium) deposits in British Columbia.

Publications of the Geological Survey

The following reports relating to British Columbia published by the Geological Survey were received by the British Columbia Department of Mines during 1955:—

National Advisory Committee on Research in the Geological Sciences, Fifth Annual Report, 1954–55.

Paper 54–9: Atlin, British Columbia, by J. D. Aitken.

Paper 54-11: Nechako River, British Columbia, H. W. Tipper.

Special reports—Misc. G-50: A List of Recently Published General Reports and Maps of Canada.

Bulletin 29: Wall-rock Alteration at Certain Lead-Zinc Replacement Deposits in Limestone, Salmo Map Area, British Columbia, by L. H. Green.

Map 900A: Canada, Principal Mineral Areas.

MINES BRANCH

The Mines Branch has branches dealing with mineral resources, mineral dressing and process metallurgy, physical metallurgy, radioactivity, and fuels and explosives. Publications of the Mines Branch pertaining to British Columbia received in 1955 included tabular pamphlets dealing with coal mines, gold mines, stone quarries, petroleum refineries, and milling plants in Canada, and the reports listed below:—

Mines Branch No. 844: The Canadian Mineral Industry, 1952.

Mines Branch No. 850: Analysis Directory of Canadian Coals, Second Edition, 1953, Supplement No. 1-1955, by E. Swartzman and T. E. Tibbetts.

Memorandum Series 129: Durability of Aggregates in Concrete Mixes (Final Report), by R. H. Picher.

Memorandum Series 130: Nickel in Canada with a Survey of World Conditions, by W. R. McClelland.

Technical Paper No. 11: Refining Antimony by Electrodeposition and by Distillation, by R. R. Rogers and R. A. Campbell.

Technical Paper No. 12: The Constitution of Bone China, Part III, by P. D. S. St. Pierre.

Technical Paper No. 13: Development of the Port Radium Leaching Process for Recovery of Uranium, Radioactivity Division.

Technical Paper No. 14: Measurement of Thorium in Ores by the Thorium Emanation Method, by J. B. Zimmerman and J. A. F. Bouvier.

Information Circular No. M.R. 13: A Survey of the Iron Ore Industry in Canada during 1954 (with special emphasis on production, development, and exploration), by W. Keith Buck.

Information Circular No. M.R. 14: A Survey of Developments in the Titanium Industry during 1954, by W. Keith Buck.

Information Circular No. M.R. 15: A Survey of the Petroleum Industry in Canada during 1954, by R. B. Toombs.

Information Circular No. M.R. 16: A Survey of the Natural Gas Industry in Canada during 1954, by R. B. Toombs.

Topical reports, Radioactivity Division, No. TR-126-55: Data on Portable Counters Available in Canada, by G. G. Eichholz.

The Mineral Dressing and Process Metallurgy Division investigates the milling of ores and industrial minerals from many deposits and also tests clays and other ceramic materials. The British Columbia Department of Mines has received the following report on work performed by the Mineral Dressing and Process Metallurgy Division, in 1955, on British Columbia ores:—

Investigation No.	Title
MD3104.	Concentration Tests on a Sample of Lead-Barite Ore from Giant Mascot Mines Ltd., Spillimacheen, British Columbia.

Lode Metals

CONTENTS

NOTES ON METAL MINES—*Continued*

NOTES ON METAL MINES—*Continued*

NOTES ON METAL MINES—*Continued*

NOTES ON METAL MINES—*Continued*

GENERAL REVIEW

Table XV lists the production of individual properties and gives the name and address of the owner or agent of each producing property. Before 1951 the production of individual properties was incorporated in the property descriptions.

In 1955 the average prices of all principal metals were higher than in 1954. The net price of gold increased fractionally as the Canadian dollar approached parity with the United States dollar. The New York price of silver rose from 85 cents per ounce to a peak of 92 cents in the latter part of the year, and averaged 5 cents per ounce higher than in 1954. The United States price of export copper averaged 9 cents per pound higher in 1955 than in 1954, and reached a peak of 45 cents per pound at the end of the year. New York lead increased from 15 to 16 cents a pound, and St. Louis zinc rose from 11.5 cents to 13 cents a pound.

Gold, silver, copper, lead, and zinc produced at British Columbia lode mines in 1955 had a gross value of $129,455,122. Miscellaneous metals, including iron ore, tungsten, tin, and minor metals recovered at the Trail smelter had a gross value of $12,935,887. The total quantity of ore mined at all lode mines amounted to 9,126,902 tons and came from fifty-three mines, of which thirty-four produced 100 tons or more. The average number employed in the lode-mining industry in 1955, including mines, concentrators, and smelters, was 9,512.

In 1955 twenty-six mills, including two magnetic concentrators, were operated. Of these mills, twenty were in production throughout the year. The H.B. operated for the first time and the Nickel Plate closed. The Reeves MacDonald resumed operation. Two mills at Sandon and the Can-Amer at Ainsworth operated briefly. Custom ore was accepted at four mills, of which the Western Exploration mill at Silverton operated steadily on that basis.

The Trail smelter recorded custom receipts of 685 tons of crude ore, 1,235 tons of lead concentrates, and 11,880 tons of zinc concentrates from properties in British Columbia. Totals of 35,061 tons of lead concentrates and 61,706 tons of zinc concentrates were shipped out of the country for smelting. Copper concentrates and ores, and dross from the Trail smelter were shipped to the Tacoma smelter. Concentrated iron ore was shipped to Japan and Germany. Tungsten concentrates were sold under government contract.

The Nickel Plate mine closed on September 23rd, 1955, after twenty years of continuous operations, and all equipment and installations were removed. Since 1904 the ore zones on Nickel Plate Mountain produced more than 1,500,000 ounces of gold and paid a total of just over $7,500,000, principally from the Nickel Plate mine.

Amongst silver-lead-zinc mines the H.B. was brought into production in May, after lying fully equipped but idle for two years, and a milling rate of 1,200 tons per day was reached by December. The Reeves MacDonald resumed production late in 1955, after a two-year shut-down. Work was resumed at the Van Roi following a company reorganization. New ore was found in the Monarch section between the Standard and Mammoth mines at Silverton. At the Highland-Bell the projected ore zone was reached from the new 2900 adit.

At the Granduc copper property sufficient ore was established to warrant plans for deep development by shaft, with a view to ultimate production. At Highland Valley extensive sampling resulted in the start of a programme of diamond drilling by a major company to test large low-grade copper zones.

Throughout the Province the increased price of copper directed attention to almost every known copper-bearing deposit, including former producing mines. There was much blanket staking, and a good deal of exploratory drilling and sampling were done.

NOTES ON METAL MINES

RAINY HOLLOW*

Copper-Silver

Maid of Erin (St. Eugene Mining Corporation Limited)

(59° 136° N.W.) Company office, Suite 401–5, 402 West Pender Street, Vancouver. Alex. Smith, director. Capital: 3,000,000 shares, $1 par value. The St. Eugene Mining Corporation owns the Maid of Erin claim together with thirteen other Crown-granted claims and four full and two fractional recorded claims. The property is on the southwestern slope of Mineral Mountain, 3 miles west of the hairpin bend in the Haines road at Rainy Hollow. This area, in the extreme northwest corner of the Province, is accessible from the Alaska Highway via the Haines cut-off road 100 miles west of Whitehorse, or from the south via Haines, Alaska.

It is the intention of the company to develop the showings on the Maid of Erin claims where there is a flat-lying bornite-chalcopyrite deposit associated with skarn and marble. The claim was originally located in 1903 and was Crown-granted in 1910. Development work was done at intervals from 1907 to 1928 and the showings were explored by an incline, several open-cuts, a vertical shaft, two short adits, and four diamond-drill holes. Sorted ore totalling 157 tons was shipped in the years between 1911 and 1922.

Work done this year was confined to road-building. A crew averaging five men was employed under C. M. Campbell, Jr., from July 20th to October 15th on the construction of a road from Mile 53 on the Haines road to the property, a distance of about 4 miles. Approximately 3 miles of road was built but still requires gravel.

[Reference: Watson, K. de P.: The Squaw Creek-Rainy Hollow Area, Northern British Columbia, *B.C. Dept. of Mines,* Bull. 25, pp. 42–47 (1948).]

ATLIN†

CRACKER CREEK (59° 133° N.E.)

Uranium

Purple Rose and Fisher

The Purple Rose and Fisher groups were located in July and August of 1954 to cover uranium showings discovered by Ole Olsen and Norman Fisher, of Atlin, while prospecting for K. J. Springer, of Toronto. The claims lie between elevations of 5,000 and 6,000 feet. The Purple Rose is at the head of Cracker Creek and the Fisher is between the heads of Boulder and Ruby Creeks; all creeks flow into Surprise Lake, east of Atlin.

During the summer of 1955 Barymin Company Limited, with Charles J. Brown in charge, did surface stripping on showings on both groups. A tent camp was established at the head of the west branch of Cracker Creek, about 4 miles by trail from the head of the road on Ruby Creek; a second tent camp, used while working on the Fisher group, was near the head of Ruby Creek, about 4½ miles by trail from the head of the Ruby Creek road, which is 22 miles from Atlin.

The purple Rose claims are, for the most part, underlain by rusty-weathering granite or alaskite characterized by a very small percentage of dark minerals and a high percentage of smoky quartz. This rock, at the very head of the west branch of Cracker Creek, intrudes quartzite, greenstone, and limestone of the Cache Creek group. At one place on the contact, at an elevation of 6,000 feet, the limestone is metamorphosed to a tremolite-garnet skarn containing a few small lenses of magnetite and showing copper stain along minor fractures.

* By A. R. C. James.
† By S. S. Holland.

The uranium showings lie within the intrusion between elevations of 5,500 and 6,000 feet on the steep headwall of the cirque at the head of the west branch of Cracker Creek.

The secondary uranium minerals zeunerite (copper uranium arsenate) and metazeunerite (hydrous copper uranium arsenate) were identified in August, 1954, by E. W. Nuffield, of the University of Toronto, in material from the Purple Rose showings. This is the first record of zeunerite in British Columbia.

One showing at an elevation of about 6,000 feet was discovered by the presence of zeunerite in float in thick granite talus on the steep south side of the cirque. A considerable amount of work was done in the talus, attempting to reach bedrock through the permanently frozen material that lies just below the surface. Bedrock was reached in only one trench about 12 feet long. The trench exposes strongly kaolinized granite cut by a shear striking about north 10 degrees east and dipping 55 degrees west. The kaolinization appears to spread outward from the shear and extends across the full width of the trench. The strongly kaolinized granite in and near the shear in some places has a pale apple-green stain or incrustation which has been identified as zeunerite and metazeunerite. Examination with a Geiger counter indicates that the highest counts are obtained on the footwall side of the shear. A selected sample of kaolinized granite containing zeunerite assayed: Uranium oxide, 0.088 per cent; thorium oxide, 0.011 per cent. Company assays from the same cut showed small amounts of silver and some lead and copper.

This showing could not be traced along strike because of the depth of permanently frozen talus.

A second showing lies about 1,600 feet to the west at about 5,500 feet elevation, on the southwest headwall of the cirque. There a shear 1 to 2 feet wide striking west and almost vertical cuts a grey porphyritic phase of the intrusion. In places the shear is occupied by a few inches of vuggy quartz which is erratically mineralized with arsenopyrite, tetrahedrite, and some pyrite. Examination with a Geiger counter showed only a slight increase over background count. A selected sample well mineralized with arsenopyrite assayed: Uranium oxide equivalent, 0.003 per cent; copper, 1.06 per cent.

A third showing, at 4,800 feet elevation, is on the southwest wall of the cirque. Kaolinization extends about 10 feet on each side of a shear striking north 20 degrees west and dipping 60 degrees southwest and exposed for a length of about 75 feet. Narrow fluorite stringers extend outward from the shear into the hangingwall. Spots of zeunerite mineralization appear in the kaolinized zone, and a selected sample assayed: Uranium oxide, 0.059 per cent; thorium oxide, 0.042 per cent.

Several other minor occurrences of zeunerite on the Purple Rose were seen, but examination with a Geiger counter indicated that the uranium content is low.

The Fisher group is underlain by rusty-weathering granite or alaskite similar to the intrusion at the Purple Rose. The showings are about 4½ miles west of those on the Purple Rose. They are at an elevation of about 6,200 feet on the southeast side of Mount Leonard, on the slope into the head of the west fork of Boulder Creek. The slope is covered to a considerable depth with talus which immediately below the surface is permanently frozen, and consequently trenching is extremely difficult. However, two northeasterly striking mineralized zones appear to be present. One, about 100 feet between terminal trenches, is a 6-inch kaolinized width in a porphyritic phase of the intrusion. It is mineralized with wolframite, arsenopyrite, pyrite, and tetrahedrite. Examination with a Geiger counter indicates a count only slightly higher than background, and no zeunerite was positively identified. A sample of selected mineralization assayed: Uranium oxide equivalent, 0.006 per cent; copper, 0.30 per cent.

The second zone shows an indeterminate width of kaolinized granite in a single open-cut. A 6-inch width mineralized with wolframite, arsenopyrite, and some zeunerite

had a low count when examined with a Geiger counter. A selected sample assayed: Uranium oxide, 0.076 per cent; thorium oxide, 0.005 per cent; copper, 0.66 per cent. Company assays from both these zones indicate a low silver and gold content.

No primary uranium mineral has been identified in these occurrences. The occurrence of the secondary mineral, zeunerite, within the zone of permafrost means that its deposition must have taken place in pre-Glacial rather than in post-Glacial time.

McDAME*

HORSERANCH RANGE (59° 128° S.W.)

Beryllium

Cassiar Beryl

Twenty-six claims, the Cassiar Beryl Nos. 1 to 26, were located in July and August, 1955, by Einar Hagen and Fred Hasselberg, of Watson Lake, and Russel Morgan and J. Stewart, of Mile 624, Alaska Highway, to cover occurrences of beryl in pegmatite in the central part of the Horseranch Range. The claims lie between 5,000 and 6,000 feet elevation on the western side of the crest of the range and about 3½ miles northwest of the highest peak in the range, elevation 7,300 feet. From Tom Harvey Lake, the nearest suitable lake for aircraft landing, the main trail from Lower Post runs southward to the old Dease River crossing, from there an Indian hunting trail climbs up on to the range, a total distance of 18 miles from Tom Harvey Lake.

The claims are underlain by sedimentary and foliated metamorphic rocks of the Horseranch group. Quartzite, biotite-muscovite gneiss, and quartz muscovite schist are common rock types which, in a zone about 2,500 feet wide and at least 3 miles long, are intruded by pegmatite dykes ranging in widfh from a few inches to a few tens of feet. The pegmatites, for the most part, are parallel to the foliation, which strikes between west and northwest.

The pegmatites are composed of feldspar, quartz, muscovite, subordinate amounts of black tourmaline and pink to pale-brown garnet, and minor amounts of pale-green beryl. Some of the narrower pegmatites are distinctly banded, some having coarse mica and tourmaline along their margins and largely quartz in the centre, and others having layers that are coarse-grained and composed dominantly of mica. One 12-inch dyke was seen to have a 2-inch marginal zone largely of muscovite, a 2-inch intermediate zone rich in tourmaline and garnet, and a 4-inch centre of coarsely crystalline feldspar and quartz containing a few small beryl crystals. In general, however, the pegmatites are not zoned, and beryl was not seen to occupy any preferred position within them.

Beryllium was first detected in 1949 by the British Columbia Department of Mines through spectographic analysis of pegmatite samples from the Horseranch Range. Beryl crystals were first found by Einar Hagen in 1953, and subsequent discoveries over a larger area were made in 1954.

Numerous samples of pegmatite containing beryl crystals have been obtained by Einar Hagen from talus slopes at the heads of three west-flowing creeks, locally known as Moosehorn, Camp, and Mica Creeks. On examination, pegmatites outcropping on bluffs at the heads of the talus slopes were found to contain beryl and presumably are the source of the beryl found in the talus. Although most pegmatites on close examination have been found to contain beryl, most samples so far have come from talus below them. Most beryl seen occurs as hexagonal prisms one-quarter to three-eighths of an inch across and one-half to three-quarters of an inch long. The largest beryl crystal found is three-quarters of an inch across and about 1¼ inches long. The beryl shows only slight colour variation, most being a pale watery green.

During four days spent examining the various beryl occurrences, close attention was paid to the distribution of beryl in pegmatite and in talus. No one pegmatite was seen to

* By S. S. Holland, except as noted.

contain beryl equivalent to a grade of 1 per cent beryllium oxide. Most beryl was seen in talus slides on the south side of the head of Camp Creek. The average beryllium content of pegmatite, based on the amount of beryl seen, is estimated to be less than 0.1 per cent beryllium oxide.

CASSIAR (59° 129° S.W.)

Silver-Lead

Graham

The Graham group of six mineral claims, first located in September, 1941, covers occurrences of galena at an elevation of about 5,000 feet near the head of Marble Creek. The showings are on and between the two forks of Marble Creek and may be reached by 2½ miles of truck-road which crosses to the south side of Troutline Creek about 3 miles east of Cassiar.

In 1955 the claims were under option to Silver Standard Mines Limited and exploration was under the supervision of W. S. Dunn.

The claims are underlain by grey limestone and marble of the Lower and Middle Cambrian Atan group. The rocks strike about north 20 degrees west and dip 45 degrees northeast, and lie 1½ miles east of the contact with the Cassiar intrusions.

Bulldozer stripping done in 1954 discloses the presence of two areas of mineralization. The easternmost showings are on the east branch of Marble Creek and consist of four irregularly mineralized areas. The mineralization, very largely magnetite and galena with minor amounts of sphalerite and pyrite, is a replacement of limestone along a line that appears to cut across the bedding and to strike almost due west. Dolomitization surrounds the magnetite-galena lenses and extends outward along bedding planes to make a total width of possibly 20 feet. There does not appear to be any continuity between the four small individual lenses of the east showing.

The main showing crosses the west branch of Marble Creek at an elevation of 5,000 feet. It terminates against a bed of hornfels on the east side of the creek and extends westward for a length of about 350 feet. One cut shows a 5-foot width mineralized with galena and magnetite, but the maximum width is obscure in a large area of bulldozer stripping on the west side of the creek. The mineralization lies along a west-striking fracture and is accompanied by an indefinite envelope of dolomitization. Small strippings along strike appear to extend the zone to the top of the ridge 500 feet higher in elevation and 1,000 feet farther west. However, there is very little galena there.

In 1954 a shipment of 22½ tons of cobbed ore was made to Kellogg, Idaho. It assayed: Gold, 0.065 oz. per ton; silver, 53.6 oz. per ton; lead, 69.1 per cent; zinc, 1.5 per cent. Diamond drilling by Silver Standard in 1955 was done to test continuity and values in the main showing. Drilling operations were suspended in September after the completion of nine holes totalling 1,728 feet.

Contact, Silver Queen (Telmac Mines Limited)*

Company office, 202 Barry Building, Edmonton, Alta. W. J. Tellington, president; J. McIntyre, engineer. The Contact group of eleven claims is 2 miles north of Cassiar, and the Silver Queen group of sixteen claims is 3 miles south of Cassiar. The Contact claims are held under a purchase agreement and the Silver Queen claims under option. The present company began work about the middle of July and continued until the middle of October. A crew averaging fourteen was employed. The Silver Queen group was opened up by a rough bulldozed road and some stripping was done, but it is reported that in general the results of this work were not encouraging. The main activity was centred on the Contact group, north of Cassiar. A road was made from the Cassiar road to the lower showings. A chute was erected for the transportation of ore from the upper showings to the end of the road, a distance of about 800 feet. A 14- by 20-foot ore-sorting building was erected at the lower end of the chute, and a 16- by 20-foot office and cook-house was built on the property.

* By A. R. C. James.

A magnetometer survey was carried out, and one diamond-drill hole was drilled to a depth of 45 feet. Great difficulty was experienced in drilling due to the fissured and broken nature of the rock, but further drilling with more suitable equipment is planned for 1956. At the upper showing, it is reported that a vein about 5 feet wide, carrying high values in silver and lead, has been exposed over a distance of 130 feet. Over 30 tons of ore was mined from this vein and was shipped by road to Dawson Creek (a distance of 720 miles), from where it was sent by rail to the American Smelting and Refining Company's smelter at East Helena, Mont.

It is further reported that Telmac Mines Limited has turned over the operation of this property to the Nevada Canadian Mining Company, and that the latter company plans to do further work in 1956.

Beryllium

NEEDLEPOINT MOUNTAIN (59° 129° S.W.)

Low Grade

Three claims, the Low Grade Nos. 2, 3, and 4, were located in June, 1954, by J. J. McDougall, of St. Eugene Mining Corporation Limited, to cover an occurrence of beryllium-bearing skarn. The claims are at an elevation of about 5,000 feet on the southwest slope of Needlepoint Mountain, about 2 miles northeast of the junction of Bass Creek and Cottonwood River.

The claims cover a short length of the contact between rather coarse-grained pink granitic rocks of the Cassiar batholith and hornfels, marble, and skarn of the Lower and Middle Cambrian Atan group.

In many places along the contact, bands of brown garnet and green diopside are developed in otherwise grey limestone. Occasional large areas and masses of garnetite have been formed. On the Low Grade No. 2 in a right-angled embayment in the granite a lenticular body of black skarn extends southeastward along the contact and close to it. The lens has a length of about 300 feet, a maximum width of 35 feet, and appears to strike about north 65 degrees west and dip 60 degrees northeast. The skarn terminates against granite on the northwest and to the southeast narrows and is covered with overburden. The skarn is composed of magnetite, dark-green chlorite, dark reddish-brown garnet, and small irregular areas and layers of pale fluorite and quartz.

The beryllium content of the rock was discovered by the British Columbia Department of Mines as a result of routine spectrographic analysis of a specimen submitted for tin assay by Gerald Davis, of McDame Lake and Christina Lake. The beryllium occurs in helvite, a manganese, iron, beryllium sulphide-silicate mineral. The helvite is cinnamon to reddish-brown in colour and occurs as small individual grains or clusters as much as one-half inch across. It is accompanied by a few small grains of native bismuth. It appears to be localized in a massive magnetite-rich core in the centre of the widest part of the skarn lens at its northwest end.

The beryllium oxide content of helvite is about 14 per cent, and consequently if any rock were to contain 1 per cent beryllium oxide, it would have to contain about 7 per cent helvite. A visual examination of the skarn indicates that the beryllium content is low, considerably less than 1 per cent.

[Reference: "Beryllium and Tungsten Deposits of Iron Mountain District, New Mexico," by R. H. Jahns, *U.S. Geol. Surv.*, Bull. 945-C, 1944.]

TAKU RIVER*

Gold-Silver-Copper-Lead-Zinc

Big Bull, Tulsequah Chief (Tulsequah Mines, Limited)

(58° 133° N.W.) Company office, Trail; mine office, Tulsequah. J. J. McKay, property superintendent; H. R. Hammond, mine superintendent; R. Cory, mill superintendent. Capital: 3,000,000 shares, $1 par value. In 1955 this company, a subsidiary of The Consolidated Mining and Smelting Company of Canada, Limited,

* By A. R. C. James.

operated the Big Bull and Tulsequah Chief mines. Ore from both mines is treated at the Polaris Taku concentrator, which is operated under lease. The mines are situated a few miles from the confluence of the Taku and Tulsequah Rivers, 5 miles from the International Boundary and 50 miles east of Juneau, Alaska. The Tulsequah Chief mine, the mill, and the camp are in the Tulsequah River valley, and the Big Bull mine is in the Taku Valley. Access to the property for personnel and light freight is by charter aircraft from Juneau. All heavy freight and outgoing concentrates are transported on the Taku River by shallow-draught barges plying between the company wharf and tide-water, about 30 miles downstream. River freighting is only possible during the summer months.

Production, ore milled: Tulsequah Chief, 118,138 tons; Big Bull, 78,562 tons; total, 196,700 tons. Concentrates totalling 36,250 dry tons were shipped to the Tacoma and Trail smelters. The concentrator has, throughout the year, been milling over 530 tons per day of gold-silver-copper-lead-zinc ores produced from the two mines. Separate copper, lead, and zinc concentrates are produced by selective flotation based on the primary bulk flotation of the copper and lead followed by conventional zinc flotation. The primary bulk copper-lead concentrate, after two stages of cleaning, is refloated, with depression of the copper minerals by cyanide additions. All concentrates produced after the end of the Taku River navigation season in September are stockpiled at the camp until the following May.

The Tulsequah Chief mine was brought into production in 1951. The orebodies are mainly pyritic sulphide stringer lodes and replacement bodies. The principal economic minerals are galena, sphalerite, chalcopyrite, and tennantite-tetrahedrite, with appreciable amounts of gold and silver; the gold occurs partly in association with the copper mineralization, and the silver occurs mainly with the tetrahedrite. The orebodies so far developed are known respectively as the Upper orebody and the A, B, C, and D orebodies. The original discovery and early development was at the outcrop of the Upper orebody above the present 6500 adit level at an elevation of 1,600 feet on the steep rocky slopes of Mount Eaton on the east side of the Tulsequah River valley. This orebody extends about 700 feet vertically below the surface and finally narrows out above the present 5900 level. The A, B, C, and D orebodies occur several hundred feet deeper and, so far as is known, do not outcrop on the surface. These latter orebodies have been developed from the 5400 level. The general method of mining all the orebodies is by shrinkage stopes. Most of the 1955 production was from stopes in the Upper orebody.

The mine is at present developed from nine levels—the 6500, 6400, 6200, 6100, 5900, 5700, 5500, 5400, and 5200 levels. All broken ore from the upper levels is passed down to the 5400 adit level, which is the main haulage level of the mine. An internal two-compartment vertical shaft, 1,017 feet long, serves all levels from the 5400 to the 6400 adit level. The 5200 level is an important new development; the 5200 crosscut adit was collared on May 2nd, 1955, and by the year end had been driven 2,841 feet from the portal in a northeasterly direction, broadly parallel with the other adit levels at higher elevations. It is expected that the A, B, C, and D orebodies will be mined from this level.

The following is a summary of development work completed at the Tulsequah Chief mine in 1955: Drifting, 1,251 feet; crosscutting, 3,772 feet; subdrifting, 547 feet; raising, 3,792 feet; underground diamond drilling, 10,161 feet; blast-hole diamond drilling, 1,962 feet.

The power-house at the 5400 level portal was enlarged during the year, and a 156-kva. diesel-driven alternator and a 660-cubic-foot-per-minute-capacity diesel-driven air-compressor unit was installed, these machines having been transferred from the Big Bull mine. A new switchboard was wired in for the power-house itself, and additional main switches were added to the distribution panel to cover the requirements of the new 5200 level. At the 5400 level change-house building a 14- by 18-foot extension was

added to provide an improved shifters' office and change-room; a new 15- by 14-foot furnace-room was also added. At the 5200 level a new 120-ton two-compartment ore-bin was constructed on a pile foundation on the river bar about 180 feet from the portal. A trestle 172 feet long was erected to carry the haulage track to the bin. Two new battery-charging stations, each complete with a 15-horsepower motor generator set, control panel, and battery racks, were set up in the 5200 and 5400 level adits about 800 feet from the portals. These stations are for charging the Titan 3½-ton battery locomotives.

The Big Bull mine was brought into production in 1951. The orebodies are similar in mineral content to those of the Tulsequah Chief and occur as steep west-dipping sulphide stringer lodes in a zone of altered rocks adjacent to a north-trending fault. The oreshoots lie in a shallow zone which does not extend more than 300 feet below the surface. The mine has been developed from an open pit and three underground levels—the 5000 adit level, the 4850, and the 4700 levels. In 1955 mining was confined to the open pit and to stopes above the 5000 level. Operations at the open pit ceased on March 31st; since November, 1953, a total production of 102,227 tons of ore was mined from this pit by power-shovel. By the end of 1955, underground mining operations had also ceased, although some broken ore may be drawn next spring. It is intended to abandon the mine after the broken ore has been drawn. The total ore milled from the Big Bull mine from 1951 to the end of 1955 was 382,237 tons. Development work done in 1955 was as follows: Drifting, 115 feet; crosscutting, 11 feet; subdrifting, 632 feet; raising, 1,645 feet; underground diamond drilling, 6,366 feet; surface diamond drilling, 2,226 feet; blast-hole diamond drilling, 965 feet.

Additions to the main camp included a 92- by 12-foot extension to the Giegerich Recreation Hall to house two bowling alleys and a 9- by 15-foot extension to the office building with installation of a new furnace.

The total crew (including staff) employed in December was as follows: Tulsequah Chief mine, 79; Big Bull mine, 26; mill, 31; other surface, 94; total, 230. A total of twenty-four lost-time accidents occurred in 1955, two of which were classified as serious. A full-time safety engineer is employed, and a safety committee meets regularly and carries out inspections of the property. In general a high standard of safety consciousness is maintained throughout all operations, and the rather high rate of serious accidents this year is unusual. A resident doctor is available at the camp to give immediate attention in case of injuries or illness, and serious cases are usually evacuated by air to hospitals at Juneau or Vancouver.

The annual "Tulsequah flood," a remarkable feature of this locality caused by the sudden draining of Tulsequah Lake through a channel in the glacier ice, began on September 4th and ended on September 7th. After the flood, 368 feet of bridging had to be rebuilt.

The two-month-long Union Steamships strike in July and August caused considerable difficulties, inasmuch as freight deliveries by sea to the property were held up until September.

STIKINE*

Copper

Callison Copper (Brikon Explorations Limited)

(58° 131° S.W.) Company office, 532 Burrard Street, Vancouver; mine office, Whitehorse, Yukon Territory. J. D. Mason, president. Capital: 100,000 shares, $1 par value. This property consists of eight claims held by Brikon Explorations Limited under option agreement with F. C. Callison, and thirty-two adjoining claims located by Brikon Explorations Limited. It is on Copper Creek near the Telegraph Creek trail, 28 miles in a straight line northwest of Telegraph Creek settlement.

* By A. R. C. James.

The property is reached by charter float-plane to Kennicott Lake near the headwaters of Hackett River, 25 miles northwest of Telegraph Creek, and from that point by a 5-mile pack-horse trail to the camp.

The showings are reported to consist of disseminated chalcopyrite mineralization in shattered basic volcanics. According to information supplied by the company, the mineralized outcrop measures 50 by 100 feet.

Work was begun on September 1st and was suspended on October 30th. The following was accomplished: 1 mile of switchback trail to connect the property with the Telegraph Creek trail, a limited amount of trenching and mapping, a drill camp set up on the north bank of Hackett River, and two diamond-drill holes totalling 204 feet. A. Allan was the engineer in charge of the work.

All equipment was left on the property in the charge of a watchman, and a programme of mapping, trenching, and drilling is planned for 1956.

UNUK RIVER*

Copper

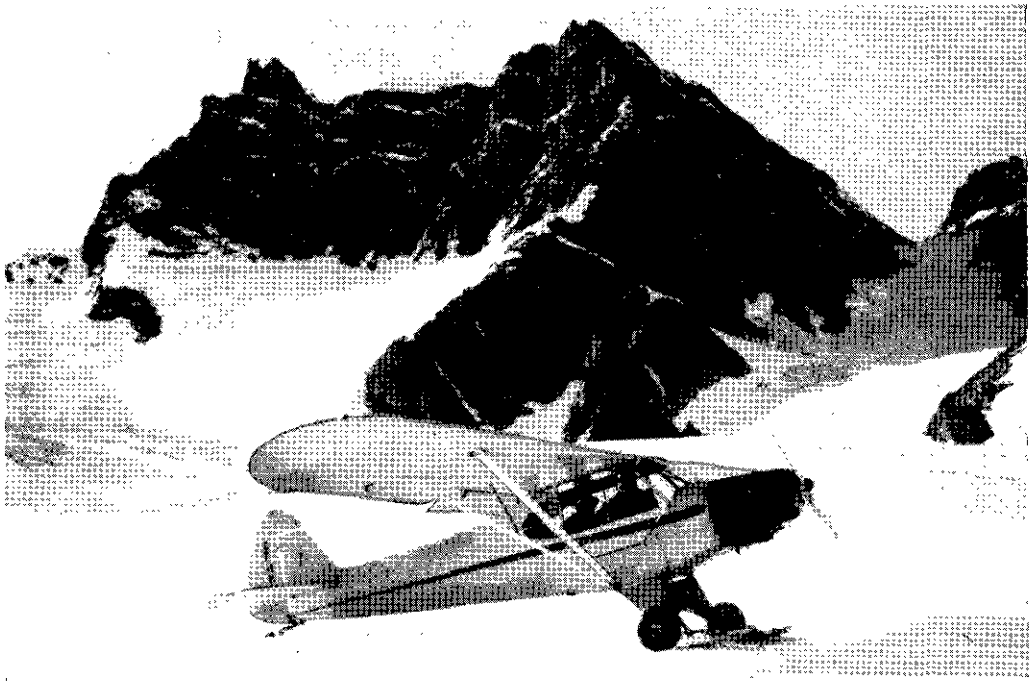
Granduc (Granduc Mines, Limited) (56° 130° S.E.) Company office, Room 507, 1111 West Georgia Street, Vancouver; mine office, Stewart. President, L. T. Postle; manager, J. J. A. Crowhurst; assistant manager, J. M. Parker. Capital: 4,000,000 shares, $1 par value. This company holds by record 171 claims at the head of Leduc River. The property is 25 miles north 35 degrees west of Stewart, and the outcrops of the orebodies are at elevations between 3,260 and 4,800 feet on the mountain slope on the north side of the Leduc Glacier. The deposits at present being developed, consisting of two extensive copper orebodies, are in the Coast Mountains near the eastern contact of the Coast Range batholith. The surrounding rocks are metamorphosed sediments and the mineralization is mainly chalcopyrite, pyrrhotite, and pyrite.

In spite of the difficult terrain, impressive progress has been made this year in the development of this important property. The underground development comprises two adits driven in a northerly direction parallel to the strike of the orebodies. The lower (main) adit, at 3,250 feet elevation, has been extended 1,020 feet to a total length of 2,800 feet. The upper adit, at 3,750 feet elevation, was collared in April, 1955, and has been driven a total distance of 1,600 feet. Drill-hole offsets have been made at 100-foot intervals along both adit levels, and on the 3250 adit level crosscuts had been driven into the orebodies at 400-foot intervals. A total of 3,120 feet of drifting and 1,632 feet of crosscutting was completed in 1955. An extensive diamond-drilling programme was carried out, resulting in the completion of 30,011 feet of underground drilling and 6,552 feet of surface drilling. Underground, horizontal holes were drilled at 100-foot intervals; inclined holes at plus and minus 35 degrees were drilled at 200-foot intervals, and a complete ring of holes was drilled at 400-foot intervals; the maximum length of most holes was 800 feet. The surface drilling, done with a Joy HD 22 diamond drill, has included holes drilled down to 2,000 feet elevation with the object of intersecting the orebodies at depth.

This development and exploratory work has very considerably enlarged the indicated tonnage of ore on the property. Two main orebodies have so far been outlined at Granduc, known respectively as the A (or West) orebody and the B (or East) orebody. Both orebodies strike slightly east of north and dip westward at 65 degrees to nearly vertical. At the 3250 level the A orebody is from 25 to 50 feet wide and the B orebody is from 50 to 150 feet wide, the average grade of the ore being a little over 1.6 per cent copper. Near the main adit portal the two orebodies are over 400 feet apart, but this

* By A. R. C. James.

Camp and snowmobile on upper Salmon Glacier.



Aeroplane at head of south fork of Leduc Glacier.

distance soon narrows in a northerly direction to 150 feet and less. At approximately 1,700 feet from the portal the two orebodies merge. At the 3250 level the A orebody has so far been proved to extend over a horizontal distance of 2,800 feet and the B orebody for 1,700 feet (up to the point of merging with the A orebody); however, in these horizontal lengths there are several relatively barren areas, totalling about 600 feet in strike length, in which the mineral is below ore grade. The persistence of the ore at depth has been indicated by a long drill-hole from the surface which intersected the A orebody 1,200 feet and the B orebody 1,500 feet below the 3250 level.

Underground drilling and drifting was on a two-shift basis. Mucking at the faces of the drifts and crosscuts was done by means of Eimco 12B Rockershovels, the muck being loaded into 3-ton side-dump cars and transported out of the mine by Eimco 401 air locos or Mancha trammers. Compressed air is generated by one Joy-Sullivan and three Gardner-Denver diesel-driven compressors. The 3250 level tunnel is ventilated by a Joy 1000 Axivane fan powered by a 15-horsepower electric motor, and the 3750 level tunnel by a Joy Axivane fan powered by a 5-horsepower electric motor. Fifteen-inch metal duct and "Mineair" vent tube is used to conduct the air to the faces.

A crew averaging forty men (reaching a maximum of sixty-two in the middle of the summer) was employed. The men are housed in a small camp consisting of prefabricated plywood buildings on the north side of the Leduc Glacier. Owing to the danger of snowslides, the camp has to be established out on the glacier ice for the winter months, and in the summer is moved back onto the side-hill near the 3250 level portal. In 1955 the camp was moved to the side-hill in June and back onto the glacier in November. The camp was considerably enlarged during the year by the addition of the following buildings: Eight 12- by 24-foot bunk-houses, one 20- by 28-foot cook-house, one 16- by 16-foot kitchen, one 12- by 25-foot dry-house, and three 8- by 20-foot cabooses. A deep-freeze chest and an R.C.A. Victor 16-mm. film projector were among other additions to the amenities of the camp.

The problem of transporting heavy equipment to a large property like Granduc is exceptionally difficult, situated as it is in a region of changeable and often severe climatic conditions and surrounded on all sides by rugged mountains, glaciers, and snowfields. Last winter the company obtained the services of the Patricia Transportation Company, a firm with much experience in tractor transportation over snow and ice. Between December, 1954, and March, 1955, this company transported 1,000 tons of equipment and supplies to the property. The materials were taken by road for a distance of 11 miles from Stewart to a point near the foot of the Salmon Glacier, where they were transferred to sleighs and hauled by tractors up the Salmon Glacier and over the high glaciers and snowfields to the property. The following equipment was used for this operation: Four D8 tractors, three D6 tractors, two muskeg tractors, one Tucker Sno-cat, and twenty sets of sleighs.

Routine servicing of the property and transportation of personnel was carried out by aeroplane. A Super Cub and a Fairchild 82 are used for this purpose, and two experienced pilots are employed on a full-time basis. In winter and spring the Super Cub is operated with a ski landing-gear and lands on the snow-covered glacier. In summer it is necessary to use an airstrip, and an airstrip approximately 1,200 feet long was built on the northwest flank of Granduc Mountain in 1955. A total of about 100 tons of light freight was taken in by aeroplane during the year.

The mine office is at present established in Stewart, and communication with the camp is maintained by two-way radio.

Working conditions were found to be satisfactory considering the location of the property. Eight compensable accidents were reported, none of which was serious.

PORTLAND CANAL*

BEAR RIVER (55° 129° N.W.)

Silver-Lead-Zinc-Gold

Ben Bolt, Jumbo, Prosperity, Porter Idaho, Silverado (Cassiar Consolidated Mines Limited)

Company office, 209 Credit Foncier Building, 850 West Hastings Street, Vancouver. Capital: 3,000,000 shares, 50 cents par value. W. R. Wheeler, president. This company holds the Prosperity, Porter Idaho, and Silverado groups of claims on Mount Rainey, and the Jumbo and Ben Bolt groups on the south fork of Glacier Creek. It also holds an option on forty-one Crown-granted claims of Portal Mining Company Limited in the Glacier Creek area. All these properties are on the east side of the Bear River valley. Commencing in June, 1954, the company reopened and cleaned out the Portland Canal adit tunnel. This work was completed by February, 1955, and since that date the adit has been surveyed and the various mineralized zones have been sampled. The portal is 5¾ miles by road from Stewart at an elevation of 254 feet on the east side of the Bear River valley, immediately south of Glacier Creek. The adit was originally driven in 1914, and is 3,671 feet long in an easterly direction. The face of the adit underlies the Mosquito claim and is about 630 feet below the surface. A total of 1,600 feet of drifting was done by the original owners on four separate mineralized zones, known respectively as the Lucky Boy, Melba, Richard, and Mosquito.

The company's consulting engineer, A. C. Skerl, surveyed and sampled the Glacier Creek adit on the north side of Glacier Creek and adjacent workings and surface showings. He also surveyed and sampled the Ben Bolt and Jumbo properties and made an examination of the Prosperity, Porter Idaho, and Silverado groups.

SALMON RIVER (56° 130° S.E.)

Gold-Silver-Lead-Zinc

Silbak Premier Mines Limited

Company office, 907 Birks Building, Vancouver. A. E. Bryant, president and managing director. Capital: 3,000,000 shares, $1 par value. Production at this well-known property was suspended in 1953. In 1955 an exploration programme was under the direction of Henry L. Hill, consulting engineer. A crew of twelve men was employed from May to September under the supervision of W. N. Plumb. Geological work was carried out on the Northern Light claim (Premier Border). The Premier Border shaft was unwatered and nine diamond-drill holes were drilled, totalling 2,752 feet. A geological study was also made of the old Silbak workings, with particular reference to ore reserves. A geophysical survey was carried out by A. R. Clark on the Mist claim. An anomaly revealed by this survey was diamond-drilled with five holes totalling 518 feet. There was some minor rehabilitation of some of the camp buildings.

AMERICAN CREEK (56° 129° S.W.)

Skeena, American Belle, Ricadonna, A.B., R.J. (Great North Mining Company Ltd.)

Company office, 416 Bank of Nova Scotia Building, West Hastings Street, Vancouver. Elmore Meredith, president; B. W. W. McDougall, secretary. Capital: 5,000,000 shares, $1 par value. This company holds by record twenty-nine claims and three fractions at the head of American Creek, 24 miles due north of Stewart. The property is at an elevation of 4,000 feet on the bare slopes, bluffs, and benches above the steeply sloping west side of the creek valley. Access is by road as far as the confluence of Bear River and American Creek, and then by an 18-mile pack-horse trail up the valley of American Creek to the property.

* By A. R. C. James.

The formations of the locality consist of sedimentary and volcanic rocks of the Hazelton group. Dark argillites outcrop on the lower slopes to about 500 feet above the valley floor. The volcanics at the higher elevations comprise tuffaceous rocks and greenstones. A shear zone with siliceous replacement and quartz veins and stringers occurs in the volcanics, and some of these structures are reported to be mineralized with galena, sphalerite, chalcopyrite, tetrahedrite, and pyrite, and to carry values in gold and silver. The property was explored intermittently by trenching, open-cutting, and drilling from 1930 to 1932 by Northwestern Aerial Prospectors Limited, and from 1937 to 1940 by Napco Gold Mines Limited.

The present company began work in July and finished on October 6th, when a heavy fall of snow blanketed the property. A crew of from four to eight men was employed under the supervision of J. McBeth. A helicopter was used for transporting heavy freight to the property, and pack-horses were used for the lighter equipment. There was considerable delay in starting work on the property due to adverse weather conditions and mechanical trouble with the helicopter. However, the following was accomplished: 1,000 feet of new trail was made at the upper end of the valley, and the remainder of the trail was improved; a new cable crossing was installed across American Creek south of the Pimple; a log cabin was erected at the half-way point along the trail, 9 miles from the mouth of American Creek; a cabin was erected at the property; 700 feet of X-ray diamond drilling was done, of which some was on the "Moonlight" vein and some on the main shear zone; and 150 feet of open-cutting was completed, using a Pjonjar gasoline drill. Further work on this property is planned for 1956.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1937, pp. B 20–24.]

Maple Bay (55° 130° S.E.)

Copper

Maple Bay (Maple Bay Copper Mines Limited)

Head office, Room 906, 357 Bay Street, Toronto; British Columbia office, 315 Credit Foncier Building, 850 West Hastings Street, Vancouver. W. J. Lawson, president. Capital: 3,500,000 shares, $1 par value. The company holds twenty-two Crown-granted claims, twenty-four recorded claims, and sixteen fractions near Maple Bay on the east side of Portland Canal, 37 miles south of Stewart. The principal showings are at an elevation of 2,400 feet and upwards and comprise a series of quartz veins mineralized with chalcopyrite and pyrrhotite. Access to the property is by charter boat from Stewart to Maple Bay, or arrangements may be made with Pacific Western Airlines for their scheduled flight to call at Maple Bay. The camp is reached by a 3-mile pack-horse trail from the beach.

Some drilling and development work have been done on the Maple Bay group in previous years, particularly by The Granby Consolidated Mining Smelting and Power Company Limited. On the Eagle and May Queen claims a large vein was diamond drilled. On the Star claim a 700-foot adit was driven, and in 1916, 4,000 tons of copper ore was shipped. On the neighbouring Outsider group a copper-bearing quartz vein was mined from 1906 to 1907 and from 1922 to 1926; 138,854 tons of ore was produced.

Work by the present company began in the middle of June, 1955, and continued until the end of November. A crew of nine men was employed under the supervision of R. E. Renshaw. The 3-mile trail from the beach to the camp-site at 2,400 feet elevation was reopened, and a temporary camp was set up. Surface stripping and diamond drilling were done on the Princess and Anaconda veins. Ten holes were drilled, totalling just over 3,000 feet. The results of drilling are reported to be encouraging, and an extensive programme is planned for 1956. The work is under the general direction of F. J. Hemsworth, consulting engineer.

[References: *Minister of Mines, B.C.*, Ann. Rept., 1921, p. 59; *Geol. Surv., Canada*, Mem. 175, p. 100.]

ALICE ARM*

Silver-Lead

Toric (Torbrit Silver Mines Limited) (55° 129° N.W.) Registered office, 309 Royal Bank Building, Vancouver; executive office, 44 King Street West, Toronto; mine office, Alice Arm. R. W. Burton, manager; A. M. Cormie, mine superintendent; A. R. Johnson, mill superintendent. Capital: 3,000,000 shares, $1 par value. The Torbrit mine camp and mill are at an elevation of 1,000 feet on the west side of the Kitsault River, 17 miles by road from Alice Arm. The portal of the 1,000-foot or main haulage level of the mine is on the opposite side of the river, half a mile north of the mill. The mine and the mill are connected by an extension of the mine haulage system. Five miles farther up the Kitsault River valley, near the mouth of Clearwater Creek, the company operates a hydro-electric power plant of 1,600-horsepower capacity.

Production: Ore milled, 151,863 tons. Flotation concentrates amounting to 1,655 tons were shipped to the East Helena smelter, and additional silver amounting to 358,995 ounces was sold as bullion. Gross contents of concentrates and bullion shipped: 1,819,593 ounces of silver and 1,128,833 pounds of lead. The greater part of the silver is recovered with the galena as a bulk concentrate, which is shipped to the lead plant at Trail. The native silver is recovered by cyanidation of the flotation tailings and is refined and shipped as bullion. The milling capacity is between 400 and 450 tons per day.

The ore occurs in shoots in a quartz-barite-hematite-jasper replacement deposit within a country rock consisting of agglomerates and tuffs of the Hazelton group. The important ore minerals are galena, ruby silver, and native silver. Most production is at present obtained from three levels in the mine at 1,000, 900, and 800 feet elevation respectively; in 1955, 26 per cent of the total ore production was from the 1000 level, 60 per cent from the 900 level, and 14 per cent from the 800 level. The method of mining is by long blast-hole and conventional shrinkage stopes. The 1,000-foot level is the main haulage level. A vertical shaft driven from the surface provides access to the lower levels. Further reserves of ore lie below the 800 level, and the development of this section was begun toward the end of 1955. Ventilation of the mine is mainly natural, but assistance in ventilation of the lower workings is provided at the 800 level by a Canadian Sirocco Vanaxial fan powered by a 15-horsepower electric motor; this fan circulates approximately 30,000 cubic feet of air per minute.

A crew averaging 118 was employed. A mine safety committee carries out regular inspections of the mine and mill and holds monthly meetings. Seventeen compensable accidents occurred in 1955, thirteen of which took place in the mine, two in the mill, and two on other surface operations. None of these accidents was classified as serious.

There were no important additions to the camp buildings or surface plant in 1955. The Kitsault suspension bridge was severely damaged by a slide on May 31st, but was repaired and reopened by July 25th.

* By A. R. C. James.

The following is a summary of the work done underground:—

Work Done	Advance	Ore	Waste
	Ft.	Tons	Tons
Drifting—			
700 level (including 205 feet of winze)	205	.....	951
800 level	601	3,153	1,494
900 level	88	109	501
Totals	894	3,262	2,946
Stope drifting—			
800 level	335	763	420
900 level	37	203	.....
Totals	372	966	420
Stope raising—			
800 level	1,691	3,192	2,350
900 level	612	1,316	734
1000 level	14	41	.....
Totals	2,317	4,549	3,084
Stoping—			
800 level	.....	83,701	.....
900 level	.....	49,971	.....
1000 level	.....	1,162	.....
Totals	.....	134,834	.....
Loading-pockets—			
700 level (including 38 feet of winze)	38	366	.....
Diamond drilling—			
800 level	7,782	.....	.....
900 level	183	.....	.....
1000 level	3,082	.....	.....
1150 level	1,475	.....	.....
Surface	4,222	.....	.....
Totals	16,744	.....	.....

Exploration work was done on the Moose and Lamb claims of the Toric group on the east side of the Kitsault River. A number of open-cuts, contemporary with the original work on the Toric claims, were examined, and further prospecting located continuations of the silver-bearing veins. Twenty diamond-drill holes totalling 2,387 feet were drilled in this area, and the management reports that the results are of sufficient interest to warrant further investigation in 1956.

Copper

Boulder (Torbrit Silver Mines Limited)

(55° 129° N.W.) This property is on the east side of Kitsault River, 3 miles south of the Toric mine, and comprises eleven claims located between March and June, 1955, by Torbrit Silver Mines Limited. The property is characterized by the presence of a number of very large mineralized boulders, the existence of which has been known locally for a good many years. Some of the boulders are extremely large, containing many hundreds of tons of mineralized volcanic rock. Mineralization of the boulders is erratic, ranging from fairly massive patches of chalcopyrite to areas of practically no sulphides a few feet farther along the face of a boulder. Most of the showings are on two claims, the Torbrit Nos. 2 and 4. A geophysical (resistivity) survey was carried out for the company by A. R. Clark early in the summer in an attempt to locate the source of the mineralized boulders. Later in the year 670 feet of diamond drilling was done to test one of the anomalies indicated by the geophysical survey. Further work is planned for 1956.

Kinskuch, Reina Blanca (Northwestern Explorations, Limited)

(55° 129° N.W.) Company office, 402 West Pender Street, Vancouver. Capital: 5,000 shares, $100 par value. This property, consisting of eighteen recorded claims and fractions, is south and east of the south end of Kinskuch Lake, approximately 15 miles in a direct line north-northeast of Alice Arm. Kinskuch Lake is at 3,700 feet elevation in mountainous country east of the Kitsault

River, and its waters drain into the Nass River system via the Kinskuch River. The Kinskuch group was located by Gunn Fiva, of Alice Arm, and the Reina Blanca group by E. Samuelson and W. McLean. It is reported that low-grade copper mineralization is associated with a large pyritic zone in shattered volcanic rock. Northwestern Explorations, Limited, purchased both groups in September, and in October a crew of three men supervised by C. S. Ney did 500 feet of sample drilling with a packsack drill. More work is planned for 1956.

Transportation was provided by a Norseman aircraft operated by Queen Charlotte Airlines, ferrying from Alice Arm direct to the camp at the shore of Kinskuch Lake. At the present time there is no direct access to the property by trail.

OBSERVATORY INLET*

Copper

Anyox (The Consolidated Mining and Smelting Company of Canada, Limited).—(55° 129° S.W.) A geological party of five men carried out geological and geophysical work in the vicinity of the old Hidden Creek mine over a period of five months. D. W. Heddle was in charge.

PORCHER ISLAND*

Iron

Star (Utah Co. of the Americas) (54° 130° S.E.) Company office, Room 1502, 736 Granville Street, Vancouver. A. D. Christensen, president. Capital: 250,000 shares, no par value. This property consists of ten Crown-granted claims recently transferred to the Utah Co. of the Americas, together with another claim and several fractions held by record. It is on the northeast coast of Porcher Island opposite Chismore Passage, 22 miles by sea from Prince Rupert. Numerous outcrops of magnetite occur along the coast to a distance of about 1,000 feet from the shore; the surrounding rocks consist of limestones, metasediments, and granitic intrusives. The magnetite deposits have apparently been known for many years, but no previous work has been done on them. A crew of five men under the supervision of J. Lafranier established a camp on the property at the end of October. Five holes totalling 1,000 feet were diamond drilled. It is planned to continue this work in 1956.

USK*

Copper

Nicholson Creek Mining Corporation (54° 128° N.E.) Mine office, Usk. J. Bell, manager. Capital: 5,000,000 shares, no par value. This property is 2 miles by road northeast of Usk, a small settlement on the Canadian National Railway about 14 miles northeast of Terrace. The present operations are mainly on the Orion claim and consist of approximately 1,200 feet of drifts and crosscuts and a number of surface trenches and open-cuts. The Orion portal is at 620 feet elevation. The mineralization occurs in shear zones in altered volcanic rocks, the principal ore minerals being chalcopyrite and bornite. A crew of four men was employed on underground work throughout the year, and a total of 622 feet of drifting, 90 feet of crosscutting, and 270 feet of diamond drilling was done. Some trenching and open-cutting was done in the summer, three men being employed at this work.

* By A. R. C. James.

HAZELTON*

Silver-Lead-Zinc-Cadmium

Silver Standard (Silver Standard Mines Limited)

(55° 127° S.W.) Company office, 602 West Hastings Street, Vancouver; mine office, New Hazelton. R. W. Wilson, managing director; H. B. Gilleland, manager; W. S. Dunn, general superintendent; A. Ritchie, mill superintendent. Capital: 3,500,000 shares, 50 cents par value. The property is on Glen Mountain, 5½ miles north of Hazelton, the mill and camp being located on the northwest side of the mountain at an elevation of 1,300 feet. In 1955 the mine was in operation 279 days and 9,561 man-shifts were worked underground. Total ore production was 14,504 tons. The mill was in operation for nine months on a 44-hour-week basis. A total of 10,048 tons of ore was treated by selective flotation, the remainder being sorted out as waste. The indicated mill recovery was 95.5 per cent. The mill capacity is from 60 to 70 tons per day.

The ore occurs in shoots in a series of parallel quartz veins. The veins range in width from a fraction of a foot to 12 feet. Most of them strike northeast and dip from 40 to 80 degrees southwest. Sixteen quartz veins are known on the property, named respectively the Discovery vein, Nos. 00, 0, and 1 to 12 veins; in addition, an unnamed blind vein was recently discovered. The distance between No. 00 vein and No. 12 vein is about 1 mile. The country rock consists mainly of tuffaceous sandstones of the Hazelton group. A small granitic intrusion cuts the Hazelton group about 900 feet south of the mine portals and lies just to the south of most of the major oreshoots. On the east side of the property a post-vein fault which dips 40 degrees to the west divides the property into an east and a west block. This fault extends for a known distance of 2,000 feet and has an indicated normal dip slip of 250 feet.

The mine has been developed by two crosscut adits driven southeastward on the 1500 and 1300 levels, cutting Nos. 4 to 11 veins and Nos. 1 to 8 veins respectively, and by a 510-foot vertical three-compartment shaft from the 1300 level with crosscuts on the 1150, 1000, and 850 levels. Nos. 1, 4, and 6 veins have been worked from these lower levels. The method of mining is mainly shrinkage stoping.

* By A. R. C. James, except as noted.

The following is a summary of work performed underground:—

Work Done	Advance	Ore Broken
	Ft.	Tons
Drifting—		
1900 level	217	.....
1700 level	406	.....
1500 level	1,263	.....
1300 level	384	.....
1200 level	40	.....
Total	2,310	.....
Raising—		
Discovery (surface)	85	.....
1900 level	149	.....
1700 level	407	.....
1500 level	313	.....
1200 level	307	.....
850 level	187	.....
Total	1,448	.....
Subdrifting—		
Discovery (surface)	85	.....
1800 level	108	.....
1100 level	365	.....
1000 level	41	.....
Total	599	.....
Crosscutting—		
1500 level	469	.....
1300 level	1,384	.....
Total	1,853	.....
Stoping—		
Discovery vein	.....	248
No. 1 vein	.....	1,488
No. 4 vein	.....	2,913
No. 5 vein	.....	73
No. 6 vein	.....	2,428
No. 7 vein	.....	1,530
No. 8 vein	.....	860
No. 9 vein	.....	794
No. 11 vein	.....	2,870
Development	.....	1,286
Total	.....	14,490

A considerable amount of exploration and development was done during the year in an effort to find additional ore reserves.

The ore found in 1954 in the Discovery vein was developed by raises and subdrifts, but was found to extend only a few feet below the surface.

The raise on No. 1 vein from the 850 level was completed to the 1200 level, and 365 feet of subdrifting was driven on the 1100 level. Although the vein is strong and fairly well mineralized, no new oreshoots were found.

The 1300 crosscut was driven 1,384 feet and was still being driven at the end of 1955 toward the blind vein found on the 1500 level. In this distance the crosscut passed through No. 8 vein above the fault and through the fault itself, so that it is now in the east block. A length of 80 feet of ore was opened up on the 1300 level, where No. 9 footwall vein and No. 8 vein intersect.

The 1500 crosscut was continued to No. 11 vein, and the vein was opened up for about 400 feet. Only one short oreshoot was found in this distance, and drilling indicated that this shoot does not persist below the 1500 level. The 45-degree raise started in 1954 from the 1500 level to intersect No. 11 vein at 1,750 feet elevation was completed, and a drift 406 feet long was driven on the 1750 level. A raise was then driven from this drift to the 1900 adit level. The only ore encountered was immediately below the 1900 level. A high-grade oreshoot 60 feet long was opened up in the footwall of No. 11 vein at the 1900 level and mined out above the level.

Two drill-holes, which were drilled to intersect No. 9 vein at 1,500 feet elevation, encountered high-grade ore in a blind vein south of Nos. 9 and 11 veins. A crosscut was

driven south from the 1500 level to intersect this vein, and by the end of 1955 the new vein had been opened up to a length of 100 feet showing sections of good mineralization but narrow widths.

Approximately 10,000 feet of surface stripping was done with bulldozers. Half of this was in a single trench the same distance south of the intrusions as the major oreshoots are north. Nothing of importance was found.

A geophysical (resistivity) survey was carried out by A. R. Clark over an area of approximately 470 acres. This survey was extended in all directions beyond the mine workings and beyond any previous surface stripping. A large number of anomalies was found which were systematically investigated. They were found to include minor veins, known veins, shears containing pyrite, and beds of argillite. No new orebodies were found.

Twenty-four diamond-drill holes were drilled from the suface, totalling 6,588 feet. Forty-one holes were drilled underground, totalling 8,061 feet. This drilling yielded useful information, but apart from the two holes which produced high-grade intersections, no new orebodies were indicated.

Three prospecting parties were employed during the summer months. One, based at Hazelton, examined the following areas: Kisgegas, Kispiox Valley, Kitwanga Lake, and north of Kitsumkalum Lake. A second party spent the summer in south Cassiar, and the third prospected the country around Dall and Cry Lakes between Dease Lake and Kechika River. Examinations were carried out on approximately twenty-four properties. The following five properties were optioned: Marble Creek, Topley Richfield, Big Four, Three Hills, and Torger. Work done on these properties is described elsewhere in this Report.

[Reference: *Minister of Mines, B.C.,* Ann. Rept., 1950, pp. 87–95.]

Copper

Three Hills*

(55° 127° S.W.) This property consists of six claims located first by Alfred LeToile in 1951 and relocated by LeToile, D. R. Willemar, and E. H. Harbottle in 1955. The claims, Three Hills Nos. 1 to 6, are between South Hazelton and Skeena Crossing on the east side of the highway, 2¼ miles south of Seeley Lake.

The showings are about 1,000 feet southeast of the highway at about the same elevation (1,100 feet). The terrain is flat and drift-covered, except for a number of rock drumlins on which the showings are found. The main showing consists of a small rock drumlin about 120 feet wide and about two or three times as long that rises some 25 feet above the adjacent drift-covered area. The drumlin has been largely cleared of moss and overburden, and a shallow rock trench has been cut across its centre. The trench strikes north 30 degrees west and is approximately at right angles with the trend of the drumlin. Other showings occur on adjacent, larger rock drumlins, but they have been less extensively exposed or developed.

The rocks are hornfelsic argillite and feldspar porphyry of the Hazelton group. They strike north 35 degrees east parallel to the trend of the drumlins and on the southeast dip 40 degrees northwest; elsewhere dip is obscure. The rocks are fractured by many small joints striking north 75 to 90 degrees east and dipping about 60 degrees north. Some joints are filled by small stringers of quartz and chalcopyrite. Two chip samples, each taken over 10 feet in the centre, or better looking part, of the trench assayed as follows: (1) Gold, trace; silver, 0.3 per cent; copper, 0.06 per cent; and (2) gold, trace; silver, trace; copper, 0.61 per cent.

During the year the property was under option to Silver Standard Mines Limited, which drilled one diamond-drill hole to a depth of 268 feet.

* By A. Sutherland Brown.

TOPLEY*

Gold-Silver

Topley Richfield (Silver Standard Mines Limited)

(54° 126° N.E.) Company office, 602 West Hastings Street, Vancouver. This group of eighteen claims was optioned in 1955. The property is about 7 miles north of Topley, a small settlement on the Canadian National Railway between Burns Lake and Smithers. A considerable amount of development work was done on the Red Top group (part of the Topley Richfield property) in 1926 and 1927, and work has been done intermittently since that time.

Two diamond-drill holes were started in 1955, but difficulties in drilling stopped the first hole at 293 feet and the second at 243 feet. It is reported that further attempts to drill this ground will be made with suitable equipment in 1956.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1926, pp. 138–143; 1927, pp. 140–147; 1937, pp. C 26–27.]

DECKER LAKE*

Copper

Kerr Copper

(54° 125° S.W.) This property, consisting of about thirty-five claims and fractions, is on Gerow Creek, 1 mile south of Decker Lake. The property is reached from the village of Decker Lake by boat across the lake and by trail from the south shore of the lake. The group was optioned in 1955 by Trico Explorations Ltd. and Moneta Porcupine Mines, Limited, from A. B. Goodridge and Cyril Keyes.

Some work consisting of open-cuts and short adits was done on the property many years ago. In 1955, previous to the option being taken, Goodridge and Keyes diamond-drilled seven holes totalling 386 feet. This drilling, together with the surface showings, indicated a zone of sheared and altered volcanics partly mineralized over a length of 120 feet with chalcopyrite, sphalerite, and galena. The zone appears to strike about north 60 degrees west and to dip 40 degrees or less southwestward. The surrounding rocks are andesitic volcanics of the Hazelton group.

Trico Explorations Ltd. and Moneta Porcupine Mines, Limited, began drilling additional holes on August 1st and continued until the end of September. Six holes totalling 1,000 feet were drilled, but these deeper holes did not cut mineralization comparable to the shallower holes, and the option was dropped. R. H. Seraphim was in charge of the exploration work with a crew averaging seven men.

WHITESAIL LAKE†

Gold-Silver-Tungsten

93E -19,20

Harrison (Deer Horn Mines Limited)‡

(53° 127° S.E.) Head office, 44 King Street West, Toronto. President, W. H. Bouck; mine manager, W. Tattrie. The property consists of thirty Crown-granted claims and fractional claims and eight claims held by record. The Harrison group is north of Lindquist Lake, 85 miles southwest of Burns Lake. The claims are in Tweedsmuir Park and also in the hydro-electric power reserve granted Aluminum Company of Canada Limited.

Fuel and mining equipment are transported by barge from Kenney Dam to the western end of Whitesail Lake, a distance of approximately 140 miles, thence by 5.7 miles of tractor-road to the mine camp at an elevation of 4,150 feet. The camp consists of cook-house, bunk-house, dry, engineering and assay offices.

* By A. R. C. James.
† By A. R. C. James, except as noted.
‡ By W. R. Bacon.

In 1943 scheelite showings were discovered on the north slope of Lindquist Lake by the Harrison brothers, of Wistaria, and in 1944 Franc Joubin discovered gold-bearing quartz veins in the same vicinity. Pioneer Gold Mines of B.C. Limited optioned the property in 1944. This company explored the showings by extensive trenching and 13,093 feet of diamond drilling before dropping its option in the fall of 1946.

Deer Horn Mines Limited was incorporated in 1950 and bought the Harrison group outright. Road-building was commenced in the summer of 1953, the camp was erected in 1954, and an intensive exploration programme was initiated. An adit is being driven at an elevation of 4,260 feet.

The property was examined by the writer in June, 1955.

The Deer Horn showings are on the eastern border of the Coast Mountains. Granitic rocks underlie the southern part of the property. The predominant type is a pinkish-weathering granite which is characterized by abundant quartz and random phenocrysts of potash feldspar as much as 2 inches in length. In the vicinity of the showings the rock is a grey medium-grained quartz diorite.

The granitic rock intrudes the Hazelton group, which is locally represented by slates, sandy and silty greywackes, argillite, and tuff. Close to the contact the slates have been converted to andalusite schists.

The layered rocks strike east-west and dip 50 to 75 degrees southward, approximately parallel to the northern margin of the quartz diorite. The contact zone is marked by intense shearing and alteration. Silicification occurs in varying degree, mainly in the layered rocks, across widths as great as 400 feet.

Exploration to date has been concentrated on:—

(1) Gold-silver-bearing quartz veins in the quartz diorite. Because exploration has shown that these veins are probably faulted segments or branches of a single vein structure, they are referred to collectively as the Main Vein.

(2) Gold-silver-bearing quartz stringers and veins in the silicified contact zone.

The mineralogy of the Main Vein is similar to that of certain veins and stringers in the silicified contact zone. The quartz is generally milky white in colour and as a rule comprises at least 85 per cent of the vein material. The metallic minerals include pyrite, pyrrhotite, sphalerite, galena, chalcopyrite, magnetite, scheelite, and tellurides. The tellurides have been identified as tetradymite, hessite, tellurbismuth, and altaite by Taplin,* who found fine grains of gold within tetradymite and galena, and narrow veinlets of gold in hessite. Taplin also noted minute amounts of cosalite and arsenopyrite and tentatively identified argentite in polished sections of vein material.

There are numerous westward-striking, southward-dipping quartz stringers and veins in the silicified contact zone. Some are gold-bearing. Underground the east-west drift is entirely within the silicified contact zone; it follows a persistent vein which dips southward at 50 to 70 degrees and is generally within 50 feet of the northern margin of the silicified contact zone. In the drift the average width of this vein is about 8 inches.

The apparent length of the Main Vein is 2,600 feet. It has been explored on the surface for a distance of 1,220 feet. According to information supplied by the company, the vein for 1,075 feet of this length averaged 0.255 ounce of gold and 6.34 ounces of silver per ton across an average width of 9.5 feet. At the surface the Main Vein dips 30 to 50 degrees northward, but diamond drilling appears to indicate that the dip flattens rapidly with depth and that the Main Vein terminates in a series of horsetails against the narrow vein in the east-west drift. If so, the slope depth of the Main Vein appears to be rather limited, ranging from 130 to 250 feet in the interval explored.

No attempt has been made to develop the scheelite showings that first attracted attention to the property. Scheelite is present in slide rock shown at the western border of Figure 1. The mineral is apparently derived from otherwise barren quartz veins and

* Taplin, A. C.: A Report on the Mineralogy of the Harrison Group, Lindquist Lake, B.C. Unpublished report, Department of Geology, University of British Columbia, 1950.

stringers in rocks of the Hazelton group. The company reports that it intends to investigate the surface showings by continuing the west drift into the area beneath them.

Work was suspended in November, 1955, and according to information supplied by the company the following development work had been done in 1954 and 1955: 1,822 feet of drifting, 113 feet of raising, 3,705 feet of underground diamond drilling, and 2,997 feet of surface diamond drilling.

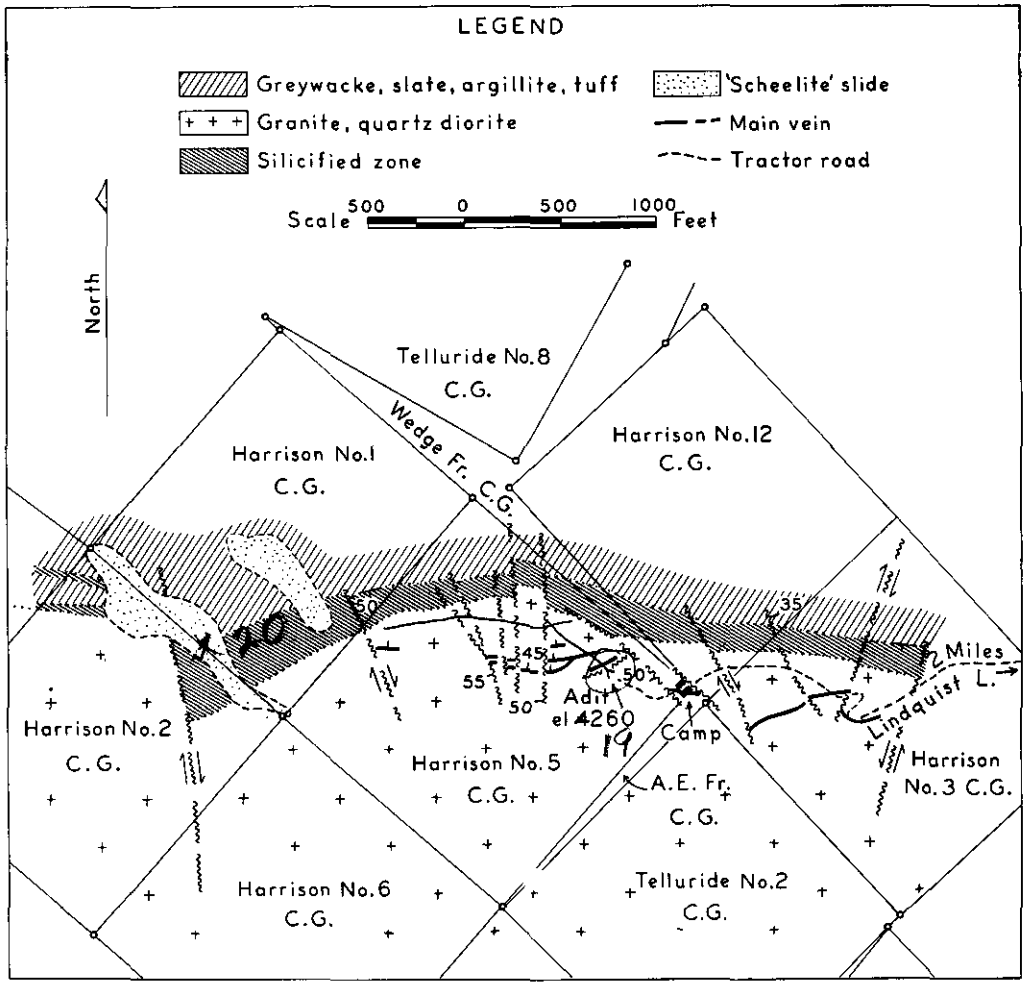


Figure 1. Deer Horn Mines Limited—principal showings.

Silver-Lead

Chikamin (53° 127° S.E.) This group of eight claims is held by a private company, the principal shareholders of which are F. R. Joubin, of Toronto, and C. V. Harrison, of Burns Lake. The property is on the northeast side of Chikamin Mountain, south of Whitesail Lake, and may be reached by air from Burns Lake or by boat from Wistaria on Ootsa Lake. A crew of four men was employed under C. V. Harrison from August 1st to September 27th on preliminary work to open up the property. The following was accomplished: 3 miles of trail was brushed out and repaired and the landing was cleared so that pack-horses and equipment could be put ashore, an old cabin was repaired, and food was stored for the winter so that

an early start can be made in 1956. A total of eighteen open-cuts was made to bedrock, and eleven of them were sampled.

FRASER LAKE*

Uranium

Abe, Babs, Ike, Pat, Zeke

(53° 124° N.W.) The Abe group of four claims located by Joe Pataji in March, 1952, and the Babs, Pat, Ike, and Zeke groups, totalling twenty-two claims, located in June and July, 1955, by C. S. Powney, E. A. Floyd, and partners, of Fort St. James, cover a uranium-bearing deposit about 6 miles south of Fraser Lake. The claims are at an elevation of 3,500 feet on the northern slope of Nithi Mountain. They are reached by about 9 miles of road from Fraser Lake P.O. In December, 1955, the claims were under option to American Standard Mines Limited.

The claims, as well as the area around Nithi Mountain, are underlain by a rather coarse pink granite which is part of a fairly extensive outcrop of the Topley intrusion. In the vicinity of the uranium showings the granite is intruded by a miarolitic rhyolite porphyry dyke that has a length of at least 600 feet and a width of at least 100 feet. The dyke has a general northerly strike, and its western contact against granite is sharp and well defined. The dyke is dark grey and has smoky quartz phenocrysts. In many instances, alteration of the rock to a paler brown-grey can be seen extending outward from fractures and hair-line cracks along which there are trains of tiny pyrite grains. In addition, there are some small crystals of pyrite widely disseminated through the rock. The rhyolite porphyry is miarolitic, and the cavities, seldom more than one-quarter inch wide and 1 inch long, are lined with minute quartz crystals.

The dyke is broken by sets of closely spaced steep joints striking north 80 degrees west, about at right angles to the trend of the dyke and cut by a few narrow vuggy quartz veinlets.

The uranium mineralization is confined to the dyke and consists very largely of the secondary hydrous aluminum uranium phosphate, sabugalite ($HAl(UO_2)_4 .16H_2O$).† The sabugalite appears as small, pale lemon-yellow tabular crystals or as incrustations on joint and fracture surfaces or within miarolitic cavities and vugs. Its field determination is facilitated by its brilliant greenish-yellow fluorescence under ultra-violet light. A small amount of bright-green metatorbernite is also present.

Uranium mineralization is present in four short, shallow trenches spaced for about 225 feet along the western edge of the rhyolite dyke. The longest trench is about 30 feet in length, and in it sabugalite extends for a length of 25 feet. A fifth trench 300 feet to the north of the group of four, also on the western margin of the rhyolite dyke, shows only a very small amount of sabugalite and was put in earlier to investigate an occurrence of molybdenite. The visible distribution of sabugalite suggests that it is associated with the westerly striking cross-fractures in areas where the alteration of the rhyolite porphyry is most intense.

A sample of dyke well mineralized with sabugalite assayed: Uranium oxide, 0.16 per cent.

Small areas within the rhyolite porphyry contain a peppering of a minute black radioactive mineral which as yet has not been identified.

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* By S. S. Holland.

† Determination by Professor R. M. Thompson, University of British Columbia.

OMINECA*

Babine Lake (54° 126° N.E.)

Copper

McDonald Island

This island, also known as Copper Island, is in the northern section of Babine Lake at the mouth of Hagan Arm. Low-grade copper mineralization was discovered here in the early years of the century, and prospecting and exploration have been carried on intermittently since then, especially in 1929 when The Consolidated Mining and Smelting Company of Canada, Limited, took an option on the property and did some diamond drilling. Mineralization is reported to consist of chalcopyrite and bornite disseminated and in fractures in volcanic rocks.

In 1955 The Granby Consolidated Mining Smelting and Power Company Limited examined the showings on the island. A small crew supervised by K. C. Farhni drilled eight diamond-drill holes totalling 2,213 feet. Further work on the property is planned for 1956.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1913, pp. 113–114; 1927, pp. 149–150; 1929, pp. 180–181; 1940, p. 78; 1946, p. 89.]

Granite Creek (55° 124° N.E.)

Niobium

Lonnie†

The Lonnie group of eight claims, located by C. S. Powney, E. A. Floyd, and partners, of Fort St. James, in 1954, is owned by Northwestern Explorations, Limited. The claims are on the southeast side of Granite Creek, a tributary of Manson River, and are about 1½ miles from the Fort St. James–Manson Creek road.

In 1955 a small crew under the supervision of K. C. Campbell built a jeep-road up the hill to the showings and explored the mineralized zone by a series of bulldozed trenches and by hydraulic stripping. The zone is now exposed in fifteen trenches extending from Granite Creek for about 1,200 feet to the southeast and rising to a height of about 450 feet above creek-level. Generally each trench from southwest to northeast exposes hornblende gneiss, marble, and syenite. The mineralization of present interest consists of niobium and uranium-bearing minerals, ilmenorutile, columbite, and uranian pyrochlore in a marble zone of uncommon mineralogy.

The claims are underlain for the most part by schists and gneisses of the Wolverine complex. Immediately to the south of the marble zone is a hornblende gneiss in which the amphibole is the soda variety, crossite (near riebekite), and the pyroxene is the soda variety near acmite. Most of the trenches terminate in this sodic hornblende gneiss, which is assumed to be the footwall of the marble zone. Throughout the 1,200-foot exposed length, the strike of the rocks is about north 60 degrees west and the dip steep to the south.

On the north side of this gneiss and conformable with it is a band of coarsely crystalline white marble containing individual crystals and crystal aggregates of the soda amphibole, crossite, and the soda pyroxene, acmite. In addition, the marble contains microcline, some of which is a pale honey-yellow in colour, small rounded grains of white apatite, and chocolate-brown octahedral crystals of uranian pyrochlore. The marble varies in width from a few feet to a few tens of feet. Marble layers a few inches thick interlaminated with the hornblende gneiss indicate that the marble probably was bedded limestone.

In several of the trenches, layering within the marble is involved in small dragfolds plunging from 15 to 40 degrees southeast. The few dragfolds seen indicate there is some

* By A. R. C. James, except as noted.
† By S. S. Holland.

folding within the rocks, and this could account for the different widths of marble in adjacent trenches. The amphibole and pyroxene in the marble show no lineation.

Adjoining the marble on the north side is a syenite having three distinct phases; the relation of the three is not apparent. The syenite directly in contact with the marble is of medium grain and white, being devoid of amphibole and pyroxene. Under the microscope the white syenite is seen to be composed essentially of microcline, orthoclase, and some oligoclase, and may contain as much as about 25 per cent calcite. It contains as much as 10 per cent zircon and is peppered with finely disseminated ilmenorutile. An unusual syenite exposed only in one trench is a rather coarse-grained grey rock containing orthoclase, yellow microcline, biotite and acmite, and at least 10 per cent cinnamon-coloured zircon. The syenite invariably exposed on the northern side of the zone is grey and consists of orthoclase, microcline, oligoclase, biotite, some calcite, and a very small amount of pyrite.

Some trenches expose a streaky blue-grey marble on the north side of the syenite. Rocks farther north are Wolverine gneisses.

Niobium is present in the minerals ilmenorutile and columbite, which seem to be very largely confined to the white syenite, or in pyrochlore which was observed only in the marble. The highest assay of 0.79 per cent niobium pentoxide was from a selected sample of white syenite. The niobium content of the marble is low.

The combined width of marble and syenite ranges from 25 feet to a maximum of almost 100 feet.

A very large number of samples was taken for assay by the company when the surface stripping of the zone had been completed in the autumn of 1955.

NAZKO* (53° 123° S.W.)

Manganese

An occurrence of black manganese oxide a little more than a mile north of Nazko was examined in July, 1940, by John S. Stevenson. The essential data from Stevenson's notes are recorded in the following paragraphs.

Black oxide had been exposed in six pits in an area of 1.3 acres within Lot 2144. The area is presumed to lie within the Rainbow mineral claim recorded June 22nd, 1953, and held by W. M. Libengood, of Wieside, Nebraska. The manganese oxide lies below 2 inches to 3 feet of soil that is dark with admixed black oxide, and is underlain by soil, sand, or gravel, some of which is stained with limonite. In one pit, tufa 6 inches thick immediately overlies the manganese oxide.

The area tested is near Redwater Creek, at the foot of a bench that stands some 70 feet above the area in which the test-pits were sunk. Argillaceous cherts underlie the bench.

Assays of samples taken by Stevenson indicated the manganese content of the layer of powdery black oxide and of the soil that contains a substantial amount of black oxide. The assays are tabulated below.

Pit No.	Depth	Thickness	Manganese	Iron	Remarks
	In.	In.	Per Cent	Per Cent	
1	0–16	16	20.3	6.5	Brown to black soil.
1	20–24	4	38.2	2.9	Black powdery oxide.
2	6–26	20	53.1	0.3	Powdery to granular material.
2	26–34	8	40.0	0.3	Contains some grey sand.
3	26–32	6	16.8	17.7	
4	0– 8	8	18.0	16.1	Black-brown loam.
4	8–17	4–9	16.0	23.3	
5	6–42	36	11.6	29.0	
6	0–10	10	33.9	9.4	
6	16–42	26	19.1	4.1	Overlain by tufa 6 in. thick.

* From field notes of John S. Stevenson.

CARIBOO*

WELLS-BARKERVILLE (53° 121° S.W.)

Gold

The Cariboo Gold Quartz Mining Company Limited

Company office, 1007 Royal Bank Building, Vancouver; mine office, Wells. W. B. Burnett, president; A. Shaak, general manager; M. Guiguet, general superintendent; J. Stone, mill superintendent. *Capital: 2,000,000 shares, $1 par value.* The Cariboo Gold Quartz and Aurum mines presently being operated by this company are adjacent to the town of Wells, which is 51 miles by road from Quesnel on the Pacific Great Eastern Railway.

Underground development at the two mines comprised 3,020 feet of drifting, 2,877 feet of crosscutting, 1,770 feet of raising, and 13,173 feet of diamond drilling.

The diamond drilling was done to outline the bottom of Jack of Clubs Lake directly over 19-172R stope in the Cariboo Gold Quartz mine.

Most of the production was obtained from the No. 1, Tailings, and Rainbow zones of the Cariboo Gold Quartz mine and from the 1000-1E block of the Aurum mine.

The average number of men employed was 228, of which 169 were employed underground. Production: Ore milled, 108,652 tons.

QUESNEL*

YANKS PEAK (52° 121° N.E.)

Gold

Jim

F. H. M. Codville, of Duncan, and two partners, W. F. Edwards and G. Burgleman, did 180 feet of crosscutting on the Jim group near Yanks Peak, about 11 miles by road from Keithley Creek P.O. The Main vein was intersected and two new veins, the A and B, were discovered by this crosscutting. Two bridges on the Keithley Creek road, damaged by spring flooding, were repaired.

[Reference: *B.C. Dept. of Mines,* Bull. 34, 1954, pp. 65–68.]

CLINTON*

Gold

Empire Valley Gold Mines Ltd.

(51° 122° S.E.) Company office, Chilliwack. G. H. Clarke, president; J. C. Cooper, manager. This company holds by record twelve mineral claims and six placer leases on Porcupine (Black Dome) Mountain near the headwaters of the north fork of Lone Cabin Creek. Access to these properties is by 29 miles of road from the Churn Creek bridge, which spans the Fraser River about 1 mile north of the mouth of Churn Creek.

Between April 15th and October 28th a total of 200 feet of drifting was done—150 feet on the Giant vein and 50 feet on the Red Bird vein. The adits on these veins are at about 5,800 and 6,500 feet elevation respectively. Stripping was done on the Black Shear and Honey veins. In addition, a short aircraft landing-strip was constructed at 6,500 feet elevation. Four men were employed.

[Reference: *Minister of Mines, B.C.,* Ann. Rept., 1954, pp. 98–100.]

* By J. W. Patterson.

LILLOOET*

Bridge River

Gold

Bralorne Mines Limited (50° 122° N.W.) Company office, 555 Burrard Street, Vancouver; mine office, Bralorne. A. C. Taylor, president; M. M. O'Brien, vice-president and managing director; D. N. Matheson, general manager; C. M. Manning, general superintendent; C. D. Musser, mill superintendent. Capital: 1,250,000 shares, no par value. The Bralorne mine is on Cadwallader Creek, a tributary of Bridge River, and is 75 miles by road from Lillooet on the Pacific Great Eastern Railway.

Development comprised 7,825 feet of drifting, 2,865 feet of crosscutting, 1,463 feet of raising, 5,852 feet of diamond drilling, and 259 feet of shaft-sinking.

The development was directed primarily toward the exploration of the 77 and 79 veins from the Queen shaft below the 2600 level. Some drifting was done below the workings of the King mine on the 77 vein at the 2000 and 2600 levels, and on the 79 vein at the 2500 level.

Diamond drilling was done to test known veins on horizons not otherwise developed and to test the walls of productive veins for possible parallel structures.

Sinking in the Queen shaft continued on a single-shift basis, lateral development being done on the other two shifts. The Queen shaft is now 3 feet below the 3300 level. Loading-pockets were excavated below the 3100 and 3200 levels and a sinking-hoistroom completed on the 3200 level. Below the 3200 level an additional 3- by 5-foot compartment was added to the south end of the shaft to allow the original manway to be used for sinking purposes. Excavation of a hoistroom and a rope raise was started on the 2600 level. A new 58- by 72-inch double-drum electric hoist will be installed in this hoistroom to service the Queen shaft.

The average number of men employed was 396, of which 288 were employed underground.

Production: Ore mined, 153,555 tons; waste mined, 35,621 tons; ore milled, 166,831 tons.

Through the co-operation of the Bridge River mining companies and the Department of Highways, a road was constructed along Bridge River between the Moha and Bridge River roads, thus providing direct access to Lillooet.

Pioneer Gold Mines of B.C. Limited (50° 122° N.W.) Company office, 711 Yorkshire Building, 525 Seymour Street, Vancouver; mine office, Pioneer Mine. Victor Spencer, president; H. T. James, managing director; W. B. Montgomery, mine manager; J. C. Moore, mine superintendent; T. Bevister, mill superintendent. Capital: 2,500,000 shares, $1 par value. The Pioneer mine is on Cadwallader Creek, a tributary of Bridge River, and is about 78 miles by road from Lillooet on the Pacific Great Eastern Railway. The property adjoins that of Bralorne on the east.

Development comprised 3,103 feet of drifting, 1,909 feet of crosscutting, 1,036 feet of raising, and 8,228 feet of diamond drilling.

This development was concentrated mainly on the 27 vein on the 2700, 2800, and 2900 levels, on which 2,431 feet of drifting and 1,009 feet of raising were done. The 92 vein, discovered in 1954 on the 2000 level, was followed for an additional 421 feet on this level. Also on the 2000 level, 943 feet of crosscut was driven. The diamond drilling was directed primarily to ascertain the width of the 27 vein on the lower levels and to test the walls of the 92 vein on the 2000 level.

A permanent sump was excavated just below the 2900 level and is now being used. A station was cut on the 2500 level at No. 2 shaft and was connected by a crosscut to the

* By J. W. Patterson.

main haulageway at No. 3 shaft. This station and crosscut are used to transfer equipment from the No. 2 shaft via the main haulageway to No. 5 shaft.

Installation of 1,500 feet of 19-inch galvanized pipe and an 8,000-cubic-feet-per-minute fan followed by a 20-inch Ventube improved the ventilation in the 2000 level East drive.

Due to excessive wear of steel pipes by sandfill, 2,500 feet of steel pipe in No. 3 shaft was replaced by 3-inch rubber-lined pipe.

The average number of men employed was 256, of which 145 were employed underground.

Production: Ore mined, 97,814 tons; waste mined, 17,705 tons; ore milled (after sorting), 89,063 tons.

Under the direction of B. C. Murray, the safety programme, started in 1954, was continued with some modifications and additions. The accident-frequency rate was reduced by 33 per cent from that of the previous year, representing a possible saving in direct costs of about $20,000. A total of forty-six persons were trained in first aid and twenty-one supervisors in job safety and job instruction.

Tungsten-Copper

Chalco (50° 122° N.W.) The Chalco is owned by Mrs. D. C. Noel of Bralorne and Vancouver. The thirteen claims in this group are adjacent to Piebiter Creek, about 7 miles southeast of the Pioneer mine. The camp is 1 mile from the Cadwallader Creek road.

Between June 10th and October 8th Mrs. Noel and one employee prospected and stripped several ore occurrences and constructed trails to these occurrences. Three-quarters of a mile of tractor-road was constructed by contract from the Cadwallader Creek road up Piebiter Creek.

[Reference: *Minister of Mines, B.C.,* Ann. Rept., 1948, pp. 97–102; 1954, pp. 102–103.]

TYAUGHTON CREEK*

Mercury

Silver Quick (51° 122° S.W.) W. Sevrens, of Vancouver, holds by record the Silver Quick group of four mineral claims, located on an unnamed creek flowing north into Tyaughton Creek about 18 miles by road from the Bridge River road. The claims are reached by about 4 miles of trail from the Tyaughton Creek road.

One flask of mercury was produced with the use of a small retort. The rock was crushed manually to approximately 2 inches in diameter and then roasted for six hours. The mercury was purchased by Pioneer Gold Mines of B.C. Limited for gold amalgamation purposes. The retort was transported to the property by pack-horse.

LYTTON†

Uranium

Orlean (50° 121° S.W.) In August, 1955, the Orlean group of mineral claims was located by Francois Paquet to cover the occurrences of uranium-bearing material exposed in a rock cut on the roadside 7.3 miles from Lytton on the Lytton–Lillooet road. Subsequently a total of fifty-five claims was located, but the only known uranium mineralization is in the road cut. In a shear striking north 50 degrees west and dipping 50 degrees northeast, 2½ feet of black slate lies between walls of massive reddish sandstone. The slate is exposed for a length of about 6 feet. It has films of malachite and azurite along the fracture surfaces, and with the Geiger counter a maximum count of three times background may be obtained. No

* By J. W. Patterson.
† By S. S. Holland.

uranium minerals are to be seen, and a sample of selected material showing copper staining assayed: Uranium oxide equivalent, 0.0045 per cent.

Rosyd

(50° 121° S.W.) The Rosyd group of claims was located in April, 1955, by S. Baker, of Lytton, to cover an occurrence of uranium-bearing material found on the east bank of the Thompson River about 1 mile north of Lytton. The claims are on both sides of the Thompson River, and subsequently a large number of additional claims were located to the northwest and southeast to cover presumed extensions in those directions.

The showing is just above high-water level on the east bank of the Thompson River in a band of sheared and altered limestone about 150 feet wide that lies within grey biotite granite. The zone of shearing lies within the limestone band and strikes north 50 degrees west and dips 75 degrees southwest. A maximum count is obtained about 35 feet from the south side of the zone, and at that point Rose Mining Corporation Ltd., of Vancouver, drove an adit 40 feet to the southeast to provide access for diamond drilling. The limestone in the vicinity of the adit is intersected by narrow ankeritic carbonate stringers and contains small reddish-brown areas of hematite, but no uranium minerals were seen. The highest of three samples, selected on the basis of their representing the highest count obtained with a Geiger counter, assayed: Uranium oxide, 0.062 per cent; thorium oxide, 0.001 per cent.

HIGHLAND VALLEY*

Copper

Bethlehem Copper†

(50° 120° S.W.) Bethlehem Copper Corporation Ltd. holds about 100 claims on the southeast side of Forge Mountain and on the north side of Witches Brook, about 30 miles by road south-east of Ashcroft. The claims cover copper showings on the former Snowstorm, Iona, Jersey, and Guernsey mineral claims, once part of the Snowstorm group.

The copper showings were discovered prior to 1900 and were first explored between 1907 and 1915. In 1919 eight diamond-drill holes totalling 5,452 feet were drilled by the British Columbia Department of Mines to explore the Snowstorm vein, and from 1919 to 1921 a large number of surface pits were dug on the Iona claim and a 280-foot adit was driven to explore a large area of disseminated copper mineralization.

In 1942 the property was under option to Ventures Limited, which drilled four holes totalling 2,359 feet beneath the Iona showing and one 419-foot hole beneath the Moly shaft on the Jersey claim.

In 1952 a small amount of bulldozer trenching was done on the Iona and Jersey claims by Newmont Corporation.

The claims lapsed and the ground was relocated in November and December, 1954, by H. H. Huestis and associates, who formed the Bethlehem Copper Corporation. This company did a very large amount of surface stripping by bulldozer in 1955 in order to obtain exposures for bulk sampling.

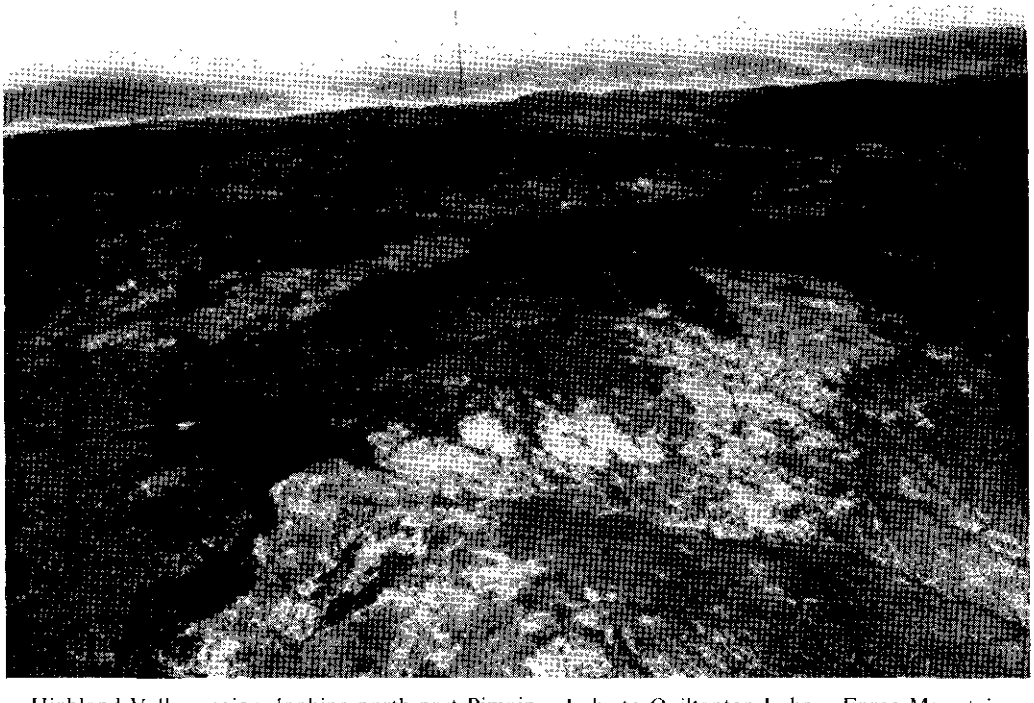
In midsummer of 1955 the Bethlehem company entered into an agreement with American Smelting and Refining Company, and since October 1st, 1955, all exploration has been under that company's direction.

Several new showings were found and opened up during 1955, and now showings are known at various elevations from the valley bottom at 4,000 feet to the ridge top at 5,300 feet. So far, however, the Iona and Jersey showings have received most attention. They are between 4,900 and 5,300 feet elevation on Forge Mountain ridge.

Exploratory work was begun in June, 1955, by Bethlehem Copper Corporation. Two D-8 bulldozers with 13-foot blades were used to construct access roads and to trench

* By E. R. Hughes, except as noted.
† By S. S. Holland.

Highland Valley region, looking up Witches Brook on the left to Quiltanton Lake to right of centre. Pukaist Creek valley near right margin. Junction of Thompson and Nicola Rivers in centre distance.



Highland Valley region, looking north past Pimainus Lake to Quiltanton Lake. Forge Mountain on centre line of photo. Kamloops at upper right distance.

the showings. The work accomplished comprised 6,900 lineal feet of trenching, involving the removal of 27,460 cubic yards of overburden and 27,060 cubic yards of weathered rock. The Iona adit was rehabilitated and its sides slashed in order to provide bulk samples for assay.

A 5- by 6-inch jaw crusher and a triplex Jones type sampler-splitter were set up on the dump at the Iona adit. Bulk samples from the Iona adit were crushed and reduced in size, as were samples taken from 20-foot lengths in all bulldozer cuts. In the bulldozed trenches 1 cubic foot of broken rock was taken from each foot of length.

Technical direction of the work was done by W. H. White, R. M. Thompson, and K. C. McTaggart, of the University of British Columbia, who in addition made a detailed geological examination of the property.

The claims are underlain by quartz diorite of the Guichon Creek batholith, which outcrops in an elliptical area about 40 miles long and 16 miles wide. The quartz diorite, particularly in the vicinity of the Iona and Jersey showings, is intruded by a complex of diverse rocks, including several variations of quartz diorite, and several porphyries. In addition, the Iona adit and the trenches on the Iona showing expose a breccia which has a length of about 1,200 feet in a northerly direction and is about 800 feet wide. The breccia is light coloured and composed of rock fragments of the younger complex ranging in size up to 6 inches across that are set in a fine-grained lithified matrix. This rock is considerably altered and is the host rock of the mineralization at the Iona showing.

The rocks are crossed by a conspicuous set of joints striking about north 20 degrees east and vertical or dipping steeply east. Joints of this set commonly are mineralized.

The one large fault so far known runs through the Jersey zone striking about north 20 degrees east. The rocks are sheeted and fractured across a width of about 400 feet.

The mineralization consists of chalcopyrite, bornite, specular hematite, and molybdenite, which occur along the northerly joint planes and are finely disseminated through the rock. Malachite is conspicuous in exposures in the Iona zone and somewhat less so in the Jersey zone.

The bulldozer trenching undertaken by the Bethlehem company was devoted very largely to exploration of the Iona and Jersey zones. As a result, the company has made public the statement that in the Iona zone there is ore indicated to the extent of 113,000 tons per vertical foot containing 0.49 per cent copper, and in the Jersey zone indicated ore of 53,000 tons per vertical foot containing about 1 per cent copper.

Since October 1st, 1955, all exploration has been done by American Smelting and Refining Company under the supervision of G. A. Dirom, resident engineer, and C. J. Coveney, engineer in charge on the property. Open-cutting and trenching by bulldozer was continued, and diamond drilling from surface was begun. At the end of 1955 the diamond-drill footage amounted to 1,816 feet.

Transvaal Copper (Jackson Basin Mining Co. Ltd.)

(50° 121° N.E.) Company office, Suite 303, 413 Granville Street, Vancouver. A. J. McClellan, president. This company has forty-two claims in the Highland Valley area, including the old Transvaal group, which is 5 miles northwest of the Snowstorm group and 28 miles by road southeast from Ashcroft. The old Transvaal shaft was rehabilitated and some work was done in cleaning up the 100- and 200-foot levels. A camp was erected and a diamond-drilling programme was started. On October 20th five men were employed underground and seventeen on the surface. A reorganization in December resulted in the name of the company being changed to Jackson Mines Limited.

Trojan (Trojan Exploration Limited)

(50° 121° N.E.) Company office, Suite 303, 413 Granville Street, Vancouver. A. J. McLellan, president. This company acquired a group of claims between the Transvaal and Lodge groups, about 2 miles from the Jackson Basin camp. Some surface stripping and trenching was done during the fall and winter

months. In December control of the company and its Highland Valley property was acquired by Chimo Gold Mines Limited.

Anuwon Uranium Mines Limited (50° 121° N.E.) Company office, Suite 303, 413 Granville Street, Vancouver. A. J. McLellan, president. J. S. Ives, resident engineer. This company has ten claims held by record in the Highland Valley area adjoining the Jackson Basin property, as well as the Black Diamond group of nineteen claims 3 miles west of Merritt. The latter group is held under option from W. T. Curnow. Work at these two properties was started in December and was still in progress at the end of the year. At the Highland Valley property a bulldozer was used to do approximately 900 feet of surface trenching. On the Black Diamond group the old workings were reopened and examined, and a total of 1,066 feet of diamond drilling was done. In addition to the diamond drillers, two surface workers were employed.

Beaverlodge Uranium Mines Limited and Farwest Tungsten Copper Mines Limited (50° 120° N.W. and 121° N.E.) Company office, Suite 206, 1178 West Pender Street, Vancouver. James Mackee, chairman of the board; Donald F. Farris, president; John S. Davidson, vice-president; J. D. Thomas, secretary; these officers represent both companies. James Soles, field manager, Ashcroft. Farwest Tungsten Copper Mines Limited was incorporated in August, 1955, and acquired the assets and liabilities of Western Tungsten Copper Mines Limited. Beaverlodge Uranium Mines Limited and Farwest Tungsten Copper Mines Limited held 187 mineral claims in this area under joint ownership. Thirty-four of the claims, known as the Lodge group, adjoin the north boundary of the Bethlehem property and have been since sold to the North Lodge Copper Company Limited. The remainder of the claims are generally centralized in the Highland Valley area, but some extend easterly and westerly therefrom.

Development work was concentrated on the Krain Copper claim, which was jointly optioned by the two companies. The Krain camp-site is north of the Jackson Basin camp, and a jeep and truck road 1 mile long was built to connect the two camps. A cookhouse, bunk-house, and office were built. Diamond drilling totalled 700 feet. Initial work was undertaken on May 27th and operations continued at the end of 1955.

Victor (Skeena Silver Mines Ltd.) (50° 121° S.E.) Company office, 411, 850 West Hastings Street, Vancouver 1. S. S. Parker, president; C. Rutherford, director and consulting engineer. This company has under option twenty claims held by record, 2½ miles southeast of Quiltanton (Divide) Lake on the old forestry trail to Gnawed Mountain in the southeast part of Highland Valley. This property is a relocation of ground formerly covered by the Victor group. Old work on this property includes a crosscut adit 110 feet long, a winze sunk 30 feet on an incline of about 30 degrees at the face of the adit, and a shaft 20 feet deep. New work included the building of 2½ miles of road, bulldozing out the mouth of the old portal, scaling and cleaning out the old adit, and unwatering the winze. Other work included 300 lineal feet of bulldozer trenching to a maximum depth of 12 feet. Work on the building of a camp was started in mid-December. Six men were employed from October 10th.

MEADOW CREEK*

Copper

Dunmore Mines Ltd. (50° 120° S.W.) Company office, 1686 West Sixty-ninth Avenue, Vancouver. Thomas Moore, manager. This property of fifteen claims is in the Meadow Creek area, 35 miles from Kamloops, 45 miles from Merritt, and 3½ miles south of the Mamit Lake–Kamloops road. It includes ground formerly covered in part by the Bertha and

* By E. R. Hughes.

Molly claims. A D-8 bulldozer was used to do surface stripping around the top of an old caved-in shaft. Work started in the fall and was discontinued for the winter early in December. Three men were employed.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1930, p. 195.]

KAMLOOPS*

Copper

Makaoo Development Company Limited

(50° 120° N.E.) Head office, 1208 Vancouver Block, Vancouver; mine office, P.O. Box 273, Kamloops. President and general manager, W. I. Nelson, Kamloops. This is a new company holding sixty-eight mineral claims about 6 miles southwest of Kamloops. Five of the claims are Crown-granted and sixty-three are held by record. The property is immediately south and east of the Iron Mask, and includes the Python group, which was among the earliest locations on Coal Hill; some of the claims were located in 1896. In 1899 the Python produced 30 tons of ore containing 4,800 pounds of copper. There are two old shafts, one of which is reported to be 123 feet deep and the other 75 feet. The old adit, which was 525 feet long, was extensively caved near the portal, and in September rehabilitation of it was started by removing the debris from the portal and retimbering. When this work was completed, the adit was 460 feet long. New track, and air and water lines were laid to the face.

About 2,000 feet of new road was constructed. Surface work in 1955 was done on the Python, Python No. 2, Python No. 3, Python No. 4, Python No. 6, Noonday, and Copperhead claims and included twenty-seven trenches and open-cuts totalling 4,040 feet in length. At the end of the year geophysical prospecting was in progress as part of the programme for completing a grid of the entire area of the claims, with readings to be taken every 50 feet along lines spaced 100 feet apart. Equipment and supplies had been obtained in readiness for starting underground exploration by drifting and diamond drilling. A bunk-house, cook-house, and a compressor building were erected. Nine men were employed during the last four months of the year.

Commercial Minerals Limited

(50° 120° N.E.) Head office, Suite 2, National Trust Building, 10072 Jasper Avenue, Edmonton, Alta. Mine office, Kamloops. M. J. Pritchard, manager. This company controls ninety-seven mineral claims in an area 3 miles south of Knutsford on the Kamloops–Merritt Highway. There are two old adits on the property, each about 50 feet long, driven on a flat shear. Work was started in September, and a 16- by 20-foot cabin was built at the mine. Most of the crew live in Kamloops. A diamond-drilling programme was started, and short vertical holes were drilled on a grid at 50-foot centres; the work was still in progress at the end of the year. Six men were employed.

BIRCH ISLAND*

Fluorite-Celestite-Uranium

Rexspar Uranium & Metals Mining Co. Limited

(51° 119° N.W.) John W. Scott, manager. This company's property is in the Red Ridge area, 2 to 3 miles in a straight line southeasterly from Birch Island on the Canadian National Railway, 81 miles by rail or 90 miles by road north of Kamloops. The company holds 109 claims in an area which for many years has been known to contain celestite, fluorite, silver-lead, manganese, and, more recently, uranium. A road 7 miles long passes through the camp and connects the workings with the railway at Birch Island. The camp, consisting chiefly of three bunk-houses, office, and a cook-house, is 6 miles by road from Birch Island, 1 mile north of the Black Diamond zone, and 1½ miles north of the "A" zone. In addition, in the "A" zone area there are a change-house, compressor-house, and fuse-house. A powder magazine is situated on the "A" zone road.

* By E. R. Hughes.

The underground work started on the "A" zone in December, 1954, was continued; the main adit was driven 388 feet north 30 degrees west, drifting was done east and west on the vein, and a raise was driven to the surface to provide a second exit and ventilation outlet. Underground work was completed on June 1st. Total development in 1955 consisted of 176 feet of drifting, 530 feet of crosscutting, 405 feet of raising, and 10,486 feet of diamond drilling. One ton of ore was shipped for test purposes. Sixteen men were employed during the spring and summer, and nine men during the fall and winter.

[Reference: *Minister of Mines, B.C.,* Ann. Rept., 1954, pp. 108–111.]

ADAMS PLATEAU*

Silver-Lead-Zinc

Plateau Metals Limited (51° 119° S.W.) Head office, 711, 525 Seymour Street, Vancouver. Field office, Celista. C. Riley, president. This company has sixty-five claims on Adams Plateau, 22 miles by road northerly from Squilax. Six men were employed from July 1st to November in prospecting, and surface stripping with a bulldozer. The men lived in tents.

TULAMEEN RIVER*

Summit Camp (49° 121° S.E.)

Silver-Lead-Zinc

Silver Hill Mines Ltd. Company office, 104, 435 West Pender Street, Vancouver. Ralph J. Pronger, president; Edward L. Borup, vice-president and managing director. This property is in the Summit camp, 21 miles by road southwest of Tulameen. The property includes the old Dornberg mine (also known as the Mary E or Silver King), as well as the old Jensen mine. Twenty-four claims are held, of which eight are Crown-granted.

Underground work in 1955 consisted chiefly of the formation of a sublevel between Nos. 2 and 3 levels in the Dornberg mine. The sublevel was started 150 feet below the No. 2 level, in the ventilation raise between the Nos. 2 and 3 levels. From the sublevel station, drifts were driven east and west on the vein. The east drift was driven 40 feet, and from the face a raise was driven to connect with the No. 2 level. The west drift was driven 50 feet and a raise was driven 12 feet. Other underground work included rehabilitating and retimbering 800 feet in No. 2 level and 200 feet in No. 3 level. No ore was mined. Further work was done on preparing the mill for production. Thirty men were employed from July to late in December, when operations were suspended for the winter months.

SIMILKAMEEN RIVER*

Gold-Silver-Copper-Zinc

Red Star (49° 120° S.W.) The Red Star group of mineral claims on the Hope–Princeton Highway, 32 miles south of Princeton, consists of six claims, of which the Red Star and Anaconda are Crown-granted. The owner, Roy A. Tower, Sr., entered into an agreement with Woodbury Mines Limited, and in September, 1955, open-cut work was started in the area adjacent to No. 1 adit. A Caterpillar D-7 bulldozer was used to do the surface stripping. Four men were employed.

* By E. R. Hughes.

COPPER MOUNTAIN*

Copper

Copper Mountain (The Granby Consolidated Mining Smelting and Power Company Limited)

(49° 120° S.W.) Head office, 1111 West Georgia Street, Vancouver 5. L. T. Postle, president, Vancouver; J. A. C. Ross, general manager, Copper Mountain. D. W. Pringle, mine superintendent. This company operates the Copper Mountain mine at Copper Mountain, 12 miles south of Princeton. The company's 17,500-kw. steam-electric power plant in Princeton supplies power to the mine and to the concentrator at Allenby, 3½ miles south of Princeton. A branch line of the Kettle Valley Railway from Princeton serves the power plant, mine, and concentrator.

The main development of the mine is from No. 6 adit level, No. 1 and No. 2 vertical shafts, No. 3 inclined shaft, 4-260 service raise, and an auxiliary raise. No. 1 shaft is a service shaft that extends from the surface at the mine camp to the No. 6 or main haulage level. No. 2 is used to service No. 7 and No. 8 levels, and is an internal shaft with the hoist on No. 5 level. An auxiliary raise connects Nos. 3, 4, 5, and 6 levels with the surface at a point 350 feet southwest of the collar of No. 1 shaft. This auxiliary raise is equipped with a manway and skipway and is used chiefly as a means of entrance into the mine for the electric cables and compressed-air pipes. No. 3 shaft is inclined at 45 degrees and extends for 1,026 feet from No. 6 level to the surface near the camp mess-house, and is used as a ventilation airway and auxiliary exit. The 4-260 raise extends from No. 6 level to the surface at an elevation of 4,130 feet and provides an aircourse and manway to the east and north ends of the mine workings.

Open-pit operations were further expanded, with seven pits in various stages of development. The pits are on the north, south, and east sides of the mine workings, within 1 mile of the company's office. Most of the pits are in orebodies also mined underground, and some are extensions of former glory-holes. The pits were operated continuously throughout the year, No. 2 being the largest producer. All trucking and shovelling in open pits is done by independent contractors. Early in the summer a fourth shovel was added to the contractors' equipment so that production could be increased. The new shovel was used almost entirely in mining the No. 2 level waste dump, which is estimated to contain approximately 1,000,000 tons of low-grade material which may be milled at a very modest profit at present-day copper prices. Drilling at the open pits is done from the top of 20-foot benches, and short-period blasting-caps are used in blasting. A CD-48 Dupont electric blasting-machine, capable of firing 1,000 shots, is used. Additions to open-pit equipment included three Gardner-Denver D-99 wagon drills, one Gardner-Denver Airtrac self-propelled wagon drill, and one 10½-cubic-yard Euclid dump truck.

After two years of doing only the minimum amount of exploratory work, underground exploration was resumed under the impetus of higher copper prices. This new work included driving the 2,000-foot-long No. 4-310 drift on No. 4 level to explore the area below the No. 2 open pit, and driving the 1,000-foot-long No. 6-300 drift at the south end of No. 6 level. The 200-foot-long No. 7-10 drift was completed and the 9-4 ore block was rehabilitated. Development was completed in the 1-13 ore block. Total underground development consisted of 3,287 feet of drifting and 5,240 feet of raising.

Core drilling amounted to 26,484 feet, of which 2,578 feet was for underground exploration and 23,906 feet for surface exploration. A total of 18,804 feet of drilling was done with percussion machines underground to delimit orebodies. The sludge is assayed, and this type of development drilling has been found to be considerably cheaper than diamond drilling. A total of 107,104 feet of blast-hole diamond drilling was done.

* By E. R. Hughes.

Percussive blast-hole drilling was done with Canadian Ingersoll-Rand DA-35 drifters, using threaded rods and 4-wing tungsten carbide detachable bits.

Five new grizzlies and six new chutes were built. Concrete was used to line 51 feet of drifts and raises. Rock bolting was used in 646 feet of drifts and raises, and 1,201 bolts were used in this work.

The mine is ventilated by mechanical means, with very little change from that recorded in the past several years, except for the incidental changes of auxiliary fans to provide newly installed scraper units with fresh air. At the time tests were made in October, it was found that the average dust concentration in the mine, exclusive of drilling locations, was 322 particles per cubic centimetre of air. This compares favourably with the 398 particles per cubic centimetre found in similar tests in 1954. In addition to the main power plant, one Canadian Ingersoll-Rand 500-cubic-feet-per-minute compressor and one Jager 210-cubic-feet-per-minute compressor are used in isolated open-pit locations.

All ore mined at Copper Mountain, both from the surface and underground, is passed to No. 6 level and taken from the mine in Granby-type cars hauled by electric-trolley locomotives. After it is crushed in the coarse crushing plant on the surface near the portal of No. 6 level, the ore is hauled 8 miles by rail to the concentrator at Allenby. Ore produced during the year totalled 1,966,999 tons, again an all-time yearly production record. The average tonnage milled was 5,389 tons per calendar day, with an average copper content of 0.721 per cent. The ore from the open pits was 42.5 per cent of the total production.

Safety committees make regular tours of inspection of all surface and underground workings, and the company employs a safety engineer. The competitive bonus system, now in use for four years, whereby shiftbosses are awarded merits or demerits on their records of safety and efficiency, has played an important part in the continued lessening of the accident rate. In 1955 the frequency rating for accidents involving more than six shifts of lost time was 0.05 per 1,000 man-shifts worked. During 1955, 310 men were hired and 282 either quit or were laid off. The total number of persons employed at Copper Mountain at the end of the year was 346, of which 246 were employed underground. In addition, fifty-two men were employed by contractors in the open pits as truck-drivers, padmen, and shovel operators. The total number of men employed in all operations at Copper Mountain, Allenby, and Princeton at the end of the year was 563. An emergency hospital is maintained at the camp, and a trained nurse and industrial first-aid attendants are available at all times. First-aid classes are held, and in conjunction therewith twenty industrial first-aid certificates were awarded, as well as forty-eight senior and twenty-seven junior St. John Ambulance Association awards. Aluminium-dust therapy is available for employees. A doctor visits the Copper Mountain camp twice a week and is available in emergencies. An ambulance is maintained for transporting sick or injured persons to the Princeton General Hospital, 12 miles from the mine. A local first-aid competition was held at Allenby in the spring for company employees and their families, and trained teams competed in the mine-rescue and first-aid field-day held in Princeton on June 4th. Mine-rescue teams from Copper Mountain also competed at Cumberland on May 28th and at Fernie on June 18th. The team captained by Luke Kirby won the Cumberland competition.

HEDLEY*

Gold

Nickel Plate and French (Kelowna Mines Hedley Limited).—(49° 120° S.E.) Company office, Room 2630, 630 Fifth Avenue, New York 20, N.Y.; British Columbia office, 821 Hall Building, 789 West Pender Street, Vancouver; mine office, Hedley.

* By E. R. Hughes.

George L. Mill, manager; L. D. Smillie, mill superintendent; J. Biggs, mechanical superintendent. This is a private company operating the Nickel Plate mine and the French mine at Hedley.

Nickel Plate Mine.—C. T. Williams, mine superintendent. P. C. B. Emery, chief engineer; R. E. C. Richards, mine captain. Full descriptions of the operation have appeared in previous Annual Reports. Exploratory and development work was discontinued and the remaining broken ore was taken out of the mine. Operations ceased on September 23rd, 1955. The machinery and equipment were removed from the mine and all the portals and surface openings were fenced. All the buildings and surface equipment at the mine were sold. The ore milled from the Nickel Plate mine in 1955 amounted to 90,572 tons, which yielded 36,303 ounces of gold. The average grade of the ore during the period 1934 to 1955 was 0.39354 ounce of gold per ton, and 1,566,956 tons of ore was produced.

The Nickel Plate is one of the oldest mines in the Province. The mine had operated from 1904 to 1930 and, after a period of shut-down, from 1935 to 1955. In the first period the Yale Mining Company and Daly Reduction Company operated for six years and Hedley Gold Mining Company for twenty-one. In the second period the mine was revived by the Kelowna Exploration Company Limited, whose name was changed to that of the present company in 1951.

The Nickel Plate Mountain ore zone was largely mined through the Nickel Plate workings, but Hedley Mascot Gold Mines Limited mined about 680,000 tons of the zone from the Mascot Fraction, from 1936 to 1949. The total ore mined, from the Nickel Plate property and the Mascot Fraction, has amounted to 3,967,350 tons with a gross content in ore and concentrates of 1,556,749 ounces of gold, 188,139 ounces of silver, and 4,077,305 pounds of copper. The total dividends paid by all companies has been $7,533,744.

French Mine.—Brian T. Stephens, mine foreman. This mine is on the Oregon mineral claim, about 8 miles by road from Hedley and 1½ miles east of the Hedley–Nickel Plate road. The mine has been developed from two adit levels at an elevation of approximately 3,900 feet. The adits are about 300 feet apart and are connected. Two stopes were developed above the adits. Mining was continued below the elevation of the second adit; the broken ore was scraped up the stope floor from the face to the level, where it was loaded into cars and taken out of the mine. This property was optioned from F. H. French and associates, and in 1949 some exploratory drilling was done. Production was commenced in 1950 and the purchase was completed. The mine has been closed each year during the winter season and reopened in the spring, the ore being trucked to the company's mill at Hedley. All broken ore was removed and the mine was closed on September 3rd. Production in 1955 was 3,250 tons. During the six years of operation, 32,463 tons of ore was shipped, which yielded 25,284 ounces of gold and averaged 0.804 ounce of gold per ton.

OLALLA*

Manganese

Olalla Nos. 1 to 8 (49° 119° S.W.) The deposit of manganese-bearing chert described in this report is on the south side of the ridge separating Olalla Creek from its south fork. In 1951 the showings were reached by a trail that follows the north side of Olalla Creek about 2½ miles, crosses the creek just above its junction with the south fork, and climbs the south side of the ridge between the two creeks. The showings are at an elevation of about 5,000 feet almost a mile west of the creek junction.

* By J. T. Fyles.

The deposit was located on May 6th, 1949, by S. J. Fairclough, of Chilliwack, as the Iron King No. 1 and Iron King No. 2 claims. It was located on June 11th, 1950, by Thomas McQuillan, of Vancouver. On October 14th, 1955, the showings were located by W. W. Geminder, of Vancouver, as a group of eight claims called Olalla No. 1 to Olalla No. 8, inclusive.

The deposit was described in the Annual Report for 1949 (p. 132) as the Iron King. The writer visited the showings at the end of August, 1951.

The 1949 Report describes the geology as follows:—

"The principal types of rock exposed on the claims include both finely laminated and massive beds of chert and some beds of pebble conglomerate, of which both pebbles and matrix appear to be chert. The beds are black, red, white, or mottled. Old cuts, which have been partly cleaned out recently, prospect a bedded deposit of manganiferous chert on the Iron King No. 2 claim. The beds strike north 30 degrees west and dip about 65 degrees northeastward. In a horizontal distance of 380 feet and a vertical range of 200 feet, seven cuts prospect this bedded zone. Drift obscures the immediate extensions of the zone, and it is not exposed in the chert bluffs 2,000 feet northwest of the cuts. In the 380-foot length explored in the cuts, the zone is offset a few feet to the right at each of several northeasterly striking faults.

"The zone consists of bright-red chert traversed by a network of minute veins containing rhodonite, which merge laterally into zones of hard black siliceous manganese ore containing small irregular masses of rhodonite and chert. The red chert zone is about 30 feet wide, but the zones containing manganese in fair amount range in width from 12 inches to about 10 feet. The assays of seven channel samples and one specimen are given below. The samples were taken from the most heavily mineralized parts and are not representative of the zone as a whole."

Location	Width	Manganese	Silica
	Ft. In.	Per Cent	Per Cent
No. 1 cut—			
Central section	2 2	16.8	53.5
Combined sections on either side	5 0	13.8	57.4
No. 2 cut—50 feet northerly	1 7	34.2	21.4
No. 3 cut (small pit)—30 feet northwesterly	1 11	48.3	15.3
No. 5 cut—190 feet northwesterly, southwest side	5 0	18.5	55.3
No. 6 cut (small pit)—75 feet northwesterly	(1)	49.2	14.5
No. 7 cut—45 feet northwesterly—			
Southwest side	6 4	7.1	68.0
Northeast side	5 0	18.5	55.5

[1] Specimen.

North of the series of cuts the hillside is gentle, and there are no outcrops for more than 1,000 feet along the strike of the mineralized zone. South of the cuts the hillside is steep, talus is common, but outcrops are fairly numerous. No manganese was seen for more than 1,000 feet south.

The primary manganese minerals in the cuts are mainly silicates. Near the surface they have been oxidized to black manganese oxides, and manganese may have been concentrated in the oxidized zone. In the lowest cut a zone that is dominantly oxides extends to a depth of 1 to 3 feet and grades downward into a zone containing manganese silicates with oxides along fractures. In most of the other cuts, manganese oxides occur as masses a few inches thick along fractures in rocks that are mainly manganese silicates or red jasper. Locally, massive hard black rocks containing a high proportion of black oxides occur in these cuts. For a few tens of feet west of the zone exposed in the cuts, red jasper is coated with films of manganese oxides and no primary silicates were seen.

FAIRVIEW CAMP*

Silica-Gold

82E/SW-8

Fairview (The Consolidated Mining and Smelting Company of Canada, Limited)

(49° 119° S.W.) G. S. Ogilvie, property superintendent. This mine is about 5 miles west of Oliver. The mine was closed from January 4th, 1954, until May 2nd, 1955. The ground is difficult to hold in shrinkage-stope mining unless adequate supports are left. During the sixteen months' shut-down some caving occurred and some of the formerly developed stopes had to be abandoned. Drifting on No. 3 level and raising from the inside end of No. 6 level was the main development in 1955. This work, which had not been completed at the end of the year, will open up new ground and provide another auxiliary exit and ventilation opening. Total development consisted of 652 feet of drifting and 536 feet of raising. Electrical power is obtained from the West Kootenay Power and Light Company Limited. Quartz is mined and shipped to Trail for use as flux in the smelter. The quartz contains a small amount of gold and other metals. Seventeen men were employed underground and six on the surface. Operations were continuous from May, and the quartz shipped amounted to 28,269 tons.

OLIVER*

Gold-Lead-Zinc

Belair Mining Corporation Ltd.

(49° 119° S.W.) Registered office, Suite 204, 717 West Pender Street, Vancouver 1. William P. Watson, president; Allen Joslyn, secretary. This property consists of the Lone Pine group of four claims and one fractional claim held by record, and is 1½ miles north of Oliver. The claims were located by Joe Lawrence and later acquired by the company. Development work included the building of 1 mile of road to the property and the stripping of overburden from a 2- to 6-foot quartz vein which contained some values in gold, lead, and zinc. An adit level was driven on the vein 60 feet in a southerly direction. One truck-load of ore was shipped to the Trail smelter and about 300 tons is stored at the mine. Work started on August 20th and ceased on December 3rd. A crew of two to three men was employed.

BEAVERDELL*

Silver-Lead-Zinc-Cadmium

Prod (inc)

Highland-Bell (Highland-Bell Limited)

(49° 119° S.E.) Company office, 604, 789 West Pender Street, Vancouver; mine office, Beaverdell. K. J. Springer, president, Toronto; O. S. Perry, manager; J. DeYaeger, mine foreman; Wm. Makinen, mill superintendent. The property consists of twenty-nine Crown-granted claims, one Crown-granted claim held by option, and ten claims held by record. The No. 4 adit is at 3,974 feet elevation on Wallace Mountain, east of the main camp at Beaverdell, and is the main haulage level for the upper workings. For the past ten years, ore has been mined from the Highland Lass and Idaho claims. The ore zone, which is intensively faulted, has an over-all southerly dip of 30 degrees, and converges on a major fault, locally known as the east terminal fault. This fault dips 65 degrees to the east and has a vertical displacement of 800 feet. Late in 1954 the company undertook an extensive development programme and started a new lower adit on the 2900 level, about 1½ miles by road northeasterly from the office at Beaverdell.

The 2900 adit is 5,640 feet long and was completed in July, 1955. It is 700 feet lower in elevation than the No. 10 level in the upper workings and was driven for the purpose of exploring the hangingwall of the east terminal fault. At the end of 1955 a raise was put up to the 3,000-foot level and a sublevel was established. Ore similar to

* By E. R. Hughes.

the Highland Lass ore was opened up in several places. A Sturtevant fan, size No. 45, belt-driven from a 25-horsepower electric motor, is used to ventilate the new workings. The fan is located at the portal and the air is conducted to the adit face through 20-inch pipe. An Eimco 12-B mucking-machine is used to load the cars, which are hauled by an 18-brake-horsepower Ruston diesel locomotive. Production has not yet started from the new adit.

The ore from the upper workings is trucked to the mill, which is adjacent to a spur of the Canadian Pacific Railway at Beaverdell. Development in all parts of the property consisted of 399 feet of drifting, 4,500 feet of crosscutting, 174 feet of raising, 2,521 feet of diamond drilling, and 300 feet of road construction. The total ore milled was 13,229 tons. At the end of the year forty-seven men were employed, of which twenty-three were underground.

LIGHTNING PEAK*

Silver-Lead-Zinc

Waterloo (Paycheck Mining and Development Company Limited)

(49° 118° N.W.) Company office, P.O. Box 72, Nelson. L. N. Renwick, general manager. Capital: 4,000,000 shares, no par value. This private company controls the principal mineral discoveries in the Lightning Peak area, including such old groups as the Waterloo, Dictator, Rampalo, and Pay Day. Most of the claims lie between the headwaters of Rendell Creek and Granby River on a plateau terrain with an average elevation of 5,900 feet. A poor road, 18½ miles long, connects the area with Inonoaklin Crossing, a point on the Monashee Highway 20 miles from Needles. Work previous to 1955 had been concentrated at the Waterloo, where a small mill had been erected. In 1955 no underground work was done, but a surface diamond-drilling programme was started in an effort to trace the showings on the Pay Check claims. Four men completed over 1,200 feet of drilling before a heavy snowfall forced cessation of activities.

The mill was inactive. Most of the lead concentrates recovered in 1954 were shipped to the Trail smelter in that year and the zinc concentrates remained on site.

GREENWOOD†

Gold-Silver-Lead-Zinc

82E/SE - 1

Providence

(49° 118° S.W.) W. Madden, owner. This mine is 1½ miles north of Greenwood and has been worked intermittently for more than fifty years. The property was leased to S. Downham, G. Jones, and M. F. Madden. From the bottom of the 60-foot-deep No. 3 shaft, 100 feet of crosscutting and 200 feet of diamond drilling were done in an attempt to find the Providence vein. Where found, the vein was too narrow and insufficiently mineralized to be commercial. A shaft was sunk 15 feet at a point 150 feet north of the No. 3 shaft. The work was discontinued in November and had not been resumed at the end of the year.

Copper-Gold-Silver

Mother Lode (Surety Oils and Minerals Limited)

(49° 118° S.W.) Head office, 1024, 85 Richmond Street West, Toronto. W. R. Quinn, engineer, Greenwood. This company secured an option from J. W. James and associates on the Mother Lode property, which consists of eight claims, including the Mother Lode, Sunset, Crown Silver, Primrose, C.O.D., and Jack Fraction Crown-granted mineral claims, and two claims held by record. The Mother Lode property was at one time owned by the Canada Copper Corporation and was the chief source of ore for the Greenwood smelter, which ceased operation in November, 1918.

* By J. W. Peck.
† By E. R. Hughes.

Exploratory work was started during the summer and was being continued at the end of the year. Exploratory surface diamond drilling was done on the Mother Lode and C.O.D. claims, and fifteen holes were drilled, totalling 3,577 feet. The old Mother Lode No. 2 level was cleaned out and retimbered for a length of 60 feet at the portal. Eleven men were employed.

Salmo Prince Mines Limited (49° 118° S.W.) Head office, 108, 413 Granville Street, Vancouver 2. Robert T. Blackmore, president; B. I. Nesbitt, managing director. This company controls thirty-one claims, including the Greyhound Crown-granted claim, in the Deadwood camp area, 2½ miles by road west of Greenwood. A surface diamond-drilling programme was started in November with two drills at work. Eight men were employed, and 5,000 feet of diamond drilling was done.

Copper-Gold-Silver

Copper Queen (49° 118° S.W.) This property in the Copper camp area, 7 miles by road west of Greenwood, consists of sixteen claims, including the Copper Queen and King Solomon Crown-granted claims, seven other Crown-granted claims, and seven recorded claims that were optioned by W. E. McArthur and associates to The Consolidated Mining and Smelting Company of Canada, Limited, in July. On October 1st this company started a diamond-drilling programme, and at the end of the year four holes totalling 2,016 feet had been completed. Other work included 20 cubic yards of open-cutting on the Princess May, 5,430 cubic yards of stripping on the May Alice, and some geological mapping. A small tent camp was erected. The diamond drilling was done by T. Connors Diamond Drilling Company Limited. Eight men were employed on this work. The diamond drilling was completed on December 7th and the camp closed on December 13th. The option agreement gave Mr. McArthur the right to mine and remove oxidized material found on the property. Two men were employed in this work, and three carloads, totalling 162 tons of ore averaging 4.9 per cent copper, was mined and shipped to the Tacoma smelter. The ore was mined from the lower adit on the Copper Queen claim. On November 24th the face of this new adit had been driven 40 feet from the portal.

PHOENIX*

Copper-Gold-Silver

Phoenix (The Granby Consolidated Mining Smelting and Power Company Limited) (49° 118° S.W.) Head office, 1111 West Georgia Street, Vancouver 5. Field office, Grand Forks. L. T. Postle, president; J. A. C. Ross, general manager; J. H. Parliament, chief engineer. The Granby company operated its Phoenx mine from 1900 to 1919 and produced over 13,000,000 tons of ore which averaged 1.314 per cent copper, 0.049 oz. gold per ton, and 0.303 oz. silver per ton. The property was later purchased by W. E. McArthur, who operated the property on a small scale for several years. In 1951 the property was optioned by Attwood Copper Mines Limited, and for three seasons a crew was employed in geological mapping, geophysical surveying, geochemical prospecting, and diamond drilling. This work was discontinued late in the summer of 1953.

In 1955 the property was obtained from Mr. McArthur by The Granby Consolidated Mining Smelting and Power Company Limited, and on October 1st a surface diamond-drilling programme was started. Twenty-six holes were drilled, totalling 2,267 feet. Twenty holes were drilled in the Snowshoe railway pillar, and six holes in the vicinity of the Old Ironsides glory-hole. Granby's renewed interest in its former

* By E. R. Hughes.

property was prompted by the possibilities of open-pit mining, stimulated by the current high price of copper. The work was being continued at the end of the year. Eight men were employed.

EHOLT*

Copper

Noranda Exploration Company, Limited (49° 118° S.W.) Head office, 44 King Street West, Toronto. This company optioned fifty claims from W. E. McArthur and associates in the Eholt area, and late in the year a start was made on cutting grid lines for a magnetometer survey. A D-7 bulldozer was used for three weeks to do some surface stripping. Eight men were employed.

ROSSLAND†

Gold-Copper

Velvet (Mid-West Copper & Uranium Mines Ltd.) (49° 117° S.W.) Company office, 1002, 850 West Hastings Street, Vancouver; mine office, Rossland. A. G. Pentland, consulting geologist; R. Lefevre, mine superintendent. Capital: 4,000,000 shares, 50 cents par value. This company optioned this old gold-copper producer from H. F. Kenward, of Vancouver, and W. W. Sweet, of Seattle, Wash., and purchased the lease of J. C. Urquhart, H. W. Lefevre, R. Lefevre, and B. W. Price, who had operated the mine since 1952. The mine plant is on the Rossland–Cascade Highway 13 miles west of Rossland.

The mine is developed by a vertical shaft serving six levels and by two adits connected to the shaft workings. The lowest or No. 8 adit was rehabilitated for its full length of 1,700 feet. At the face and near the bottom of a raise which extends to No. 6 level, the bottom shaft level, 47 feet of drifting was done in a southerly direction on a vein. Mineralization was negligible except for a length of 10 feet, over which the vein pinched out when it was stoped up a few feet. At 1,400 feet from the portal a crosscut was driven 160 feet in a northeasterly direction to investigate a vein discovered by diamond drilling, but this crosscut was stopped short of its objective to allow further diamond drilling to be done. On No. 7 level, which is a sublevel off the raise to No. 6 level, a crosscut was driven to explore the same or a parallel vein. The vein was encountered, and, when seen in November, a drift 10 feet long exposed 2 to 3 feet of massive chalcopyrite. Development work on No. 3 level consisted of crosscutting and drifting on a vein which parallels the stoped-out main vein.

On the surface a new cook-house was built and compressors of larger capacity were installed. The small mill used by the lessees was taken over by the present company but was not operated. The crew was increased to fifteen by the end of 1955.

Snowdrop (Snowdrop Mining Company Ltd.‡ (49° 117° S.W.) Company office, P.O. Box 659, Rossland. G. Erickson, president; Warren Crowe, director. Capital: 1,000 shares, $10 par value. This private company was formed in 1954 to develop the Snowdrop, Gold King, and Concordia Crown-granted claims previously owned by Warren Crowe, of Waneta. The main workings are on the Snowdrop, which is astride the Rossland–Cascade Highway 1 mile west of Rossland.

A narrow quartz vein reported to carry low gold values has been developed in the past by two short connecting adits and a small amount of stoping. The vein strikes northeast and dips from 25 to 45 degrees southeast. The workings are mainly in fine-grained massive volcanic rocks ranging in colour from grey to green, and brown. The volcanic rocks are cut by three dark fine-grained dykes. One dyke, 4 feet wide, and a number of

* By E. R. Hughes.
† By J. W. Peck, except as noted
‡ By J. W. Peck and C. G. Hewlett.

steeply dipping north-striking faults cut the vein. Some of the faults displace the vein a few feet.

High-grade pockets of gold have been encountered in seams in the altered volcanic wallrock near the vein. One such pocket was about 100 feet from the portal of the upper adit. The free gold is of a muddy appearance, and the first shipment to the Trail smelter of 70 pounds of sorted ore assayed over 1,600 ounces per ton. Later shipments were lower in value. Three men were employed. Production: Ore shipped, 2.36 tons. Gross content: Gold, 135 oz.; silver, 25 oz.

Annie Fraction (49° 117° S.W.) This Crown-granted claim is at the junction of the Rossland–Cascade and Rossland–Paterson Highways just west of Rossland. It is owned by J. A. Henderson, of Rossland, who has been working intermittently over the past two years doing exploratory surface work in an effort to locate vein extensions of the near-by Annie and Josie mines. One shaft has been sunk 40 feet with a few feet of crosscut at the bottom. The second shaft had been sunk 20 feet by September. No veins had been encountered, and only minor mineralization of pyrite and chalcopyrite was observed in the altered sediments through which the shafts were sunk.

Silver-Lead-Zinc

Comstock* (49° 117° S.W.) This group of six recorded mineral claims includes the Comstock Nos. 1 to 5 owned by S. M. Penney and the Comstock Lode owned by F. C. Singer, both of Rossland. The main workings are between 1 and 1½ miles due north of Paterson and about three-quarters of a mile east of the Paterson–Rossland Highway. They are at the eastern edge of the broad valley of Little Sheep Creek in a thickly wooded area with few outcrops.

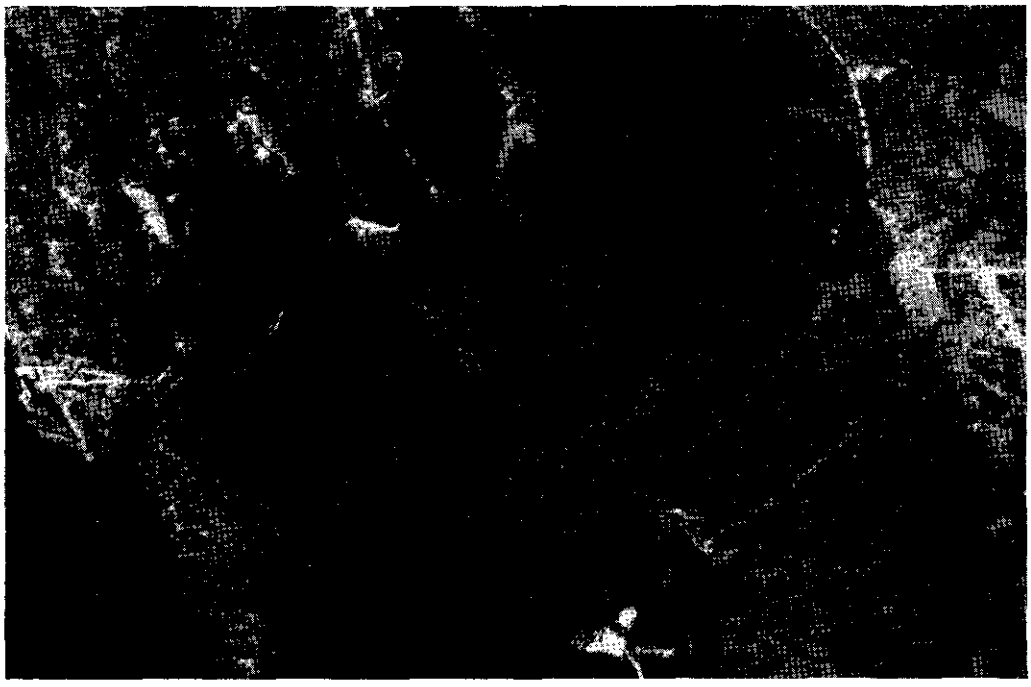
The property is an old one. During the summer old cuts were cleaned out and sampled, a few new trenches were made, and some trees and brush were cleared.

The workings are on the east side of an abandoned railway grade, and the main rock types are exposed in cuts along the grade. The rocks are breccias intruded by dark-green and by siliceous dykes. The breccias are greyish-green and are composed of angular and rounded fragments of volcanic rock, chert, jasper, and minor limestone measuring a fraction of an inch to several inches across. The dark-green dykes are a few feet thick and strike northwestward. They are cut by vitreous, light-grey siliceous dykes several tens of feet thick which strike northward; one such dyke was seen to dip 50 degrees eastward.

An old shaft about 90 feet east of the railway grade exposes finely disseminated pyrrhotite, chalcopyrite, and galena in a greyish-green altered part of a siliceous dyke. The shaft is about 12 feet deep; three sides of it are in solid rock, and the fourth is made up of rusty dump material that forms a small pile on the west side of the shaft. A sample taken across a horizontal width of 4 feet on the east wall near the bottom of the shaft assayed: Gold, 0.01 oz. per ton; silver, 4.44 oz. per ton; copper, 0.23 per cent; lead, 1.34 per cent; zinc, 0.1 per cent. Another sample taken on the north wall across a horizontal width of 6 feet assayed: Gold, 0.7 oz. per ton; silver, *nil;* copper, 0.08 per cent; lead, 0.28 per cent; zinc, 0.08 per cent.

Forty feet north and 120 feet east of the shaft an old cut has been made in the steep western side of a low outcrop of a siliceous dyke. Minor amounts of finely disseminated galena and pyrite occur in the walls of the cut, and a sample taken across a horizontal width of 10 feet on the south side of the cut assayed: Gold, *nil;* silver, 0.2 oz. per ton; lead, 0.12 per cent; zinc, 0.03 per cent. About 40 feet southeast of this cut a new trench has been made on the east side of the same siliceous dyke. A grab sample taken in this cut assayed: Gold, *nil;* silver, *nil;* copper, less than 0.01 per cent; lead, 0.15 per cent; zinc, 0.16 per cent.

* By J. T. Fyles.



Highland-Bell, Beaverdell, from the air. No. 4 adit and old Bell dumps at left; new 2900 adit at bottom of photo; Beaverdell on right margin.

Reeves MacDonald mine and camp, looking north.

Tests made with a Geiger counter made on outcrops of the siliceous dykes gave counts of about double background. Laboratory tests of the three samples taken in the shaft and the old cut indicate a radioactivity equivalent to 0.006 per cent uranium oxide, and tests of the sample taken in the new trench indicate a radioactivity equivalent to 0.007 per cent uranium oxide.

CASTLEGAR*

Gold-Tungsten-Uranium

Gibson Creek Gold Mine Nos. 1 to 7

(49° 117° S.W.) This is a group of seven recorded claims situated on the ridge summit between the two forks of Gibson Creek, a southwesterly flowing tributary of Norns (Pass) Creek. They are owned by John Sawchenko and associates, of Castlegar. The main showings are reached by 4½ miles of road from the Nelson–Castlegar Highway plus 1½ miles of steep trail. Elevations of the workings range from 3,900 to 4,500 feet. Intermittent work has been done since 1942. At that time several open-cuts were put in on irregular vein-like masses of quartz which are fairly common in the coarse granitic country rock. Gold assays were reported to be low. In recent years six open-cuts have been made at irregular intervals on granite exposures in search of tungsten. Samples were taken in four of the cuts. These all assayed *nil* in tungstic oxide. On the highest part of the claims another granitic exposure gave abnormally high readings on the Geiger counter, and it was here that most of the 1955 work was done. The area was stripped and a pit was sunk at the place of the highest readings. Feldspar and quartz were the most noticeable minerals exposed and an erratically distributed unidentified black mineral. Two channel samples were taken in the pit 8 feet apart. These assayed as follows:—

Location of Sample	Width of Sample	Chemical Assays	
		Uranium Oxide	Thorium Oxide
	Ft.	Per Cent	Per Cent
South end of pit	1.2	0.03	0.008
North end of pit	2.0	0.11	0.021

NELSON*

Silver-Lead-Zinc

Deer Horn

(49° 117° S.E.) The Deer Horn, Snowflake, Mercury, Mildred Fraction, and Arthur Fraction are recorded claims held by Fred Arnot, of Nelson. They lie astride the Nelson–Salmo Highway 4 miles south of Nelson. The showings are on the Deer Horn claim, which covers in part an old Crown-granted claim, the Bartlet, Lot 9183. Old workings, consisting of shallow inclines sunk on gently dipping quartz veins in granite, are situated east of the highway and of the right-of-way of the Great Northern Railway. This is an old gold prospect, but there is no record of production. West of the highway, on a former road location, lead-zinc mineralization in limy schist has recently been discovered. A small amount of stripping has been done, and in the best section a sample taken across 3 feet assayed: Gold, 0.02 oz. per ton; silver, trace; lead, trace; zinc, 2.7 per cent.

The property was sold in the latter part of 1955 to L. Haycock, of Lumby, but no further work was done.

Copper

Queen Victoria

(49° 117° S.E.) J. Norville, of Toronto, owns a large group of claims near Beasley, including the Queen Victoria. The last major shipments from this old copper mine were made forty years ago.

* By J. W. Peck.

A road 1½ miles long leads to the property from a point on the Trail–Nelson Highway about 7 miles south of Nelson. A contact metamorphic deposit has been developed in the past chiefly by a large open pit. In 1955 the area back of the open pit was tested by twelve diamond-drill holes. These ranged in depth from 119 to 402 feet and totalled 2,000 feet. This drilling was carried out from January to April under direction of P. E. Olson.

YMIR*

Lead-Zinc

Sunny (49° 117° S.E.) The Sunny group of sixteen recorded claims is near the head of Seeman Creek, about 13 miles northeast of Ymir. The claims are owned by The Consolidated Mining and Smelting Company of Canada, Limited, and were recorded in the autumn of 1954. During the summer of 1955 the old trail from the end of the Ymir Creek road over the pass to the head of Seeman Creek was repaired for use by horses, and a new trail was built from the head of Seeman Creek to a tent camp on the north fork of Seeman Creek. Little work was done on the showings of lead and zinc covered by the claims.

SALMO†

Iron Mountain (49° 117° S.E.)

Lead-Zinc-Tungsten

Emerald, Jersey, Dodger, Feeney (Canadian Exploration Limited) Head office, Royal Bank Building, Vancouver; mine office, Salmo. G. A. Gordon, general manager; J. D. Little, general superintendent; D. N. Hogarth, mine superintendent, lead-zinc operations; H. V. Maxwell, mine superintendent, tungsten operations; E. A. Erickson, superintendent, lead-zinc concentrator; R. MacLeod, superintendent, tungsten concentrator. This company is a wholly owned subsidiary of Placer Development Limited. The Emerald, Feeney, Dodger, and Jersey mines, the tungsten concentrator, and the main camp are located on the summit between Sheep Creek and Lost Creek. The property is reached by two roads which leave the Nelson–Nelway Highway 4 and 5½ miles respectively south of Salmo. The lead-zinc concentrator is on the Nelson–Nelway Highway and is served from the mine by a series of surface and underground conveyors. The labour force increased slightly to an average of 345 employees.

Emerald.—As in previous years, this tungsten mine continued to produce most of the ore for the tungsten concentrator, but at a lesser proportional rate. From the large open pits along the outcrop down to the 3800 or lowest adit, the locating and mining of ore remnants became more difficult. In November production started from the winze area, where an interior 32-degree inclined 3-compartment shaft has been sunk during the past two years to a slope depth of 1,390 feet below the 3800 level. Six levels have been established at 100-foot vertical intervals. The orebody in the winze area appears to be smaller but of higher grade than that mined above the 3800 level. It is trough-like, with a plunge similar to the dip of the shaft. Ore is mined up the limbs of the trough until it pinches out.

Feeney.—This tungsten mine is located to the north of the Emerald workings but is not connected to them. It is served by one adit, from which the ore is trucked to the concentrator at the Emerald mine. It was idle for the greater part of 1955, after most of the known ore had been removed.

Dodger.—The Dodger 4400 tungsten mine is a 14- by 15-foot adit driven south 1,050 feet at a portal elevation of 4,405 feet. A section above this adit has now been stoped out, and the only activity was the removal of broken ore by diesel loaders and trucks.

* By J. T. Fyles.
† By J. W. Peck.

The Dodger 4200 tungsten mine is about 5,000 feet southwest of the Dodger 4400 mine. A 14- by 15-foot crosscut adit at a portal elevation of 4,125 feet has been driven east for 2,500 feet. During 1955 the 8- by 8-foot drift, driven north 1,950 feet from the end of this crosscut, was enlarged to 14- by 15-foot size to allow diesel trucks to haul direct from ore and waste chutes. At the end of this drift a raise was driven and the 4300 level established. This sublevel was driven north for about 1,200 feet, and a raise connection was then made to the Dodger 4400 mine. A considerable amount of diamond drilling was done, but no new large orebodies were located. Above the 4200 drift two previously located orebodies were mined by open stoping, and the ore was removed by scraping to draw points. The orebodies are flat-lying troughs with a slight rise to the north. They are irregular in shape, and this involves considerable prospecting with raises on the limbs of the trough. During 1955 production from this area was much increased over that of 1954. All ore was trucked to the top of a raise just outside the portal. This raise leads to the underground crusher on the 3800 level of the Emerald mine.

Tungsten Concentrator.—This mill is near the 3800 portal of the Emerald mine. It can receive ore by track haulage from the Emerald mine, by conveyor from the underground crusher on the Emerald 3800 level, or by truck from outside sources. The milling rate averaged 12,500 tons per month, an increase over 1954. There were no major additions to the mill circuit, but steady research by the metallurgical staff was necessary to keep impurities out of the concentrates. All tungsten concentrates continued to be sold to the United States Government under contract.

Jersey.—This lead-zinc mine extends like the fingers of a hand through Iron Mountain in a northerly direction from the Lost Creek slope. The orebodies occur close to one another in folded dolomitized beds which rise gently to the north. Since 1953 all production has been by " trackless mining " through the 4200 Jersey adit. Mining was by room-and-pillar method, with the ore removed by diesel trucks and shovels. The "A" orebody on the western limit was fully developed, and this fact necessitated opening the thinner " C " and " D " orebodies to maintain production. Connections were made (1) in the "A" zone to the old Emerald lead-zinc mine, (2) in the "D" zone to the Dodger 4200 crosscut, and (3) and (4) in the "A" and "C" zones to the Jersey track mine. This improved the ventilation so that over 100,000 cubic feet per minute of air was entering the mine, a quantity more than sufficient to reduce the concentration of exhaust gases of diesel equipment to well below the permissible amount. A large underground shop was constructed, making it unnecessary to remove equipment from the mine for servicing.

Lead-Zinc Concentrator.—This mill operated at about half capacity, or 30,000 tons per month. As in 1954, the lead and zinc concentrates were shipped respectively to smelters at Kellogg, Idaho, and Black Eagle, Montana. In the first quarter of 1955 some zinc concentrates were shipped to the Trail smelter.

During the summer a system for ponding tailings was developed on the gravel flats close to the Salmo River.

Aspen Creek (49° 117° S.E.)

Silver-Lead-Zinc

H.B. (The Consolidated Mining and Smelting Company of Canada, Limited)

J. C. MacLean, property superintendent; H. G. Barker, mine superintendent; H. Chalmers, mill superintendent. The H.B. mine (named after the discoverers, P. F. Horton and J. A. Bensen) is on the west side of Aspen Creek, with the main camp located on the north side of Sheep Creek, 7 miles by road from Salmo. Operations recommenced in April after a shut-down of two years. Two zinc-lead dolomite replacement orebodies were developed previous to the shut-down in 1953. The main haulage, known as the No. 8 or 2800 level, was driven, and a vertical

interior shaft raised more than 700 feet to the No. 4 or 3500 adit level. The 3300 level was driven and two ore-passes were raised from the 2800 level to the ore zones above 3300 level, together with wing connections to slusher drifts. The orebodies lie to the south of the old Oxide mine along the north-south strike. They are roughly parallel to each other about 150 feet apart, are nearly vertical, and have a rake to the south of about 20 degrees. The walls are not easy to define but have been outlined from assays of diamond-drill cores. The No. 1 or East orebody is about 60 feet wide and 350 feet high. The No. 2 or West orebody is about 70 feet wide and 200 feet high. The southern limits have not been determined but are being explored. When stoping got under way in 1955, it was concentrated in the No. 1 orebody, which was developed over a stoping length of 540 feet. Shrinkage stoping was done at the north end. One such stope was unique in that it was mined 350 feet high, 60 feet wide, and 75 feet long. The remainder of the stoping length was mined by long-hole percussion and diamond drilling. The holes were drilled from sublevels and then blasted to slots and undercuts. The ore was removed by slusher drifts to wings out of the main ore-passes. All ore was trammed on the 2800 level by two diesel locomotives.

The mill started in May, and by December had reached a daily rate of 1,200 tons per day. At the end of 1955 there were 135 employees.

LOST CREEK*

Tungsten

Tungsten King (49° 117° S.E.) This group of eighteen Crown-granted claims is on Lost Creek, south of the Canadian Exploration Limited holdings. This company optioned the claims from the owners, R. Oscarson and E. Oscarson, of Spokane, Wash., and L. R. Clubine, of Salmo. The main workings consist of open-cuts and bulldozer strippings. They are near the Lost Creek road about 2½ miles from its junction with the Nelson–Nelway Highway. In 1955 work was restricted to three short diamond-drill holes and a small amount of road construction. The option was dropped early in 1956.

NELWAY*

Silver-Lead-Zinc

Reeves MacDonald Mines Limited (49° 117° S.E.) Company office, 413 Granville Street, Vancouver; mine office, Remac. W. L. Zeigler, Metaline Falls, Wash., general manager; L. M. Kinney, Metaline Falls, Wash., general superintendent; J. B. Shannon, superintendent; H. Shuttleworth, mine superintendent; J. S. Steele, mill superintendent. Capital: 3,000,000 shares, $1 par value. This company owns the Reeves MacDonald mine on the Pend d'Oreille River, on the Nelway–Waneta road 4 miles west of Nelway. A zinc-lead limestone replacement orebody has been developed by two connected adits 766 feet apart vertically. The mine was closed in 1953, but operations started again late in 1955. The main orebody, serviced by the interior shaft raise, was put into production quickly, and by December 1,000 tons per day was being mined and milled. The ends of the ore zone were not mined, and as these were of lower grade than the central part, the grade of ore recovered was considerably higher than when the mine was last worked. The orebody, which has a dip of 55 degrees, has been undercut 40 to 80 feet wide on every level across the width of the orebody. Pillars are left at 100-foot intervals. Slot raises are driven adjacent to these pillars from undercut to undercut. Conventional leyner machines, mounted on long crossbars and using sectional steel, are used to drill vertical down holes which, when blasted, break into the slot raises. Three to four machines can supply the mill tonnage by this method. On the 1900 level, the lowest adit, development was started in the O'Donnell orebody,

* By J. W. Peck.

which is about 7,000 feet from the portal. A raise started in 1953 was continued, with the objective of connecting with the old O'Donnell adit 450 feet above.

The stockpile of 5,100 tons of zinc concentrates, stored since 1953, was sold in 1955. The recently produced lead and zinc concentrates were shipped respectively to smelters at Kellogg, Idaho, and Black Eagle, Montana. The crew was increased to about 130 by the end of 1955.

BOUNDARY LAKE*

Silver-Lead-Zinc

82 F SE - 54

Canada Belle No. 1 and No. 2 (49° 116° S.W.) These claims are on the west flank of North Star Mountain, 24 miles by good logging-road west of Porthill, Idaho. They are owned by Harry J. Yerbury, of Creston. A series of northerly striking quartz veins in dolomite have been exposed in open-cuts through a range in elevation of 4,700 to 5,000 feet. The veins are conformable with the nearly vertical bedding of the dolomite. The quartz ranges from 0 to 2 feet wide and is sparsely mineralized with barite, galena, sphalerite, and pyrite. The best showing is at 5,000 feet elevation, where a vein has been stripped for 50 feet along the strike. This work probably encountered one or more lenses of galena, of which a few pounds are in evidence, but mineralization exposed in place is negligible.

SOUTH KOOTENAY LAKE†

SANCA (49° 116° S.W.)

Tungsten-Gold-Silver-Lead

82F/SE - 38

Valparaiso (Akokli Tungsten Mine Ltd.) Mine office, Boswell. N. E. Willson, president and manager. This private company holds two Crown-granted and fifteen recorded claims on the east side of Kootenay Lake near Akokli (Goat) Creek. The mine is at an elevation of 4,240 feet and is reached by a 4½-mile truck-road which leaves the Creston–Kootenay Bay Highway 1 mile south of Akokli Creek. Since 1900 this property has been operated successively by Valparaiso Gold Mining Company Limited, Associated Mining & Milling Company Limited, Sanca Mines Limited, and the present company.

Development work has been confined chiefly to the examination of the Valparaiso-Government vein, outcrops of which have been traced along the mountainside for several thousand feet. The vein is a well-defined quartz-filled fissure in the granite of the Nelson batholith. It strikes north 20 degrees west and dips eastward at 40 degrees into the mountain. It is from 5 to 6 feet wide. A lamprophyre dyke accompanies the vein, which it frequently crosses, and locally passes into and returns from the granite walls. The ore is composed of quartz mineralized with pyrite, arsenopyrite, wolframite, secondary tungsten minerals, occasional disseminations of galena, and in one instance a 14-inch-wide vein of galena. It also contains gold and silver. Wolframite has been observed in the granite walls where local shearing has occurred. In the numerous open-cuts and in the underground workings the minerals are extensively oxidized. Parallel to this vein and higher on the hillside east of it, surface stripping has exposed vein outcrops of similar mineralization. Additional work on these outcrops is necessary to determine their extent and value.

In 1955 the inclined shaft on the Government claim was reopened to a depth of 130 feet. It was enlarged to dimensions of 9 feet by 14 feet and contains a manway and a hoisting compartment. The north drift was begun 80 feet below the shaft collar and was driven a distance of 433 feet. The entire drift required timbering. The face of the drift is 240 feet south of and 60 feet below the face of the Valparaiso south drift. At a

* By J. W. Peck.
† By J. E. Merrett.

point 280 feet north of the shaft a raise was driven up the vein footwall a distance of 80 feet to the surface. Five hundred feet of exploratory long-hole drilling was done from various points along the drift. A total of 1,300 tons of ore was mined.

A truss-constructed mill building was built in five levels covering an area of 3,000 square feet.

From a 60-ton fine-ore bin the ¼-inch crushed ore passes through a Denver Duplex jig. The drillings from the jig are ground in a ball mill and passed over four Wilfley tables. The table concentrate and the jig concentrate are ground in a rod mill and passed through six flotation cells to make a pyrite and a tungsten concentrate. The mill was operated intermittently and 553 tons of ore was treated, from which 11,200 pounds of concentrates was produced. The wolframite concentrate requires retreatment to remove magnetite, and the pyrite concentrate requires retreatment to remove wolframite.

A 16- by 30-foot frame-constructed assay office was built. The colorometric assay method is used to determine the tungsten content for mine and mill control.

The operation was suspended by cold weather in November, when the 13,800-foot water pipe-line was frozen.

The average number of men employed was fourteen, of which six were employed underground.

[References: *Minister of Mines, B.C.*, Ann. Rept., 1900, p. 885; 1926, p. 285; 1927, p. 320; 1932, p. 195; 1933, p. 239; 1953, p. 121; 1954, p. 129.]

NORTH KOOTENAY LAKE*

Riondel (49° 116° N.W.)

Silver-Lead-Zinc

Bluebell (The Consolidated Mining and Smelting Company of Canada, Limited)†

This mine is at Riondel on a small peninsula on the east shore of Kootenay Lake, 6 miles by road north of the ferry-landing at Kootenay Bay. The ore deposits are sulphide replacement bodies in a limestone band that crosses the peninsula and dips westward under the lake. The Bluebell ore zone is in the central part, the Comfort near the north, and the Kootenay Chief ore zone is at the south end of the peninsula. The early history of the property was given in the Annual Report for 1949, in which year extension development was begun.

The Bluebell shaft was reopened in 1949, and from it drifts were driven on the 225 level, to investigate both the Comfort and Kootenay Chief ore zones. The drift to the Comfort zone was hampered by difficult mining conditions, but the drift to the Kootenay Chief zone indicated an orebody approximately equivalent in size and grade to the Bluebell zone. As a result of these investigations, a new camp, complete mine plant, and a concentrator of 500 tons daily capacity were constructed. The concentrator began milling ore in April, 1952. A 3-compartment shaft 8 by 23 feet in over-all dimensions and inclined to the west at 30 degrees was sunk from the surface to the 375 level. The shaft was located between the Bluebell and Kootenay Chief ore zones. Subsequent development work has extended the shaft to a total slope length of 1,800 feet, a vertical depth of 843 feet. At this depth the shaft bottom is 783 feet below the level of Kootenay Lake. Shaft stations have been established at 150-foot intervals from the 75 level to the 825 level.

Development work completed in 1955 was as follows: 1,820 feet of drifting, 1,100 feet of crosscutting, 4,180 feet of raising, 110 feet of shaft-sinking, and 15,130 feet of exploratory diamond drilling. Most of this work was done in the Kootenay Chief ore zone. A northerly directed drift to the Comfort ore zone was begun on the 525 level. The main shaft was deepened from below the 675 level to the 825 level. Stope mining

* By J. W. Peck, except as noted.
† By J. E. Merrett.

was done by conventional open stoping methods and the ore scraped to draw points. A total of 29,000 cubic yards of backfill material was placed in empty stopes. This material was principally gravel, together with a minor amount of mine waste rock.

As underground workings have extended, increasing inflows of water have been encountered. Most of the water is apparently from local drainage, probably by way of fissures directly from Kootenay Lake. In addition, large continuous flows of water of higher temperature as much as 78° F. and heavily charged with carbon dioxide issue from some fissures and cavities. It is believed that the origin of this water is more remote and deeper seated than that of the local drainage. In December, 1955, the quantity of water pumped from the mine amounted to 1,550 gallons per minute. To meet the increased pumping requirements, a 150-horsepower 500-gallons-per-minute pump was added to the equipment at the 525 level pumping station.

The ventilation of the mine was by both natural and mechanical means. The approximate volume of air discharged from the Kootenay Chief workings was 60,000 cubic feet per minute and from the Comfort workings, 20,000 cubic feet per minute.

A 66,000–6,900 volt 1,500-kva. unit substation was erected on the surface near the No. 1 shaft hoistroom, and a transformer-substation was installed underground on the 525 level.

Surface construction consisted of the building of a recreation hall, fuse-house, and additions to the doctor's office, hospital, and core-shed. A 750-pound air-hammer was added to the blacksmith's shop equipment. Some of the original concentrating-plant buildings were demolished.

A new ambulance boat was purchased for the transportation of patients across Kootenay Lake en route to hospitals at Kaslo or Nelson.

A well-organized safety programme was successful in keeping the accident-frequency rate at 0.13 and the severity rate at 3.2 shifts lost, per thousand shifts worked. In the first-aid classes held, forty-four people passed examinations. Nine men were trained and received certificates of competency in mine-rescue work. Bluebell teams competed in the Department of Mines first-aid and mine-rescue competitions at Nelson.

The average number of persons employed was 289, of which 152 were employed underground.

The concentrator milled 241,788 tons of ore, and the concentrates were shipped to the Trail smelter. Past production, from 1895 to 1955, inclusive, has amounted to 1,134,575 tons of ore.

[References: *Minister of Mines, B.C.,* Ann. Repts., 1908, pp. 95–97; 1949, pp. 176–178; 1952, pp. 154–155.]

AINSWORTH (49° 116° N.W.)

Silver-Lead-Zinc

Highlander, etc. (Yale Lead & Zinc Mines Limited)

Company office, 525 Seymour Street, Vancouver; mine office, Ainsworth. H. W. Knight, president; H. D. Forman, managing director; P. E. Olson, mine manager; L. N. Garland, mill superintendent. Capital: 5,000,000 shares, $1 par value. This company controls most of the claims lying between Coffee and Cedar Creeks in the Ainsworth camp. The new crushing plant, new haulage adit, and the mill are below, and the mine plant and old Highlander adit are above the Nelson–Kaslo Highway, about three-quarters of a mile south of Ainsworth. Production was increased from an average of 4,500 tons per month to over 5,000 tons per month in the last quarter of 1955. In 1954 the outside properties produced 20 per cent of the mill-feed, but the steady decline of this production in 1955 necessitated increased production from the Highlander.

The Highlander mine is serviced by the old Highlander or 2150 level adit, and by the new haulage adit or 1900 level, completed in 1955, 200 feet below. The 2150 level

explores for several thousand feet the 7-foot-wide Highlander ore-bearing shear which strikes north-south and dips 45 degrees west. Two orebodies, the Albion and Banker, have been developed by raises to the 2600 Albion adit and the 2500 Banker adit respectively. Sublevels have been developed off these raises, the longest being the 2400 level, which connects between the main raises, a distance of 1,250 feet. Open stope methods of mining are used, but the hangingwall requires considerable support by pillars, timber, and roof bolts. By the end of 1955 the Albion orebody was worked out above the 2150 level, except for the recovery of a few pillars. In 1955 the 1900 level was extended below the orebody and a raise connection made with the 2150 level. A sublevel was driven off this raise about 60 feet above the 1900 level at what appeared to be the bottom of the orebody. Stopes exposing a better than average grade of mine ore were quickly developed off this sublevel. They were producing 50 per cent of the mill-feed by the end of 1955.

At the Krao a vein, conformable with the north-striking limestone beds, has been developed in the past by a 75-degree shaft and three short levels at 35, 100, and 200 feet. Previous mining had been concentrated above the 100-foot level, but in 1955 the 200-foot level was rehabilitated. Stoping above this lower level was carried out by three men under a contract arrangement.

At the Eden and Crescent the mine was worked only during the first half of 1955. A vein about 5 feet wide and dipping 45 degrees had been developed in the past by about 500 feet of adit crosscut and a raise driven on the vein to surface. Production prior to 1955 has been from a stope serviced by this raise. During 1955 a winze was sunk 120 feet on the vein from a point immediately below the raise. A sublevel was established at the bottom of the winze and a stope raise driven to the adit level above. Very little ore was encountered, an unexpected condition as good mineralization is exposed on the sides of the winze. Three men operated this property under a contract arrangement.

At the Danira a vein conformable with the limestone bedding was developed at one time by a shaft sunk 25 feet on the dip of 45 degrees. During 1955 a crosscut adit, collared 180 feet south, was driven westward to intersect the vein at 75 feet from the portal. A drift was driven to the north for 175 feet, and from the end of this drift a raise was driven to connect with the bottom of the old shaft. Half-way along the drift a second raise was driven on the vein to surface. In all this work the only worth-while mineralization encountered was in the shaft raise near the bottom of the shaft.

At the Hector, which with the Danira was part of the Ainsworth Syndicate holdings prior to 1954 (see *Minister of Mines, B.C.*, Ann. Rept., 1951, p. 159), R. Golac, of Nelson, completed a development contract. The Hector adit is 950 feet east of the Danira workings and lower in elevation. It had been driven 630 feet southwestward with 100 feet of drifting on a shear at 570 feet from the portal. In 1955 a raise was driven to surface from this drift. The adit was also driven nearly due west to a distance of about 1,200 feet from the portal. Most of this work was disappointing. A flow of warm water encountered in the extension of the adit raised the underground air temperature 10 degrees.

Shaft-sinking was started at the Firebrand, but at a depth of 30 feet work ceased because of winter conditions.

The total ore milled from all sources is tabulated as follows:—

	Tons	Tons
Highlander		51,449
Eden and Crescent	2,563	
Krao	1,916	
Danira	313	
Trinket	47	
Tariff	12	
McCune dump	125	
Tariff dump	47	
Little Phil dump	58	
		5,081
Total, Yale properties		56,530

In addition, 27 tons was purchased from the Star mine. The grade of Yale ore milled averaged over 5½ per cent lead and 1½ per cent zinc.

A new crushing plant was completed adjacent to the mill. This consisted of a 300-ton coarse-ore bin, 13- by 24-inch Telsmith jaw crusher, 6-foot by 30-inch Dillon screen, 22-inch Symons cone crusher, and a 160-foot conveyor to a 250-ton fine-ore bin. The mill was enlarged by the addition of an Allis-Chalmers 5- by 6-foot ball mill and extra flotation cells. The new machinery has increased the daily capacity to 300 tons.

Development: Raising, 2,248 feet; crosscutting, 847 feet; drifting, 2,248 feet. The number of Yale employees averaged eighty-five.

Kootenay Florence (Western Mines Limited)

Company office, 850 West Hastings Street, Vancouver; mine office, Ainsworth. H. M. Wright, president. Capital: 2,500,000 shares, $1 par value. This company owns a large group of claims lying south of Lendrum Creek and astride Princess Creek. The mine plant and mill are on the Nelson–Kaslo Highway, 2 miles north of Ainsworth, and have been kept intact since the shut-down in 1953. In 1954 The Consolidated Mining and Smelting Company of Canada, Limited, made an agreement for eventual control. Geological and geophysical surveys were carried out in 1954, and this work was followed by a diamond-drilling programme still in progress at the end of 1955. A gentle arc in the beds of limestone which strike roughly north-south was investigated south and west of the old Lakeshore shaft. The limestone dips to the west, and to investigate it three rows of holes were planned, the rows being 400 to 600 feet apart from east to west. The holes were drilled north 60 degrees east and down at 55 degrees. In the first row the holes averaged 380 feet deep and were spaced 100 feet apart on strike. These holes were collared in the overlying greywacke which extended for 80 feet; then limestone was encountered for 300 feet, with the bottom of the holes in quartz mica schist. Two mineralized bands were reported to be encountered in the limestone, the upper band being as much as 35 feet wide. The second row of holes encountered similar mineralized bands but at greater depth from surface, which in this area is relatively flat. By the end of December the total footage drilled amounted to 11,000 feet, and a start had been made on the third row of holes. Closer drilling will be required before the drill intersections can be correlated.

Hercules (Pataha) (Triumph Mines Limited)

Company office, 355 Burrard Street, Vancouver. S. A. Liening, Seattle, Wash., president; C. Lind, manager. Capital: 3,000,000 shares, $1 par value. This company owns the Hercules, Sullivan, and Noranda recorded claims, which are respectively the former Pataha, Ellen, and Bugaboo cancelled Crown-granted claims. In 1955 the holdings were enlarged by the acquisition of several adjoining Crown-granted

claims. Since 1954 a small but continuous development programme has been carried out, mainly on the Hercules claim, 2.7 miles by road from the Kootenay Florence camp. One fissure vein has been developed by about 400 feet of drifting and crosscutting and two raises to surface. A small block of lead-zinc ore as much as 3 feet wide has been outlined. An estimated 500 tons of ore obtained from development work has been stored at the portal. A second fissure vein about 500 feet south of the first was explored in 1955. A new adit was collared below the outcrop and followed the vein for 130 feet. Surface diamond drilling done along the strike of the first vein totalled 400 feet in three holes. All this work was considered sufficiently encouraging to warrant exploration at greater depth, and to this end a road 1 mile long was built to an old adit situated on the Silver Glance claim on the south bank of Lendrum Creek. This adit, which follows a narrow quartz vein, was rehabilitated and enlarged throughout its length of 270 feet. It is planned to extend this adit about 1,000 feet to get beneath the main Hercules adit 380 feet vertically above. Five tons of sorted ore was obtained from the clean-up of the Silver Glance adit and was trucked to the Trail smelter.

A small mining plant is on site. H. Fowler, a Vancouver consultant, conducted a survey during the summer. C. Lind was in charge of the development work with two men employed. The crew was transported daily from Kaslo.

Star The Star mine, owned by D. H. Norcross, of Nelson, is 6 miles by road west of Ainsworth at an elevation of 3,700 feet. It has been idle since 1952. A vein has been developed by an adit 300 feet long and stope raises to surface 65 feet above. Replacement ore occurs at intervals in the limestone. In 1955 the owner, assisted by one man, enlarged the surface break-throughs in the vicinity of old shaft workings. About 200 tons of ore was obtained from this work; 27 tons was sold to Yale Lead & Zinc Mines Limited, about 150 tons was delivered to the Can-Amer mill, and the remainder was trucked to the Trail smelter.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1952, pp. 166–168.]

Woodbury Creek

Can-Amer Mining & Milling Company Ltd. (49° 116° N.W.) Company office, 459 Baker Street, Nelson. L. N. Martini, Kennewick, Wash., president; L. D. Besecker, Ainsworth, manager. Capital: 400 shares, $500 par value. This company erected a custom mill in 1953 at the mouth of Woodbury Creek. It has since operated intermittently on small shipments of custom ore. The following tonnage was treated in 1955: Caledonia, 103 tons; Dixie, 109 tons; Star, 50 tons. About 100 tons of Star ore remained frozen in the ore-bin at the end of 1955. Milling charges were $6 per ton.

Woodbury (49° 116° N.W.) L. D. Besecker, of Ainsworth, owns the Woodbury group of claims at the mouth of Woodbury Creek. The Nelson–Kaslo Highway crosses the property. The only claim worked in 1955 was the Dixie Fraction. A new adit, started in 1954 on a fissure vein, was extended. Production amounted to 109 tons which was treated at the Can-Amer mill. The ore assayed 7.4 per cent lead and 3.7 per cent zinc. Only a lead concentrate was made, which was shipped to the Trail smelter.

KEEN CREEK*

Silver-Lead-Zinc

Silver Bear (49° 117° N.E.) This Crown-granted claim is on the southeast side of Keen Creek, 14 miles by road from Kaslo. In 1955 Miss Naomi E. Cloggie, of Edmonton, obtained the property from the bankrupt Abacot Mines Limited. No work was done at the mine, but a small shipment of ore previously mined was made to the Trail smelter by A. V. Fiala, of Ainsworth.

* By J. W. Peck.

PADDY PEAK*

Silver-Lead-Zinc

Utica (49° 117° N.E.) The Utica mine is at the head of Twelve Mile Creek, about 15 miles by road from Kaslo. It is owned by Utica Mines (1937) Limited, and has been under lease since 1953 to J. A. Cooper, of Kaslo. The main level is the No. 7 adit, which is connected by raise to the No. 4 adit. A sublevel, the No. 5, has been driven from the raise to develop two parallel veins known as the East and West veins. As in 1954, all production in 1955 was from the East vein. The stope started in 1954 on No. 7 level produced most of the ore, but in October a stope on No. 5 level, last mined in 1950, was put into production. Mining was by cut-and-fill methods. The nearly vertical vein contained from 1 to 6 inches of galena with a high silver content. Ore was removed by horse haulage via the No. 7 level. Air for drilling was supplied by the old water-driven compressor, but this was supplemented in the winter by a Le Roi 210-cubic-feet-per-minute compressor. Four men were engaged at this operation. Production: Ore shipped, 115 tons. Gross content: Silver, 16,260 oz.; lead, 32,909 lb.; zinc, 38,165 lb.

RETALLACK-THREE FORKS*

Silver-Lead-Zinc

Jackson (Jackson Basin Mining Co. Ltd.) (50° 117° S.E.) Company office, 303, 403 Granville Street, Vancouver; mine office, Kaslo. B. I. Nesbitt, managing director; D. McLean, manager; J. Ives, superintendent. Capital: 3,000,000 shares, no par value. This company owns the Jackson mine on Stenson (Jackson) Creek, 5.7 miles from Retallack. The main workings are on the Northern Belle claim, where the Jackson lode has been developed by five adits and a 45-degree inclined shaft. No. 5, the lowest adit, intersects the shaft 80 feet below the collar at a point 200 feet from the adit portal. The shaft extends to No. 6 level, about 150 feet vertically below No. 5 level. There is a raise on the lode to No. 5 level from a point on No. 6 level 80 feet northeast of the shaft. A sublevel 70 feet long is driven from this raise; both faces of the sublevel are well mineralized. In 1955 No. 6 level was driven southwest and northeast on the lode to points 125 and 250 feet respectively from the shaft. Five exploratory raises were driven a short distance above No. 6 level. Two of these, near each side of the shaft, contained ore and the others were in waste. The best showing on No. 6 level is at the southwest face, where 2 feet of massive sphalerite is exposed. Three diamond-drill holes were drilled from No. 6 level to a total of 129 feet, but the results were negative. On No. 5 level a raise was driven 90 feet from a point 430 feet southwest of the shaft. The only worth-while mineralization exposed was in the first 20 feet. A few hundred tons of ore was salvaged from development work and was trucked to the Western Exploration mill at Silverton.

On the surface the Ore Bin vein, which was discovered in 1954 near the ore-bin at No. 5 portal, was tested by diamond drilling. A hole 121 feet long was drilled at minus 45 degrees. Scattered sphalerite mineralization was reported to occur throughout the length of the core, but not in sufficient concentrations to be of ore grade.

On the Kootenay Star claim across Jackson Creek there is an old adit which apparently was driven to test the extension of the Jackson lode. This was rehabilitated and mapped. No ore mineralization was found in these workings.

On the Sunset-Trade Dollar and Bell group, which lies 1 mile south of Jackson mine at the head of Jackson Creek, the No. 4 level of the Bell workings was rehabilitated. A diamond-drill station was established at the face of the south crosscut. Four holes were drilled to a total of 1,178 feet to test the downward extension of the Sunset-Trade Dollar vein. Results were reported to be unsatisfactory.

* By J. W. Peck.

On the Morning Star claim, which lies north of the Jackson mine, an old drift was opened up and examined. This drift extends for a distance of 79 feet and was driven on a quartz-galena vein 2 to 3 inches wide. An inclined winze 15 feet from the portal could not be examined, but it is estimated to be about 50 feet deep.

In November all operations ceased at the Jackson mine and most of the equipment was removed. Up to fifteen men were employed when the property was operating. Production: Ore shipped, 595 tons. Gross content: Silver, 614 oz.; lead, 11,660 lb.; zinc, 147,326 lb.

Keystone Charleston (Slocan Charleston Mining Company Limited)

(50° 117° S.E.) Company office, 609 Baker Street, Nelson. Ray McDonald, Seattle, Wash., president. Capital: 1,000,000 shares, $1 par value. This company acquired the Keystone-Charleston group of claims in 1946 but has been inactive since 1950. The mine camp is on the west side of Whitewater Creek, 2.2 miles by road north of Retallack. All work in 1955 was in the Keystone mine. A steeply dipping lode has been developed by two adits, the upper being 170 feet long and the lower 430 feet. In 1950 a raise connection was made between the two adits and ore was mined at that time from near the top of the raise. In 1955 this ore was mined nearly to surface above the upper adit over a length of 60 feet. The lode maintained a width of 4 feet with an average grade of 3 per cent lead and 5 per cent zinc. The hangingwall was very smooth and required support. The ore was trucked to the Carnegie mill at Sandon. J. Vlahovich was in charge with four men employed. The property was closed in November. Production: Ore milled, 602 tons.

Caledonia

(50° 117° S.E.) The Caledonia mine is east of Rossiter Creek, a southerly flowing tributary of Kaslo River. A short access road leads to the workings from Blaylock. It is worked intermittently by the owner, G. E. McCready, of Retallack. Production: Ore milled at Can-Amer mill, 103 tons; ore shipped, 8 tons.

SANDON*

Silver-Lead-Zinc

Silversmith, etc. (Carnegie Mines of British Columbia, Ltd.)

(49° 117° N.E.) Head office, 1160 Peel Street, Montreal; mine office, Sandon. A. E. Sinclair, president; T. R. Buckham, mine manager. Capital: 10,000 shares, $1 par value. This company owns the Silversmith, Slocan Star, Richmond-Eureka, Ruth Hope, and Slocan King mines on Sandon Creek, south of Sandon. A truck-road extends to all mines from the mill on the western outskirts of Sandon. In 1955 work was restricted to the No. 10 level of the Silversmith. About 3,200 feet from the portal a crosscut was started into the hangingwall to investigate the projection of parallel vein systems determined by previous geological mapping. About 200 feet of a possible 1,800-foot drive had been completed by December.

The mill operated briefly, treating 602 tons of Keystone Charleston ore. About six men were employed at irregular intervals.

Noble Five, etc. (Cody-Reco Mines Limited)

(49° 117° N.E.) Head office, 721 Eastern Avenue, Toronto. James A. Taylor, president; D. M. Kline, consultant; R. E. Miller, manager. Capital: 3,000,000 shares, $1 par value. This company owns a group of claims north of Cody, including old mines such as the Noble Five, Slocan Sovereign, Last Chance, American Boy, and Deadman. A road extends from the mill at Cody to all principal workings. The mill can also be served by tram-line from the lower portals of the Noble Five and Slocan Sovereign mines.

All work in 1955 was in the Noble Five mine. This mine is serviced by a long adit crosscut (No. 18 level) and a 1,000-foot, vertical, interior, 4-compartment shaft extend-

* By J. W. Peck.

ing from this adit to No. 8 adit. Another raise connection was made on the Noble Five vein from No. 18 to No. 16 level, making between these levels a total of three raises on this vein and one on the Spur vein. In most of these raises the mineralization exposed was disappointing. In the 18-24 raise, which does not carry through to No. 16 level, a short section of well-mineralized vein 2 feet wide was encountered. A sublevel was established about 100 feet vertically above No. 18 level and driven for 230 feet. Exploratory raises were driven off the sublevel, but none of this work revealed mineralization of ore grade. On No. 16 level two exploratory raises were driven on the Noble Five vein. The longest of these was driven for 500 feet at about 45 degrees, and from it Nos. 15 and 14 sublevels were driven 100 feet and 200 feet respectively vertically above No. 16 level. No. 15 level was driven for 120 feet. Zincy mineralization was exposed in this work but was erratic in distribution. No. 18 level, the main adit crosscut, was extended to a point 350 feet northwest of the shaft. At 140 feet from the shaft a drift was driven to the northeast for 100 feet on a slightly mineralized shear. Also on No. 18 level, the Spur vein (also called Cody) was followed by a drift to a point 450 feet west of the main adit crosscut. From the end of this drift a crosscut was driven 350 feet north, where a vein 0 to 6 inches wide was intersected. This was believed to be the downward projection of the American Boy vein. It was followed by a drift for 200 feet, and exploratory box holes were put up, but the mineralization exposed by December was negligible.

The mill was started May 24th after being closed since 1952. It operated until June 23rd, when a flash flood disrupted operations. Ore was obtained from the stockpile that had been built up at the mill over the past three years from development work. About 1,500 tons was milled. The mill-heads assayed less than 4 per cent combined lead and zinc. The concentrates, including zinc concentrates that had been on site since 1952, were trucked to rail-head at Sandon.

R. E. Miller severed his connection with the company in October. W. Hall was then in charge. The crew varied from five to twenty.

Shady Fraction (49° 117° N.E.) This is a recorded claim situated astride Carpenter Creek, one-half mile east of Cody. It is bounded on the west by the Crown-granted Wellington claim. The owner, N. Sibilleau, of New Denver, made a small shipment of float material to the Trail smelter. Production: 1.5 tons. Gross content: Silver, 121 oz.; lead, 2,080 lb.

Victor (Violamac Mines Limited) (49° 117° N.E.) Head office, 67 Yonge Street, Toronto; mine office, New Denver. Mrs. Viola R. MacMillan, president; J. C. Black, mine manager. Capital: 5,000,000 shares, $1 par value. This company owns the Victor mine, 2½ miles by road northwest of Sandon, or 2½ miles by road southeast of Three Forks. The nearly vertical Victor vein has been developed by several adits, the lowest being No. 9. Most of the ore has come from stopes between No. 7 and No. 5 levels. The stoping area has a length of 900 feet, in which the vein ranges in width from a crack to as much as 6 feet. Cut-and-fill stoping methods are used with close timbering. During 1955 a winze was sunk from No. 7 level to connect with No. 9 level at a point 2,100 feet from No. 9 portal. A sublevel was established in this winze at the bottom of the ore zone. Very little ore is exposed on No. 9 level, but a new ore section was discovered in a raise put up from near the inner end of this level. No. 7 level was driven ahead to connect with this raise and then was continued to investigate further ore possibilities. A sublevel was established in the raise.

On the surface a vein was exposed in 1953 near the compressor-house at the portal of No. 9 adit. In 1955 a similar vein and possibly the same one was exposed 160 feet lower and 300 feet northeast. A road was built to the latter showing and 200 feet of adit had been driven by December.

Sorted ore which assayed over 70 per cent lead and 100 ounces of silver to the ton continued to be shipped to the Trail smelter. The remainder had a milling grade of over 20 per cent combined lead and zinc and over 20 ounces of silver to the ton. It was

trucked to the Western Exploration mill at Silverton at an average of over 1,800 tons per month. The number of men employed averaged sixty-eight.

Lone Bachelor (Lone Bachelor Mines Limited) (49° 117° N.E.) This company is controlled by Violamac Mines Limited, which owns the adjoining Victor mine. The main haulage adit is the No. 4 level, which is connected by raises via a sublevel to the old No. 3 adit. In 1955 the sublevel was driven 200 feet to a full length of 650 feet. A narrow vein which contained small lenses of galena was followed. Some drifting and raising was done on the same vein on No. 4 level. All services were supplied from the Violamac camp. Two men were employed.

Hinckley (49° 117° N.E.) The Hinkley is an old Crown-granted claim situated east of the Victor claim about half-way along the Sandon–Victor mine road. It is owned by W. D. Pengelly and associates, of New Denver and Silverton. In 1954 a short access road was built to an old adit and some drifting done on a narrow lode containing small lenses of galena. This work was continued in 1955. Sorted ore was trucked to the Trail smelter. The remainder was stored for future milling at a custom mill. A road was built to a site below this stockpile to allow it to be handled by a chute. A building was erected for housing the small compressor. Two men were engaged in this work.

Wonderful (Silver Ridge Mining Company Limited).—(49° 117° N.E.) Company office, 373 Baker Street, Nelson. Harry F. Magnuson, Wallace, Idaho, president; J. R. Kenney, managing director. Capital: 5,000,000 shares, 50 cents par value. This company owns a large group of claims southwest of Sandon, including the Wonderful. The property has been idle since 1953 but the plant has been kept intact. In 1955 two men were employed doing surface exploration.

SLOCAN LAKE*

Silver-Lead-Zinc

Mammoth, Standard, Enterprise, Monarch (Western Exploration Company Limited) (49° 117° N.E.) Company office, 38 South Dearborn Street, Chicago, Ill.; mine office, Silverton. M. P. McCullough, Chicago, president; A. M. Ham, Silverton, managing director; R. A. Avison, mine superintendent. Capital: 2,000,000 shares, 50 cents par value. This company owns the Mammoth, Monarch, and Standard mines near Silverton, and the Enterprise mine on Enterprise Creek, 12½ miles by road south of Silverton. The Monarch lode, which lies between the Mammoth and Standard mines, has been developed since 1952 by several thousand feet of drifting and crosscutting in the Monarch adit (elevation, 5,350 feet). In 1954 the No. 7 adit level of the Mammoth mine (elevation, 5,040 feet) was extended to reach under an orebody outlined by diamond drilling below the Monarch adit. The drift, called the Hecla, was extended 2,633 feet in 1955 to a total length of about 4,000 feet. A mineralized section, about 500 feet long, was encountered in this drift. A raise was started toward the orebody lying below the Monarch adit. It had reached 160 feet at 62 degrees when all work ceased for the winter months.

The Standard was idle except for leasing operations. C. E. Towgood and J. Nesbitt obtained 183 tons from the No. 2 level, and this ore was milled at the company's mill. W. Postlethwaite and J. Kelly obtained 109 tons for milling from a stope on No. 6 level about 2,000 feet from the portal. W. Nelson mined 174 tons from No. 7 level, and this was also milled at the company's mill.

The Enterprise mine remained closed, but the camp is intact and a watchman is employed.

* By J. W. Peck.

The mill operated throughout 1955, treating Violamac ore on a custom basis. In addition to that mentioned, custom milling was done for the Van Roi and Jackson mines. The number of men employed averaged thirty-four.

Van Roi, Hewitt (Slocan Van Roi Mines Limited)

(49° 117° N.E.) Company office, 532 Burrard Street, Vancouver; mine office, Silverton. G. W. West, mine manager. Capital: 5,000,000 shares, no par value. This company is a reorganization of Van Roi Consolidated Mines Ltd., which owned the Van Roi and Hewitt mines near Silverton. Transcontinental Resources Limited has directional control. The Hewitt mine, 6¼ miles by road southeast of Silverton, was reopened in the latter half of 1955. It had been idle since 1952, except for some work done by lessees in 1954. On the lowest or No. 10 level, an orebody about 2,000 feet from the portal has been stoped in the past above the level. To investigate this orebody at depth a drift 430 feet long was driven into the hangingwall and diamond-drilling stations established. The drift followed a mineralized brecciated quartz shear for 200 feet. Diamond drilling was in progress at the end of 1955. Air for drilling was supplied by a portable compressor at the portal. Other services were supplied from the Van Roi camp. As many as ten men were employed.

A shipment of 5 tons was made by E. Merrill and H. Lyon, who leased the Hewitt in 1954.

The Van Roi mine and camp are one-quarter mile by road east of the Hewitt No. 10 portal. Since 1953 the mine has been under lease to M. Slobodzian, J. W. Miller, and L. Fried. These lessees continued to obtain most of their ore from an underhand stope in the southwest end of the workings on No. 3 level. This stope was more than 100 feet deep on a 45-degree incline. The sorted ore was shipped to the Trail smelter and the remainder was stored in an old ore-pass which extends from No. 5 to No. 3 levels. The latter ore was trucked to the Western Exploration mill at Silverton whenever milling facilities became available. A total of 1,457 tons was milled in 1955.

The Van Roi mill is 1 mile south of Silverton on the Nelson–Nakusp Highway. Since its shut-down in 1952 the sink-float plant and the power units have been removed. Late in 1955 power units were again installed and the flotation circuit was improved by the addition of more cells. It is expected the mill should be able to treat custom and company ore early in 1956.

Bosun (New Santiago Mines Limited)

(49° 117° N.E.) Company office, 511, 850 West Hastings Street, Vancouver. Capital: 3,000,000 shares, 50 cents par value. The Bosun mine is on the east shore of Slocan Lake, 1½ miles south of New Denver on the Nelson–Nakusp Highway. The main haulage, No. 6 adit, is driven beneath the highway from a site 40 feet above the lake. At 2,730 feet from the portal an inelined winze extends to No. 7 and No. 8 levels. The mine has been idle since 1953. In 1955 a small crew was engaged to unwater the winze, but the project was abandoned after a few weeks. J. Zambon was in charge of this work.

Galena Farm

(49° 117° N.E.) This mine is about 2 miles by road south of Silverton. For several years it has been under intermittent lease to Frank S. Mills, of Silverton. Only surface work was done in 1955. An interesting discovery of a lead-silver fissure was made in the vicinity of bulldozer stripping done in 1954.

Noonday

(49° 117° N.E.) The Noonday mine is just east of the Galena Farm mine. It is owned by R. Wilson-Smith and the Bank of Montreal. M. Arishenkoff, of Shoreacres, who leased the property in 1954, made a 10-ton shipment to the Trail smelter in 1955.

Silver-Gold

V & M (49° 117° N.E.) This Crown-granted claim is on Memphis (Twelve Mile) Creek about 1½ miles east of the Nelson–Nakusp Highway. It was under lease from the Crown in 1955 by A. Archibald, W. Thicket, and W. Boisvert. A small shipment was made to the Trail smelter. Production: Ore shipped, 3 tons. Gross content: Gold, 3 oz.; silver, 398 oz.; lead, 51 lb.; zinc, 19 lb.

LEMON CREEK (49° 117° N.E.)

Uranium

Try Again The Try Again group on Lemon Creek is owned by D. Bain, of Trail. It was consolidated with an adjoining group owned by W. McLeod, of Silverton, and the combined property was optioned to Jackson Basin Mining Co. Ltd. This company acquired more claims by location so that a large area was controlled on both sides of Lemon Creek. The original discovery of a radioactive mineral was made in 1950 on the Try Again claim on the south bank of Lemon Creek at a point on the Lemon Creek road 2 miles from its junction with the Nelson–Nakusp Highway. A quartz-pegmatite dyke in granite gave higher than normal readings on the Geiger counter, the radioactivity being associated with a black mineral identified as allanite. Since 1950 D. Bain had driven an adit at the level of the Lemon Creek road 30 feet on the dyke. In 1955 Jackson Basin Mining Co. Ltd. widened the adit and extended it to a length of 94 feet. The quartz-pegmatite did not appear to have any definite strike or dip. It persisted for approximately 70 feet in the adit and then disappeared. Only minor amounts of the black mineral were exposed. It was reported that fergusonite had been tentatively identified, but it would appear that allanite was still responsible for most of the above-normal radioactivity. A sample of selected black mineral taken at the portal-site in 1950 assayed 0.051 per cent uranium oxide.

On the surface a scintillometer survey was made, chiefly on the Try Again group. Several anomalies were found to the north of the Try Again claim, and some trenching was done, but with disappointing results. All work ceased by September, and the options on the claims owned by Bain and McLeod were dropped.

LOWER ARROW LAKE*

Silver

Chieftain (50° 117° S.W.) This Crown-granted claim is west of Burton on the south side of Caribou Creek. In 1955 it was under lease from the Crown by Randolph Harding, of Silverton. A small shipment of ore salvaged from previous work was made to the Trail smelter. Production: Ore shipped, 3 tons. Gross content: Gold, ½ oz.; silver, 72 oz.; lead, 61 lb.; zinc, 34 lb.

Silver-Lead-Zinc-Tungsten

Renata (49° 118° S.E.) The Renata group of four claims owned by R. W. Cook, of Castlegar, is on the east side of Dog Creek, 1 mile by road south of Renata. The claims are adjacent to the old Mountain Chief property and cover ground that at one time was held as the Peggy and Rickward claims. The workings consist of several open-cuts exposing metamorphosed limestone intruded by granite. In 1955 these cuts were deepened and enlarged. The large open-cut at the north end of the workings now exposes granite for 20 feet, then a 6- to 12-inch band of skarn, then limestone. A sample taken across 6 inches of the skarn assayed 0.21 per cent tungstic oxide and 0.34 per cent lead. This compares with a sample taken in 1953 across 1 foot of the same band of skarn but 10 feet higher in elevation, which assayed 0.2 per cent tungstic oxide. The limestone is also mineralized with galena

* By J. W. Peck.

and scheelite, but the mineralization is erratic and difficult to sample. About 15 feet south of this cut a second cut, which started in limestone, was deepened to reach the granite. A sample across 3 feet of limestone on the south wall of the cut near the contact assayed: Lead, 9.55 per cent; tungstic oxide, 0.25 per cent. A second sample, adjacent to the first sample, across 6 feet, assayed: Lead, 1.09 per cent; tungstic oxide, 0.11 per cent.

Copper

Mountain Chief (Renata Copper Company Limited) (49° 118° S.E.) Company office, 1, 373 Baker Street, Nelson. W. W. Ferguson, president. Capital: 300,000 shares, $1 per value. This company owns a group of claims on the east side of Dog Creek south of Renata. The main workings are on the Mountain Chief Crown-granted claim. The property has been idle since 1922. In 1955 a new road was built from the Dog Creek road, so that these workings are about 3½ miles by road from Renata. An orebody of copper sulphides in silicified limestone has been developed by an open pit and an inclined shaft 110 feet deep with a level at 50 feet. In the latter half of 1955 the property was optioned to United Estella Mines Ltd. The shaft was unwatered, and four holes, totalling about 400 feet, were diamond drilled from the shaft and the 50-foot level. The work was under the direction of B. I. Nesbitt. The option was dropped after this work.

[Reference: *Minister of Mines, B.C.* Ann. Rept., 1927, pp. 328–329.]

NORTH LARDEAU*

Gold-Silver-Lead-Zinc

Spider, Eclipse (Sunshine Lardeau Mines Limited) (50° 117° N.W.) Company office, 307, 413 Granville Street, Vancouver; mine office, Beaton. J. Drybrough, president; G. G. Sullivan, manager; C. Anderson, mine superintendent; E. Hall, mill superintendent. Capital: 4,000,000 shares, no par value. Berens River Mines Limited has operating control. The mine camp and mill are at the old townsite of Camborne, 6 miles by road northeast of Beaton on the northeast arm of Upper Arrow Lake. The mine is on Pool Creek, 2 miles by very steep road from Camborne. The Spider orebody, which was discovered in 1950, has been developed by several adits, the lowest being No. 10 (elevation, 2,763 feet). The orebody is vein-like with a northerly strike and a dip to the east of 75 degrees. It is 1 to 4 feet wide, except at the junction of short branch veins, where the width is as much as 18 feet. The length of the orebody ranged from 100 feet on No. 5 level to over 400 feet on No. 10 level. By the end of 1955 it had been mined out above No. 10 level, except for a section between No. 10 and No. 8 levels at the southern extremity. Mining was by shrinkage stoping. Diamond drilling was being done at the end of the year to probe the orebody below No. 10 level and determine whether development below this level was warranted.

Development continued in the Eclipse orebody, which is serviced by a 1,000-foot crosscut from the No. 10 level of the Spider mine. Drifting on this orebody on No. 10 level totalled 300 feet and exposed an ore section 180 feet long similar to the Spider orebody. A raise was put up 200 feet and a sublevel established at 110 feet. This sublevel was driven both ways for a total length of 240 feet, but the ore did not have as great a length as on No. 10 level. Mineralization pinched out in the raise about 20 feet above the sublevel.

The Sandy adit, which is at an elevation of 2,730 feet and 2,400 feet west of the No. 10 portal of the Spider mine, was extended to a total of about 500 feet of workings. At 300 feet from the portal a branch vein of zincy mineralization 1 foot wide was followed for 60 feet. The rest of the work in this adit was disappointing.

* By J. W. Peck.

The mill operated at about 2,200 tons per month. The concentrates and crude ore were transported by truck and Arrow Lakes barge service to rail-head at Nakusp and then to smelters at Kellogg and Silver King, Idaho. The number of men employed averaged sixty-three.

Silver-Lead-Zinc

Beatrice (Beatrice Mining Co. Ltd.)

(50° 117° N.W.) Company office, 404 Pemberton Building, 744 West Hastings Street, Vancouver. W. J. Scorgie, president and managing director. Capital: 50,000 shares, $1 par value. This company owns a group of claims at the head of the east fork of Mohawk Creek. Included in the group are the Beatrice and Folsom Crown-granted claims and four recorded claims which cover in part the cancelled Crown-granted Florence and Silver Crown claims. The main workings are on the Beatrice and are accessible by 4 miles of trail from the Spider mine road. As in 1954, work in 1955 was restricted to repairing the trail, improving the log cabin living-site, and cleaning out the mine portals. Some assessment work was also done on surface.

Molly Mac (Mollie Mac Mines Limited)

(50° 117° N.E.) Company office, 850 West Hastings Street, Vancouver. W. R. Wheeler, president. Capital: 3,000,000 shares, $1 par value. This company owns the Molly Mac group of claims on the northwest side of Gainer Creek valley, 9½ miles by road from Ferguson. A lead-silver limestone replacement ore zone was partially outlined by adit development in 1954. No underground work was done in 1955. A small crew was employed for a few weeks to complete the construction of two substantial log dwellings on the southeast bank of Gainer Creek.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1954, pp. 143–144.]

Broadview, True Fissure

(50° 117° N.E.) This property on Great Northern Mountain is accessible by 3½ miles of road which extends north from Ferguson to the True Fissure camp. The Broadview, which is south of the True Fissure, has had very little work done on it in the last fifty years. The True Fissure was last active in 1952, when The Granby Consolidated Mining Smelting and Power Company Limited carried out an underground diamond-drilling programme for the Toronto consulting firm of W. F. James, B. S. W. Buffam, and M. A. Cooper. In 1955 this consulting firm supervised a surface drilling programme at the Broadview on behalf of Yellowknife Bear Mines Limited, of Toronto. A tractor-road 1 mile long was built from the True Fissure road to the drilling-sites. Four holes were drilled to a total of 1,500 feet.

Silver-Lead-Zinc

Bannockburn, Wagner

(50° 117° N.E.) These groups of claims at the head of Hall Creek were under option in 1955 to The Granby Consolidated Mining Smelting and Power Company Limited. The main workings are reached by trail from the Healy Creek road, which leaves the Lardeau–Gerrard road 3 miles southeast of Gerrard. The Wagner was last worked in 1950; the Bannockburn has been idle for over fifty years. In 1955 a surface diamond-drilling programme was carried out on the latter group. A 10- to 30-foot band of mineralized, grey to buff, fine-grained impure limy sediments was tested by short holes 50 feet deep, drilled at close intervals along the strike. This band of sediments strikes southeast from Hall Creek, across the Bannockburn, Buckeye, Silver Bottom, and Superior Crown-granted claims, and has an exposed length of over 2,300 feet. The showings range from 6,100 to 6,650 feet in elevation. Two holes were drilled near the old Bannockburn adit, which is 400 feet northeast of the band at an elevation of 5,980 feet. Snow conditions forced an early withdrawal in the fall. The option was dropped at the end of 1955 and the ground reverted to the agent, J. Gallo, of Howser.

SOUTH LARDEAU*

J.G. (50° 116° S.W.) This group of claims lies northwest of Glacier Creek and extends across a mountain ridge to the lower arm of Duncan Lake. It is owned by J. Gallo and associates, of Howser, but was optioned late in 1955 to Bunker Hill and Sullivan Mining and Concentrating Company, of Kellogg, Idaho. Only exploratory work could be done before winter conditions forced cessation of activities.

CRESTON†

Copper

82F/SE -42

Creston Hill (Bon Ton Syndicate) (49° 116° S.E.) This property is 1 mile south of the Creston–Cranbrook Highway, 2 miles west of Kitchener. Reward Uranium Ltd., of Edmonton, Alta., optioned the property and began an investigation of two zones of copper mineralization disclosed by surface exploration. At a point 500 feet north of and 100 feet higher than the original portal, a crew of two men, crosscutting in an easterly direction, completed 50 feet of an estimated 140-foot crosscut to intersect a northerly trending, chalcopyrite-bearing ore zone. A parallel ore zone containing low-grade secondary copper mineralization is reported to be at the contact of a diorite sill 400 feet east of the zone being investigated.

MOYIE RIVER†

Lead-Zinc-Tungsten-Uranium

82F/SE-3

Cariboo (49° 116° S.E.) F. H. Giles, of Kimberley, and three associates continued surface stripping on this property astride the Nelson-Fort Steele Mining Division boundary at the head of North Moyie Creek. Using a bulldozer, 220 feet of trench was stripped on the east side of the main mineral outcrops which occur in limestone. The outcrops were exposed further by ground-sluicing.

ST. MARY RIVER†

Silver-Lead-Zinc

Boy Scout (Thomas Consolidated Mines Incorporated).—(49° 116° N.E.) Company office, 640 Peyton Building, Spokane, Wash.; mine office, Marysville. David E. Watson, president and manager. This company operates the Warhorse mine on Hell-roaring Creek, 5 miles by road from St. Mary Lake. The 4500 level adit was extended 793 feet to a total length of 3,794 feet, and 35 feet of crosscutting was done. In addition to this work, five exploratory diamond-drill holes totalling 390 feet were drilled. Five men were employed.

KIMBERLEY†

Silver-Lead-Zinc

Sullivan (The Consolidated Mining and Smelting Company of Canada, Limited) (49° 115° N.W.) Company office, 215 St. James Street West, Montreal; mine and smelter office, Trail. R. E. Stavert, Montreal, president; R. W. Diamond, Trail, vice-president and general manager. Sullivan mine office, Kimberley. B. E. Hurdle, general superintendent; J. R. Giegerich, mine superintendent; A. G. Robertson, mill superintendent. Capital: 20,000,000 shares, no par value. This company owns 678 Crown-granted mineral claims and fractions in a block in the Kimberley area, covering and surrounding the mine workings from which 68,500,000 tons of ore have been mined since December, 1909, when the company began work on this property. A comprehensive summary report of the property was prepared by the staff at the Sullivan mine and published in the May, 1954,

* By J. W. Peck.
† By J. E. Merrett.

special issue of the Canadian Mining Journal. The following report, prepared by the management, is a synopsis of the 1955 operations:—

" The Sullivan mine produced and the concentrator handled the highest production on record, over 2,800,000 tons, an average of approximately 54,000 tons per week. Approximately 20 per cent of this came from the Open Pit, where ore pillars are being removed by quarrying. Pillar recovery accounted for the major portion of the production from the North, South, and Centre sections of the mine above the 3900 level, which areas furnished 58 per cent of the mine production. The remainder of the ore was produced by primary stoping in the area below the 3900 level.

" Long-hole drilling methods, employing diamond and percussion drills with sectional steel, accounted for 94 per cent of the underground production. The remaining tonnage from underground came from open stopes, using the ordinary bench mining methods with conventional steel and tungsten carbide bits. The trend to more long-hole drilling from raises and less from sublevels continued. The diamond-drill method of sinking winzes, which are used in float filling the completed stopes below 3900 level, was continued. Six winzes, averaging 48 feet in length, were drilled and blasted.

" Development footage was slightly less than in 1954, because less exploration and less ventilation development was required. The large-scale over-all mine ventilation development was successfully concluded with the sinking of No. 33 shaft, the entrance to the central intake airway.

" Four surface fans for the main intake and return airways were installed. These included a 150-horsepower Jeffrey 8HU-84 Aerodyne fan on No. 24 shaft intake, with 202,000 cubic-feet-per-minute capacity; a similar Jeffrey fan on No. 33 shaft intake, with 175,000 cubic-feet-per-minute capacity; and two 300-horsepower Jeffrey 12A-58 Aerodyne fans on No. 29 shaft exhaust, with 282,000 cubic-feet-per-minute capacity. These installations completed the over-all mine ventilation scheme that was started in 1952. The total volume of air exhausted from the mine is 730,000 cubic meet per minute.

" In 1955, 260,000 cubic yards of gravel backfill was placed in mined-out areas above the 3900 level, and 229,000 cubic yards of float fill, from the concentrator, was placed in stopes below the 3900 level. Natural caving of waste rock from the hanging-wall accounted for 1,224,000 cubic yards of backfilling above the 3900 level.

" Communications and safety conditions for underground transportation crews were improved by the installation of two-way radio trolley phones on six 3900 level haulage motors and in the dispatcher's control booth. The addition of five remote-controlled electric track switches at key junctions has increased safety and efficiency.

" The sustained safety programme at the mine and mill was effective in maintaining the 1954 accident-frequency figure of 0.11 per thousand shifts worked. The severity figure increased to 8.1 shifts lost per thousand shifts worked. The mill established an all-time record with only five lost-time accidents for a frequency of 0.04 and a severity rate of 2.6 per thousand shifts worked. The Open Pit and South section of the mine set new section safety records by working 884 and 544 days, respectively, without a lost-time accident.

" Twenty-two employees attended the Underground School of Instruction, making a total of 1,863 who have received training since 1946. Twelve mine-rescue men were trained, and forty-two employees took part in mine-rescue competitions. In first aid, a total of 436 St. John Ambulance certificates were awarded to 234 adults and 202 school-children who had qualified after a course of instruction.

" At the year-end the number of men employed at the mine and concentrator was 1,480, of which 643 were employed underground."

WASA*

Silver-Lead-Zinc

Estella (United Estella Mines Ltd.) (49° 115° N.W.) Company office, 917 Vancouver Block, Vancouver; mine office, Wasa. G. Annesley, managing director; B. I. Nesbitt, manager; J. Austin, superintendent. Estella Mines Limited was reorganized in 1955 to form United Estella Mines Ltd. The mill-site is at Wasa on the Kootenay Central Railway, 9 miles north of Fort Steele. The mine is at an elevation of 6,000 feet in a basin at the head of Tracy Creek, 18 miles by road east of Wasa.

Underground exploration, which had been suspended for a two-year period, was resumed in June, 1955. At the southeast end of the 6100 level, 35 feet of crosscut was driven but did not disclose additional ore on this level. Most of the work was done on the 5950 level. This level was extended in a southeasterly direction by 156 feet of drift and by three crosscuts totalling 109 feet. The drift followed the lode through a fault zone and exposed approximately 100 feet of disseminated mineralization which had an average width of 14 feet. As the mineralization did not continue to the drift face, two exploratory raises, one 20 feet long and the other 60 feet long, were driven upward on ore. Considerable faulting was encountered and the raises were discontinued. To improve ventilation on the 5950 level, a third raise was driven a distance of 25 feet to connect with the 75-degree winze from the 6100 level. Two diamond-drill holes totalling 150 feet in length were directed under the mineralized area. A third hole, 100 feet long, was drilled vertically upward from the east end of the 6250 drift in the Rover adit. When the work on the 5950 level was completed, the R-14 raise in the Rover workings was extended 135 feet to a total length of 287 feet. Work was suspended in December because of winter conditions. A crew of twelve men was employed.

[References: *Minister of Mines, B.C.*, Ann. Rept., 1951, pp. 186–190; 1953, pp. 150–151.]

WINDERMERE*

Silver-Lead-Zinc

Paradise (Sheep Creek Gold Mines Limited) (50° 116° S.E.) Company office, K.W.C. Block, Nelson. H. E. Doelle, managing director; J. B. Magee, resident manager. This property is at the headwaters of Springs Creek, a tributary of Toby Creek. The mine, at an elevation of 7,800 feet, is 20 miles by road west of Athalmer. In June, 1955, work began on the repair of the road between Jackpine Flat on Toby Creek and the mine. In August, after the mine buildings had been repaired, a crew of seven men, five of which were employed underground, completed the driving of a manway and ore-pass from the 7800 level to the 7860 hangingwall stope. Using square-set mining methods, 694 tons of ore was mined, of which 534 tons was trucked to the Mineral King concentrator. Operations were suspended on October 15th because of winter conditions.

Mineral King (Sheep Creek Gold Mines Limited) (50° 116° S.E.) Company office, K.W.C. Block, Nelson; mine office, Invermere. H. E. Doelle, managing director; J. B. Magee, resident manager. This property is on the Toby Creek slope of the ridge between Jumbo and Toby Creeks, 27 miles from Athalmer. The deposit is a lead-zinc replacement, with barite, in limestone of the Mount Nelson formation.

In 1898 underground exploration was begun immediately below a mineralized outcrop at an elevation of 5,730 feet. In 1928 the No. 2 or 5,600-foot level was started, and in 1950 the present company began work. Because of favourable results obtained from diamond-drill exploration and underground development, the No. 3 or 5,450-foot level was driven. Four subparallel orebodies known as the "A," "B," "C," and "D" ore-

* By J. E. Merrett.

bodies are known. The first three, from which the entire production to date has been obtained, appear to dip steeply and to rake flatly to the northwest. The " B " orebody merges with "A" near the surface and with " C " on the 5450 level. In 1955 diamond-drill exploration in a northeasterly direction from the " C " orebody on the 5450 level intersected the " D " orebody. It is reported that the intersection indicated a higher-than-mine-average zinc content. Development work indicated a continued downward and northwesterly extension of the "A," " B," and " C " orebodies. To gain access to this extension at depth, the No. 7 or 4750 level adit was started at the same elevation as the top of the mill coarse-ore bin. This crosscut, which is to be the main haulage level, was driven 2,008 feet, 8 by 8 feet in dimension. In addition to this work, underground development comprised 770 feet of crosscuts and drifts, 466 feet of raises, and 1,439 feet of diamond drilling in nineteen holes.

Mining was by open stoping methods, the ore being drawn to draw points by scrapers. The ore was transported by train to the surface inclined skipway and lowered to the mill. The concentrates were trucked to Invermere for rail shipment. The amount of ore milled was 161,962 tons. This included 534 tons of ore shipped from the Paradise mine.

Ventilation was by natural air circulation, except in development headings where fans were used.

The following buildings were erected: School, two dwelling-houses, bunk-house, and change-house. The heating-plant building was destroyed by fire but was rebuilt, incorporating a stoker-fed steam heating plant. Volunteer workers erected a curling club building.

Improvements and relocations were made on the upper 15 miles of road between the mine and Athalmer.

The average number of men employed was ninety, of which forty were employed underground.

[References: *Minister of Mines, B.C.,* Ann. Rept., 1898, p. 1039; 1929, p. 293; 1950, p. 157; 1952, pp. 151–154.]

Silver-Copper

Ptarmigan (50° 116° N.E.) This property is at an elevation of 8,600 feet, at the headwaters of Red Line Creek, a tributary of McDonald Creek, which in turn is a tributary of Horsethief Creek. The first record of work done was in 1899, and by the end of 1903 development work in three adits amounted to at least 2,800 feet of drifts and crosscuts and 148 feet of winzes. Some raising and stoping were done, but in 1955, because the two upper adits and portions of the bottom adit were solidly blocked with ice, it was not possible to determine the amount of this work. In 1906 a small amount of development work was done, and in 1919 and 1920 dump ore was salvaged and shipped to Trail.

In 1955 Heinz K. F. Seel, of Edgewater, optioned the property and, employing a crew of two men and a bulldozer, 9 miles of the old wagon-road was reopened to the upper crossing of McDonald Creek at an elevation of 5,000 feet. An additional 4½ miles of road, passable only to 4-wheel-drive vehicles, was completed from the crossing to the mine portal.

[References: *Minister of Mines, B.C.,* Ann. Rept., 1899, p. 667; 1900, p. 106; 1901, p. 1014; 1902, p. 136; 1903, pp. 97, 104; 1915, p. 97; 1919, p. 146.]

SPILLIMACHEEN*

Silver-Lead-Zinc

Silver Giant (Giant Mascot Mines Limited)

(50° 116° N.E.) Company office, 908 Royal Bank Building, Vancouver; mine office, Spillimacheen. B. H. Gunning, managing director. A management contract is held by H. L. Hill, consulting mining engineer, Vancouver. L. P. Starck, resident manager; R. J. Willox, mine superintendent; J. M. McDearmid, mill superintendent. Capital: 3,500,000 shares, $1 par value. The property is on the west slope of Jubilee Mountain on the northeast side of Spillimacheen River, 8 miles by road from Spillimacheen station on the Kootenay Central Railway.

The first record of mineral discovery on the Spillimacheen River was in 1883. By 1884 mineral locations extended along the river a distance of 4 miles, and by 1890 a considerable amount of exploration and development work had been done, particularly on the Spillimacheen, Rothschild, Jumbo, Tiger, and Eureka mineral claims. In the same year Fred M. Wells located the Giant claim and began driving an exploration adit. By 1907 sufficient ore had been discovered to encourage Golden Giant Mines Limited to install a mill, using the Elmore vacuum concentrating process, but although concentrates were shipped to Trail in 1908, the mill process was too expensive. Work on the property was sporadic until 1926, when Pacific Mines, Petroleum and Development Company Limited began a two-year programme of development and diamond-drill exploration.

From 1927 to 1947 only minor development work and exploration were done. In 1947 Silver Giant Mines Limited reopened the mine and made shipments of ore to Trail in that year and in 1948. Siscoe Gold Mines Limited optioned the property between September, 1948, and March, 1949, and during these months the company did a large amount of development work and diamond-drill exploration. In 1950 Hedley Mascot Gold Mines Limited optioned the property and built a mill. In 1951 this company merged with Silver Giant Mines Limited to form the present operating company, Giant Mascot Mines Limited.

The ore deposit is in Jubilee limestone in close contact with McKay slate. The mine structure is a plunging, overturned, anticlinal nose in which slate is wrapped around the limestone. The plunge of the nose is westerly, and underground development has shown it to vary from 45 degrees near the surface to flat lying on No. 8 level. In and near the apex of the nose there has been replacement of limestone and slate inclusions by silica, and of limestone by barite. In this zone disseminated galena and sphalerite have been deposited. Ore occurs principally in the anticlinal nose and along the steep footwall or northern limb. The flatter hangingwall or southern limb contains a lesser amount of ore.

The following report is based on an outline of the 1955 operations supplied by the management.

The mine has been developed on Nos. 1, 2, 3, 5, and 6 levels and by crosscuts from No. 1 shaft on Nos. 7, 8, and 9 levels. No. 1 shaft is an internal shaft inclined at 49 degrees. It is 6 by 18 feet in dimensions and is divided into three compartments.

Development work comprised 237 feet of shaft-sinking, 3,260 feet of drifting and crosscutting, 2,144 feet of stope-raising, and 3,307 feet of diamond drilling.

Shaft-sinking was done in two periods during the year. In the first period, ending in May, the shaft was extended from the bottom of No. 8 level sump to a point 100 feet below No. 9 level. No. 9 level was established 150 feet vertically below No. 8 level. At the end of 1955 the shaft was being further extended.

The drifting, crosscutting, and raising were done for level development, new stoping areas, and the removal of stope pillars.

Diamond drilling was of an exploratory nature and was done specifically to outline the position and shape of the ore zones below No. 9 level.

* By J. E. Merrett.

Approximately 70 per cent of the mine production was obtained from the footwall zone between No. 8 and No. 7 levels. The remainder was obtained throughout the rest of the mine, including the open pit. The pillars were mined by long-hole stoping methods, while the stopes were mined by shrinkage and open stoping methods.

In March a change-over was made from company-generated diesel power to hydro-electric power from the British Columbia Power Commission's Spillimacheen substation.

Several mineral claims were located on the north and east boundaries of the property. The company holdings now cover an area 9 miles long and 2 miles wide. In addition to the Lead Mountain prospect, exploration has disclosed other base-metal mineral occurrences within this area.

The average number of persons employed was 108, of which fifty-five were employed underground. Production: Ore milled, 169,269 tons.

[References: *Minister of Mines, B.C.,* Ann. Rept., 1923, pp. 195–196; 1927, pp. 261–263; 1930, p. 232; 1949, pp. 200–204; 1954, pp. 148–150.]

Lead-Zinc

Lead Mountain (Giant Mascot Mines Limited)

(50° 116° N.E.) This property, comprising twelve claims, is 6 miles northeast of the Giant Mascot mine in the Spillimacheen Valley. The claims include the area formerly covered by the I.X.L. and Condor claims and later by the Rose group. Development work has indicated a number of bands or a zone of lead-zinc mineralization in an area of Jubilee dolomite. The dolomite occurs as an oval-shaped area, 2,000 feet long and 200 to 800 feet wide. It is overlain by McKay slate and underlain by Donald shale and St. Piran quartzite. The mineral occurrence has a northwesterly strike and dips 75 to 90 degrees southwest. Mineral outcrops occur on the top of the ridge at an elevation of 4,350 feet and on the steep northeast cliffs between elevations of 4,150 and 4,250 feet. Three adits have intersected a mineralized zone with an apparent width of about 200 feet. Two diamond-drill holes drilled from the 3930 level also intersected this zone. The mineralization was erratic and widespread, suggesting the possibility of a large low-grade deposit.

Early exploration consisted of a shaft 10 feet deep on the top of the mountain, a near-by drift 100 feet long at an elevation of 4,230 feet, a drift 230 feet long at an elevation of 4,130 feet, and several open-cuts on the cliffs.

The 3930 adit crosscut, begun in 1954, was continued in a southwesterly direction a total distance of 450 feet to the southwest boundary of the mineralized zone. A drift 20 feet from the crosscut face was driven 50 feet to the northwest and 50 feet to the southeast of the crosscut. Exploratory diamond drilling was started, and when work was suspended for the winter months, 900 feet of drilling had been completed.

The road from Giant Mascot mine to Lead Mountain was reconstructed to an average width of 22 feet.

[References: *Minister of Mines, B.C.,* Ann. Rept., 1917, p. 144; 1918, p. 153; 1919, p. 113; 1925, p. 221; 1954, p. 149. *Geol. Surv., Canada,* Sum. Rept., 1932, Pt. A II, p. 172.]

SKAGIT RIVER*

Copper

A.M. (Canam Copper Company Ltd.)

(49° 121° S.E.) Company office, Hope. S. A. Perry, Toronto, president; H. D. Forman, general manager; F. R. Thompson, mine manager. The property is on the Hope–Princeton Highway 26 miles southeast of Hope. In July, 1955, Mogul Mining Company Limited assumed management to develop the orebody. Diamond drilling totalling 3,234 feet was done on No. 10 level and on surface, and 209 feet was done at the near-by

* By R. B. King.

Invermay mine. On the information thus obtained, a site was cleared at 4,300 feet elevation, about 600 feet below No. 10 level, and mine buildings were erected. A new adit was started and was driven 1,725 feet by the end of the year. Fifty men were employed.

92 H/SW - 3, 42, 41

Mammoth, B.B., Defiance.—(49° 121° S.E.) These claims, held by record by William H. Robinson, of Hope, were optioned by Foundation Mines, Ltd., Alfred R. Allen, consulting engineer. The claims are located along the Hope–Princeton Highway about 20 miles from Hope. Diamond drilling was started and several short holes were drilled on the Mammoth. Five men were employed.

CHEAM RANGE*

Copper

Lucky Four (Rico Copper Mines Limited).—(49° 121° S.W.) Company office, 413 Granville Street, Vancouver. T. H. Wilkinson, mine manager. This property is on the summit of the Cheam Range at the head of Wahleach Creek, about 15 miles from Laidlaw. From August to November eight men were employed in diamond drilling from the adit on the Lucky Four No. 4 claim. Three thousand feet of drilling was done. The operation was serviced by helicopter.

AGASSIZ*

Copper

Kelowna Mines Hedley Limited.—(49° 121° S.W.) This company optioned a group of thirty-two claims on the east slope of Mount Agassiz about 4 miles west of Agassiz. Six vertical holes were diamond drilled to test a copper-bearing silicified zone. A total of 3,500 feet of drilling was done and the option was dropped.

HOWE SOUND*

Copper

Britannia Mining and Smelting Co. Limited.—(49° 123° N.E.) Head office, 730 Fifth Avenue, New York, N.Y.; mine office, Britannia Beach. H. H. Sharpe, president; E. C. Roper, manager; T. M. Waterland, assistant manager; L. Allan, mine superintendent. The company owns and operates the Britannia mine and mill at Britannia Beach. The following report, supplied by the management, provides details of the operation in 1955.

The development work totalled 17,362 feet for all sections of the mine.

Classification by Type

Class	Jane Mine	No. 8 Mine	Bluff Mine	Fairview Mine	Empress Mine	Victoria Mine	Total
	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.
Drifts	2,423	1,839	2,520	196	138	945	8,078
Crosscuts	294	296	181	25	152	386	1,334
Raises	1,226	718	1,234	1,813	412	1,249	6,635
Winzes	.....	16	.....	.....	.....	.....	16
Powder workings	5	.....	1,101	193	.....	.....	1,299
Totals	3,948	2,869	5,036	2,227	702	2,580	17,362

* By R. B. King.

Classification by Mines

Mine	Current	Stope	Total	Per Cent of Total
	Ft.	Ft.	Ft.	
Jane	2,430	1,518	3,948	22.74
No. 8	2,320	549	2,869	16.52
Bluff	2,613	2,423	5,036	29.01
Fairview	121	2,106	2,227	12.83
Empress	412	290	702	4.04
Victoria	1,280	1,300	2,580	14.86
Totals	9,176	8,061	17,362	100.00

Ore is mined by caving, shrinkage, and cut-and-fill methods. The tonnage broken in the various sections of the mine was as follows: Bluff mine, 374,822 tons; Fairview mine, 90,404 tons; Victoria mine, 98,717 tons; No. 8 mine, 166,855 tons; Jane mine, 60,634 tons; Empress mine, 16,363 tons; development, 12,487 tons; a total of 820,282 tons (dry). No. 5 mine was inactive.

The consumption of explosives and blasting accessories was as follows: Powder, 16,952 cases; electric blasting-caps, 4,005; No. 6 blasting-caps, 307,465; safety fuse, 2,515,750 feet; primacord, 124,650 feet.

The accident-frequency rate for the mining department showed a slight improvement over the 1954 rate to 0.52 per thousand shifts worked. The severity rate was 31.44 shifts per thousand shifts worked. The total number of men on the mine payroll at the end of the year was 574. Total number of shifts worked in the mining department was 152,726.

The total number of full-time employees in all departments at Britannia at the year-end was 867. The accident-frequency rate for the whole operation was 0.34 per thousand shifts worked.

Production: Ore milled, 878,661 dry tons.

TEXADA ISLAND*

Iron

Prescott, Paxton, Lake (Texada Mines Ltd.)

(49° 124° N.W.) Registered office, 626 West Pender Street, Vancouver. A. D. Christensen, San Francisco, president; B. L. Alexander, general manager; J. Kenneth Halley, chief engineer; J. Yuill, mine superintendent; E. Fox, mill superintendent. The Prescott, Paxton, and Lake pits were operated during 1955. A new orebody, known as the Cameron-Yellow Kid, was explored by diamond drilling, and a pit was developed for mining by surface roads and benches. This orebody is on Crown-granted Lots 195 and 267.

Magnetite ore is mined in pits from levels which are established at 20-foot intervals. Waste rock is stripped where necessary and hauled to waste dumps. Vertical holes are drilled with Joy and Gardner-Denver rotary drills and wagon drills and are blasted electrically. The broken ore and waste is loaded by 2½-cubic-yard diesel-driven shovels into 15-ton trucks and transported to stockpiles or to the concentrator.

Stripping and preparation for mining required the removal of 212,314 cubic yards of waste material. In 1955, 421,936 tons of magnetite ore was treated in the concentrator and 264,759 tons of concentrate was produced. Approximately 100 men were employed.

* By R. B. King.

VANCOUVER ISLAND*

NIMPKISH LAKE (50° 126° S.W.)

Iron

92L-34

Iron Crown, Rhoda The Iron Crown (Lot 126) and Rhoda (Lot 919) Crown-granted mineral claims have been optioned by Nimpkish Iron Mines Ltd. A. H. Upton, president; J. M. Black, consulting geologist. The claims are on Nimpkish River about 5 miles from the south end of Nimpkish Lake. In 1954 seven holes were diamond drilled, totalling 1,350 feet. In 1955 exploration of the iron deposit was continued by surface work and diamond drilling on both lots. Six inclined and sixty-two vertical holes were drilled, totalling 7,050 feet.

QUATSINO (50° 127° S.W.)

Copper

92L-52

Yreka (Noranda Exploration Company, Limited)† British Columbia office, 1403 Royal Bank Building, Vancouver; mine office, Quatsino Sound. Capital: 20,000 shares, $1 par value. B. O. Brynelson, field engineer; S. G. Bruce, superintendent. The property consists of sixteen Crown-granted and eleven recorded claims on the west shore of Neroutsos Inlet about 2 miles south of Pender Point. Since 1953‡ exploration has been confined to testing the bed of mineralized skarn which overlies the site of No. 6 adit and extends over parts of the North South Fraction, Ready Cash, and Superior mineral claims.

Eleven vertical and steeply inclined diamond-drill holes were put down along an irregular line about 400 feet west of the portal of No. 6 adit and about 225 feet higher in elevation. The line was roughly parallel to the strike of the bedding and extended about 925 feet northeastward from a point on the Ready Cash claim in the narrow re-entrant formed by the North South Fraction and Superior claims. The results of the drilling indicated a copper-bearing sulphide body lying within the skarn bed but with an apparent attitude at divergence with that of the bedding. The approximate size and shape of the sulphide body is indicated in Figure 2.

No. 6 adit, an old working extending 80 feet west into the hill, was driven an additional 225 feet west. At this point it was driven an additional 95 feet at about south 60 degrees west. The adit passed through the sulphide zone between 230 and 300 feet from the portal. At the first intersection with the sulphide body a branch adit was driven 125 feet at about north 60 degrees west. These distances are as at September 26th, 1955. The adit is in skarn to the westerly contact of the sulphide zone. Along the southwesterly branch, west of the sulphide contact, the texture of the rock shows a change to a coarsely fragmental appearance with irregular patches of skarn separated by a green aphanitic rock which in thin section has a high proportion of calcite, partly replaced by silicates, and mixed with tuffaceous material. The change in texture is accompanied by an abrupt diminution of sulphides. The skarn is cut by several quartz-porphyry dykes and by two small diorite dykes. The quartz-porphyry dykes show a marked silicification along joint planes, particularly within the sulphide zone. Two faults were encountered; the first is 160 to 170 feet from the portal and dips about 85 degrees east, and the second crosses both branches of the adit about 330 feet from the portal, strikes northeastward, and dips about 70 degrees southeast. On both faults, at least the latest movements are post-mineral.

The sulphide zone consists of irregular zones of abundant to massive sulphides which diminish outwards through the skarn. The zone is cut by a quartz-feldspar porphyry dyke which appears to have been dragfolded against the northeasterly striking fault.

* By R. B. King, except as noted.
† By N. D. McKechnie and R. B. King.
‡ See *Minister of Mines, B.C.*, Ann. Rept., 1953, p. 167.

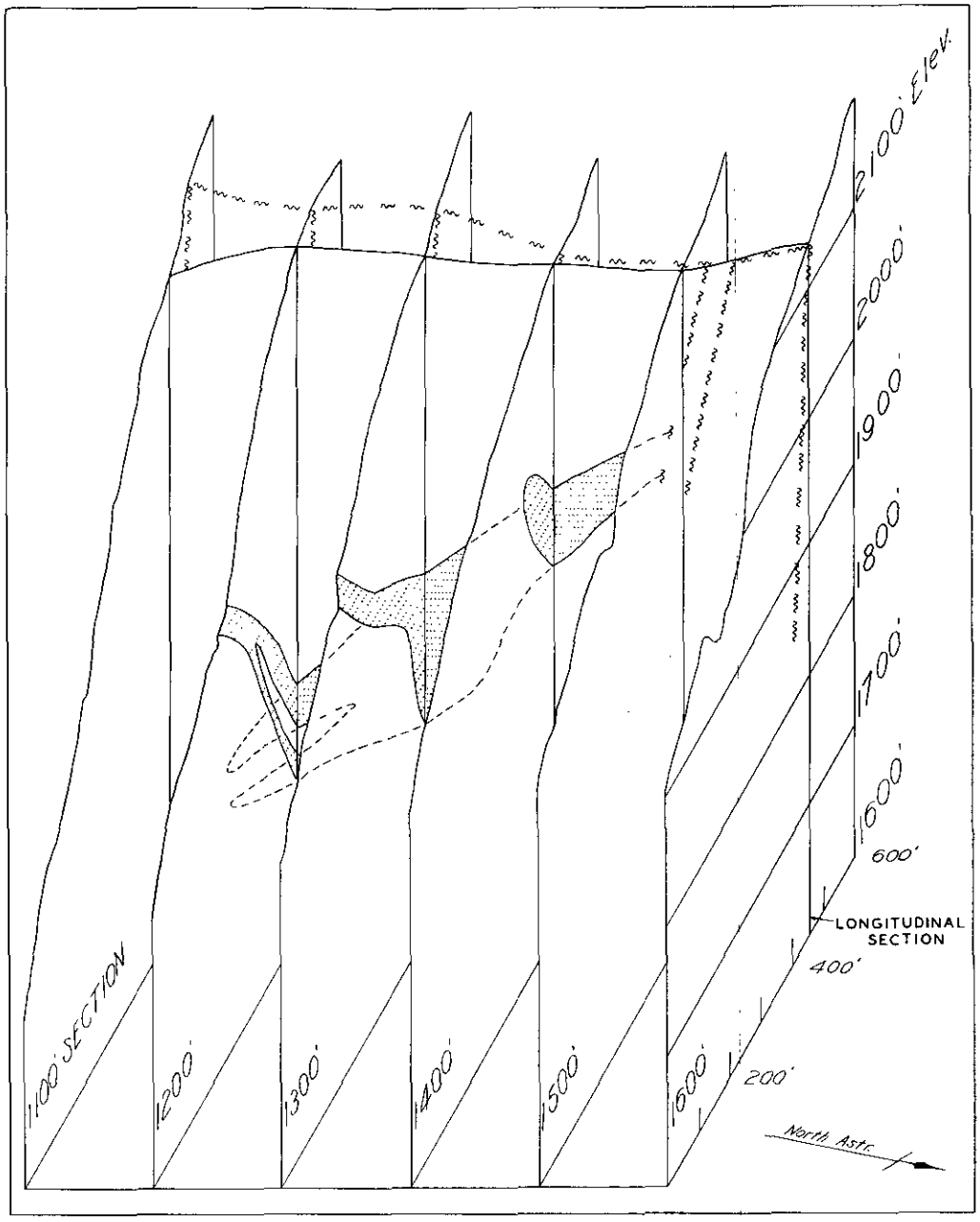


Figure 2. Block diagram of Yreka orebody.

Massive sulphide appears on the footwall side of the northeasterly fault. The attitude of the sulphide zone was not apparent in the working, owing partly to the small area exposed and partly to the presence of the fault.

The sulphide zone, as indicated by diamond drilling, appears to be lozenge-shaped, striking nearly due west at the upper, northerly, end and about north 65 degrees west at the lower, southerly, end. The dip steepens from 25 degrees south at the upper end to 40 degrees southwest at the lower, giving to the lozenge an over-all plunge to the southwest. The axis has in plan the shape of a wide-open " S."

The plunge of the sulphide lens nearly parallels the intersection between the planes of bedding and of weak shearing which strikes north 25 degrees east and dips 30 degrees southeast (*see* 1953 Annual Report). If shearing has localized the lens, it must have been weak, otherwise the porphyry dykes within the sulphide zone could be expected to be more intensely mineralized than they are. The southerly steepening of the plunge and the swing of the strike toward the northwest could be the result of the intersection of the plane of shearing with bedding which steepens toward the southwest. This suggests the possible presence of a dragfold; evidence that such a fold may exist is indicated on cross-sections, prepared by Noranda Exploration, by the traces of a skarn-tuff contact. To summarize, the suggestion is that the sulphide zone is localized within the skarn bed on a limb of a dragfold, along the intersection of the skarn with a weak shear which strikes about north 25 degrees east and dips 30 degrees southeast.

The road to the 1,000-foot elevation was reconstructed, and a slack-line tramway was built to connect the end of the road to the upper camp-site and to the 1750 and 1900 adits. Underground work on the No. 6 or 1900 adit consisted of 884 feet of drifting and crosscutting and 1,752 feet of diamond drilling. A lower adit at 1,750 feet elevation was started and 113 feet of crosscutting was done. The average number of men employed was twelve.

AMAI (DEEP) INLET (50° 127° S.E.)

Gold

Fil

This group of claims was leased by Frank Chidley and associates from J. J. Pugh. It is on the south side of Amai (Deep) Inlet in Kyuquot Sound and about 15 miles from Kyuquot. No. 2 adit at 1,600 feet elevation was rehabilitated, as was the trail leading to it. A limited amount of drifting was done. Hand-picked vein material was concentrated in a small gravity concentrator. No shipments were made.

92L-33

[Reference: *Minister of Mines, B.C.,* Ann. Rept., 1946, pp. 177–178.]

TAHSIS INLET (49° 126° N.W.)

Copper

Star of the West (Rosea Copper Mines Ltd.)

Hector C. Stone, president; Ralph Liebel, managing director; Fred Hemsworth, consulting engineer. Rosea Copper Mines Ltd. has optioned this group of eight claims. The claims are near Tahsis at the head of Tahsis Inlet. The workings, at 1,400 feet elevation, consist mainly of surface cuts. During 1955 a truck-road was partly completed to the workings from Tahsis, and open-cuts were cleaned out. Twenty-one drill-holes totalling 1,987 feet were drilled to test the horizontal and vertical extension of the showings. Four men were employed from May to November, 1955.

TOFINO INLET (49° 125° S.W.)

Foremost Copper (Taiga Mines Ltd.)

Frank C. Buckland, president. This company holds by record twenty-eight full-sized and fractional mineral claims on Tofino Creek. In 1955 a road was constructed from the mouth of Tofino Creek at the head of Deer Bay to the property, a distance of 2 miles. An adit was started at an elevation of about 650 feet and was driven 60 feet. Work stopped in September but was resumed at the end of the year.

UPPER QUINSAM LAKE (49° 125° N.W.)

Iron

Iron Hill (Argonaut Mine)

Company office, Campbell River. A. F. Geiger, general manager; E. DeMoss, mine superintendent. During 1955 The Argonaut Mining Co. Ltd. became Argonaut Mine Division, of Utah Co. of the Americas. Iron ore mined and milled at the property near

Upper Quinsam Lake is trucked 23 miles to the ore-loading dock at Campbell River. Ore is mined from an open pit in which levels are established at 15- and 30-foot intervals. Limestone waste is stripped where necessary and hauled to stockpiles.

Vertical holes are drilled by a Quarry Master or by a truck-mounted Joy heavy-duty drill. The holes are blasted electrically or with primacord. The broken ore is loaded by 2½-cubic-yard diesel-driven Northwest shovels into 22-ton-capacity Euclid trucks and transported to the concentrator or to stockpiles.

At the concentrator the ore is crushed in stages and magnetite is removed by magnetic separators after each crushing. Final recovery of the finer sizes is by a process of wet magnetic separation. The mill heads averaged 38.4 per cent total iron, the concentrate averaged 56.3 per cent, and the tails averaged 17.3 per cent total iron. The recovery of magnetic iron averaged more than 96 per cent. The mill operated from March 21st to December 21st, 1955.

The concentrate is hauled from the mine bunkers to the loading-docks by Mack and Kenworth diesel-driven tractors with modified trailer units. The average net load is 45.5 long tons.

In 1955, 225,270 cubic yards of waste was stripped. The concentrator treated 643,032 tons of ore and produced 368,288 tons of concentrate. Of this tonnage, 343,653 tons was shipped.

Cowichan Lake (48° 124° N.E.)

Copper

Blue Grouse (Cowichan Copper Co. Ltd.) Osgood G. MacDonald, president and general manager. The property is on the south side of Cowichan Lake, about 3 miles westerly from Honeymoon Bay. The underground workings are developed from an adit at 1,178 feet elevation and outline ore on the adit level and in a sublevel at about 1,260 feet elevation. Diamond drilling was done to test the downward extension of the ore. A lower adit at approximately 950 feet elevation was started and driven about 800 feet. A large sorting-shed and bin were constructed at the portal. The total development work done in the mine included: Raising, 1,170 feet; drifting, 920 feet; crosscutting, 1,880 feet; diamond drilling, 14,480 feet.

Development ore shipped to Tacoma during 1955 amounted to 3,749 tons, with an average copper content of 5.635 per cent. Twenty-seven men were employed.

Lorry This group of claims, held by record, is 3 miles south of Mesachie Lake P.O. Copper Ridge Silver Zinc Mines Limited leased the property, and underground work was carried on under the direction of W. S. Ellis. An adit at 2,500 feet elevation was driven to trace the downward extension of a quartz-chalcopyrite showing. The adit was driven in a northeasterly direction for 270 feet, and from it two short raises were driven totalling 80 feet in length. Ten diamond-drill holes were drilled, totalling 545 feet. During the operating period, September 15th to December 15th, seven men were employed.

Jordan River (48° 124° S.E.)

Gabbro (Noranda Exploration Company, Limited).—British Columbia office, 1403 Royal Bank Building, Vancouver. B. O. Brynelsen, field engineer; Morris Menzies, superintendent. The Gabbro property consists of twenty-three Crown-granted claims in the vicinity of Jordan River. During 1955 an intensive programme of surface exploration was carried out. A geological survey of the area and soil-testing, electro-magnetic, and magnetometer surveys were completed. Some surface trenching and approximately 2,000 feet of diamond drilling were done. Eight men were employed.

Placer

CONTENTS

ATLIN*

SPRUCE CREEK (59° 133° N.W.)

Noland Mines Limited

This underground operation is at the confluence of Dominion Creek with Spruce Creek and is 12 miles by road from Atlin. Five partners, A. V. Mattson, T. R. Mattson, D. S. Mattson, and R. F. Smith, with J. D. Ward as manager, continued to operate the mine under agreement with Noland Mines Limited until November 30th, when the agreement was terminated and the mine was closed down. The closure of the mine is reported to be due to failure to locate the extension of the original paystreak in the Tertiary channel after passing through a grey gravel cross-channel. The average number of men employed was eighteen. A total of 5,300 cubic yards of gravel was excavated in 1955. Gold recovery was 2,485 fine ounces.

* By A. R. C. James.

Enterprise Placers

Three partners, Clyde Day, Floyd Wilson, and John Acheson, continued to work ground leased from Spruce Creek Placers Limited on Spruce Creek about 1 mile downstream from the Noland mine. The gravel was mined with a Bucyrus-Erie 54D stripping shovel fitted with a 2-yard bucket. Below the flume, tailings were stacked with a Northwest Model 8 dragline with a 1½-yard bucket. A crew averaging six men was employed. A total of 78,404 cubic yards of gravel was sluiced. Gold recovery was 1,141.05 fine ounces.

Walter Sweet and Joe Baclund worked on two adjoining leases. A drain 4 feet square by 150 feet long was constructed, but there was no production.

Wright Creek (59° 133° N.E.)

Atlin Placers Limited

C. Dorflinger, manager. This company holds leases on Wright, Otter, Quartz, Union, and Casino Creeks. Work is at present confined to Wright and Otter Creeks; these creeks flow north into Surprise Lake. A series of Keystone drill test-holes was put down across the valley of Wright Creek about 2 miles south of Surprise Lake at an elevation of 4,000 feet; these holes found bedrock at approximately 135 feet in the centre of the valley and encouraging values near bedrock. An unsuccessful attempt was made at the end of 1954 to sink a shaft; this was abandoned at a depth of 36 feet; the ground around it was bulldozed out and a drain 800 feet long was built to carry away excess water. A new shaft was collared, and at the year-end this was reported to be over 100 feet deep. Showings in this shaft are reported to be encouraging. On Otter Creek four test-holes totalling 180 feet were drilled with a Keystone churn drill. There was no production in 1955.

McKee Creek (59° 133° S.W.)

Three partners, Joe and Luigi Piccolo and George Watt, hydraulicked about 30,000 cubic yards of gravel on McKee Creek. Gold recovery was 121.475 fine ounces.

Pine Creek (59° 133° N.E.)

Fred Graham, working alone on the Dot placer-mining lease, sluiced 1,100 cubic yards of gravel and recovered 2 ounces of gold.

Boulder Creek (59° 133° N.E.)

Three men worked on this creek by permission of Norman S. Fisher, and they recovered 6 ounces of gold during three months' sniping and prospecting.

Birch Creek (59° 133° N.E.)

Joe Yonaites worked his placer property alone.

Ruby Creek (59° 133° N.E.)

S. R. Craft worked his placer property alone. Rehabilitation work only was done.

Slate Creek (59° 133° S.E.)

Aubrey L. Stevens staked seven placer-mining leases in the early fall. Some testing was done.

OMINECA*

Manson Creek (55° 124° N.W.)

Art Hyndman worked his placer property alone, using a wheelbarrow and sluice-box.

Nat Porter worked alone on his placer property on Kildare Creek at its junction with Manson Creek.

* By J. W. Patterson.

GERMANSEN RIVER (55° 124° N.W.)

In the pit on G. H. Loper's hydraulic property on the north side of Plughat Creek about 1 mile from Germansen Landing, A. Pendle and a crew of three men lowered 220 feet of sluice-boxes about 4 feet in bedrock.

KWANIKA CREEK (55° 125° N.E.)

The Martin Mine Limited.—Registered office, 470 Granville Street, Vancouver; mine office, Manson Creek P.O. Winifred Tait, president. On its placer property on Kwanika Creek, this company drilled twelve holes totalling 240 feet. In addition, a small amount of exploratory work was done on placer properties on Twin and Twenty Mile Creeks.

CARIBOO*

HIXON CREEK (53° 122° S.W.)

Hixon Placers Inc. Company office, 2032 Third Avenue, Seattle, Wash.; mine office, Hixon P.O. H. W. Hargood, president; C. J. Norris, superintendent. The property is 3 miles east by road from Hixon on the Cariboo Highway. It is held under option from B. Briscoe, of Vancouver. A crew of four men hydraulicked 40,000 cubic yards of overburden from a former channel of Hixon Creek, and continued to prepare the right-of-way for a new pipe-line. This pipe-line will provide water to the placer workings at a pressure of 80 pounds per square inch. In addition, 1¼ miles of road was gravelled and two bridges were repaired.

WILLOW RIVER (53° 121° S.W.)

Mink Gulch.—N. Broswick hydraulicked 2,000 cubic yards of gravel on Mink Gulch, a tributary of Williams Creek.

Williams Creek.—Walter J. Smith and N. Scott sank a shaft 65 feet on their lease on Williams Creek at Devlin Point.

Provincial Exploration (1952) Ltd. Head office, 800 Hall Building, 789 West Pender Street, Vancouver; mine office, Barkerville. M. R. Benischke, president and manager. The raise started in 1954 at the end of the placer drift was extended to surface, a distance of 27 feet. From the raise at 20 feet and 46 feet above the drift elevation, two drifts were each driven 40 feet in gravels. Due to flooding, the bridge and flume across Williams Creek had to be replaced twice. An average of five men was employed.

Kumhila Exploration Co. Ltd. This company continued stripping operations on its placer property in Conklin Gulch about 1 mile southeast of Barkerville and one-half mile south of the Cariboo-Hudson road. Due mainly to the large amount of maintenance required on the dragline, stripping of the surface barren gravel was not completed by freeze-up. The average number of men employed was fifteen.

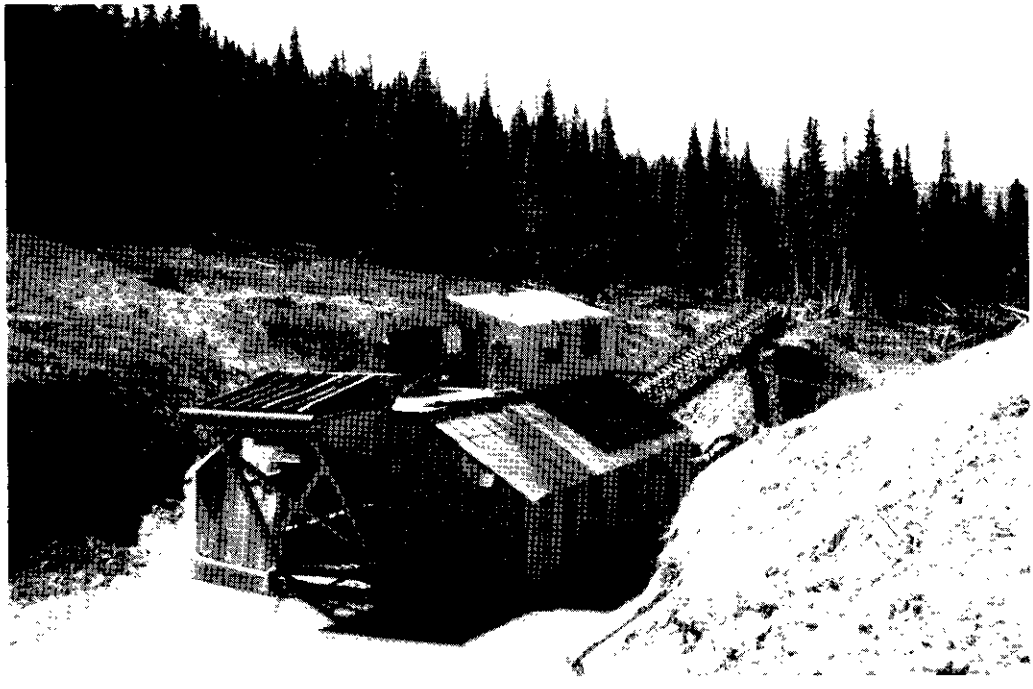
Placer Creek.—H. C. Christensen hydraulicked 800 cubic yards of gravel on Placer Creek at the south end of Jack of Clubs Lake.

Lowhee Creek.—R. E. MacDougall, in partnership with F. Jamieson and O. K. Nason, continued to hydraulic in the Lowhee pit. Two clean-ups were made. Four men were employed.

Dramont Mines, Inc.—Company office, 10335 Forty-eighth Avenue N.E., Seattle, Wash.; mine office, Wells. J. E. Ritchie, president. A. C. Johnston and one miner operated a monitor for a short period in the Dragon Creek pit.

* By J. W. Patterson.

Placer drilling in the Pundata Creek area, Barkerville.



Kumbila washing plant in Conklin Gulch, Barkerville.

Beaver Pass Gold Placers.—R. Macaulay and D. Bate hydraulicked 3,000 cubic yards of Gravel on Kee Khan Creek, a tributary of Tregillus Creek.

Hyde Creek.—C. L. MacColm hydraulicked on the Hyde Creek bench lease owned by O. R. Hougen, of Vancouver.

Pundata Creek Placers Ltd. This company has six placer leases along Pundata Creek and two along Archer Creek. These leases are reached by about 9 miles of road from the old Langford camp on the Beaver Pass road. The road is suitable only for 4-wheel-drive vehicles. Construction of this road was completed early in 1955.

The ground adjoining Pundata and Archer Creeks was sampled by several pits and drill-holes. Nine holes totalling 297 feet were churn-drilled to establish the depth of gold-bearing gravels. A bunk-house, a cook-house, and a tool-shed were built at Pundata Creek. An average of four men was employed.

Cooper Creek.—A. Frankish hydraulicked 1,000 cubic yards of gravel on Cooper Creek, a tributary of Sugar Creek.

Eight Mile Lake.—M. A. Andersen hydraulicked 1,700 cubic yords of gravel near Eight Mile Lake.

Nine Mile Creek.—C. W. Piener sluiced 100 cubic yards of gravel on Nine Mile Creek.

Two Bit Creek.—T. M. Dunlop and H. E. Reid sank a shaft 35 feet in slum to sample the rim gravels on their lease on Two Bit Creek.

Antler Creek (53° 121° S.E.)

Antler Mountain Gold Ltd.—A. W. Ludditt and three employees hydraulicked 10,000 cubic yards of gravel on Grouse and Quartz Creeks.

Canadian Creek.—John Holland hydraulicked 5,000 cubic yards of gravel on Canadian Creek.

A. McGuire sank a shaft 16 feet on his placer property on Canadian Creek.

Cunningham Creek. — D. Jorgenson worked alone on his two properties on Cunningham Creek.

Cottonwood River (53° 122° S.E.)

Gagen Creek.—G. S. Gagen sluiced 90 cubic yards of gravel on Gagen Creek.

Cottonwood River.—L. J. Martin removed overburden and made several tests of the gravel on his leases on the Cottonwood and Swift Rivers.

Lightning Creek (53° 121° S.W.)

Channel Placers, Inc.—In the Amador pit, D. H. Wells and seven men lowered the sluice-boxes and extended them 148 feet. About 40,000 cubic yards of gravel was hydraulicked. No gold was recovered as early freezing temperatures prevented a clean-up.

Last Chance Creek.—V. McFadden, three partners, and one employee mined 250 cubic yards of gravel from a drift at the bottom of a 90-foot shaft which was sunk in 1948 by the late A. Brown. It is located on Last Chance Creek a short distance from Stanley on the Quesnel–Barkerville road.

Quesnel River Area (52° 121° N.W.)

Morehead Creek.—R. C. C. Smith, of Victoria, operated a monitor on leases held by H. C. Weber, of Vancouver. The leases are on Morehead Creek, 2 miles above its junction with Quesnel River.

Likely.—A. Carbillet sluiced 2,500 cubic yards of gravel on his two bench leases near Likely.

Cedar Creek.—P. W. Ogden, of Lac la Hache, and two sons operated a monitor on the north bank of Cedar Creek half a mile above its junction with Quesnel Lake.

KEITHLEY CREEK (52° 121° N.E.)

Keithley Creek.—D. J. Sutherland and associates constructed a boomer dam and ground-sluiced about 7,000 cubic yards of overburden on their ground on Keithley Creek.

Cariboo Falls Placer.—G. A. Goldsmith and a crew of two men hydraulicked 10,000 cubic yards of gravel. In addition, the dam and flume, damaged by spring flooding, were repaired.

FRASER RIVER*

WATSON BAR CREEK (51° 122° S.E.)

E. H. Rosenau and five men, using a wire-rope-operated scraper and a D-4 bulldozer, moved 30,000 cubic yards of gravel on placer leases on the north fork of Watson Bar Creek. Some drilling with a 4-inch churn drill was done along half a mile of the north fork.

BRIDGE RIVER*

McKee and Yalakom Placer Leases.—(50° 122° N.E.) On leases between the British Columbia Electric Railway Company's diversion dam and Antoine Creek on Bridge River, Bert S. Thomas and a crew of six men moved and washed 10,000 cubic yards of gravel with a small shovel dredge. In addition, the bench and river gravels were extensively sampled by trenches and test-pits.

Hurley River.—(50° 122° N.W.) W. Haylmore and four men sluiced 160 cubic yards of gravel on Hurley River near Gold Bridge.

SPILLIMACHEEN†

Bugaboo Placers (50° 116° N.W.) St. Eugene Mining Corporation Limited (head office, 2810, 25 King Street West, Toronto) holds Special Placer-mining Lease No. 163 at the head of Bugaboo Creek, about 25 miles by road from Spillimacheen. The lease extends along the creek for 3 miles covering occurrences of post-Glacial outwash gravels containing uranianpyrochlore derived from erosion of the Bugaboo granite stocks.

In the summer of 1955 the company shipped a 5-ton sample of gravel for concentrating tests, built a concentrator, and made a pyrochlore concentrate for metallurgical tests. In addition, the gravel was tested by thirty-three churn-drill holes totalling 976 feet and ranging from 17 to 60 feet deep.

The drilling indicated a depth of about 17 feet of outwash gravel across a width of 550 feet and a length of 3,850 feet. The company estimates that about 1⅓ million cubic yards of gravel are indicated in this block. In addition, it is estimated that there are about 3 million cubic yards of gravel not proven by drilling.

* By J. W. Patterson.
† By S. S. Holland.

Structural Materials and Industrial Minerals

CONTENTS

ASBESTOS

Cassiar Asbestos Corporation Limited*

Mount McDame (59° 129° S.W.) Head office, 85 Richmond Street West, Toronto; British Columbia office, Royal Bank Building, Vancouver; mine office, Cassiar. J. D. Christian, general manager; N. F. Murray, general superintendent; C. Gordon Little, plant superintendent; J. Berry, mine superintendent; A. C. Beguin, mill superintendent. The property straddles a 6,300-foot spur of the main ridge 2.2 miles northwest of Mount McDame, and the mill and camp are located immediately to the south of the property in the valley of Troutline Creek at an elevation of 3,540 feet. A gravelled road approximately 80 miles long connects the mine with the Alaska Highway near Watson Lake.

* By A. R. C. James.

The orebody, containing chrysotile asbestos, is an elongated lens-shaped body of serpentine bounded by metamorphosed sedimentary rocks on the west and by interlayered metamorphosed sediments and volcanic flows on the east. The series strikes northward and dips steeply to the east. The main serpentine outcrop extends across a high ridge for a length of 2,000 feet, the width ranging from 50 to 450 feet. A second outcrop of serpentine occurs in the floor of a cirque 1,200 feet north of the main showing. The intervening steep slopes are covered by asbestos fluff and serpentine talus, but the two orebodies are on strike and appear to be part of a single mass.

The asbestos is mined entirely by open-cut methods, from a series of 15-foot benches. Due to the frozen ground and the high fibre content of the ore, it has proved impractical to drill down-holes in the normal manner. Instead, the face is drilled off by a series of holes, usually four in number, from flat lifters to 45-degree breast-holes. These rows are drilled from 4 to 5 feet apart along the face, the length of holes being from 8 to 10 feet for the top holes and 15 feet for the lifters. Fifty per cent Dynamex and 20 per cent stumping-powder are mixed in primary blasting and 40 per cent forcite is used for secondary blasting. All detonation is by primacord to keep foreign material out of the ore. Drilling is done by TM400A Joy wagon drills. The ore is handled by Eimco 104 and 105 loaders, International bulldozers, and a ¾-cubic-yard Northwest shovel. So far most of the ore from the workings on top of the ridge has been transported down a 37-degree 2,700-foot chute to a central truck-loading point. This chute, however, will shortly be replaced by the new aerial tram-line, which was 95 per cent completed in 1955. In 1955, mining on the "hill" (at the top of the ridge) commenced on June 24th and ended on November 4th, and mining in the cirque commenced on May 31st and ended on October 9th. Ore from the cirque was trucked to the mill. Production of ore amounted to 192,889 tons from the "hill" and 29,987 tons from the cirque, making a total of 222,876 tons.

The present mill rate is 700 tons a day, and the mill operates the year round. In general the ore circuit in the mill is as follows: Mine ore is passed through a grizzly feeding the jaw crusher, then passed over a Dillon screen with the oversize going to a 4-foot cone crusher. The ore is then passed through the drier units and carried by conveyors to the dry-rock storage shed. The mill-feed from the dry-rock storage is passed over a Dillon screen, then over a series of gyratory screens with a 3-foot cone crusher in the primary screen circuit. Milling is by a dry process, the fibre being freed from the rock by impact method, aspirated from the screens by means of exhaust fans, and collected and cleaned by cyclone collectors. The discharge of reject fines from the screens is by gravity through a number of ducts to conveyors which discharge to tailing storage. The operating staff in the mill totals about fifty-six persons. A total of 172,395 tons of ore was milled in 1955. Production of fibre was as follows:—

Grade	Tons
Crude No. 1	152
AAA	317
AC	954
3K	7,059
4K	8,710
Total fibre produced	17,192

The crew employed on all operations ranged from 208 in January to 545 in August. The latter figure included a considerable number of construction workers, and when construction work is completed it is expected the normal operating crew will be about 200. This figure includes salaried staff.

The most important item of new construction is the aerial tram-line, which is 95 per cent completed and is expected to go into operation early in 1956. This is a Breco

continuous powered aerial tram almost 3 miles long, designed to carry ore at 100 tons per hour from the mine at 5,800 feet elevation to the mill at 3,540 feet elevation. The entire structure is of steel with steel towers incorporating three stations: No. 1 station at the orebody at the top of the tramway, No. 2 station at an intermediate point half-way up, and No. 3 station with dumping-yards at the lower end of the terminal. Passenger-carrying conveyances are provided for carrying men to and from the mine. The motive power is by electric motor and reduction gears installed at the upper stations. It is expected that the tram-line will solve the difficult transportation problem between the mine workings and the mill, and as a result will extend the length of the mining season.

The following additional construction was completed in 1955: Twelve Panabode dwellings (five 2-bedroom and seven 3-bedroom), twelve temporary 22-man plywood bunk-houses, one Perma-steel compressor-house 20 by 36 feet at the mine, one Perma-steel power-house 20 by 28 feet at the mine, and 2,000 feet of new streets in townsite.

The following construction was partly completed: One Panabode 2-room school, one Panabode 2-apartment teachers' residence, and one Panabode Protestant church.

In addition, eight employee-built homes were completed under a company-sponsored assistance plan.

The many Panabode buildings harmonize well with the natural setting of the mountain valley, and in spite of the remote location the company is undoubtedly endeavouring to provide an attractive camp at Cassiar. Already it begins to have the atmosphere of a settled community.

BARITE

Mountain Minerals Limited*

Brisco (50° 116° N.E.). Company office, Meech Building, P.O. Box 273, Lethbridge, Alta. R. A. Thrall, managing director; Wm. MacPherson, superintendent. Capital: 2,000 shares, $100 par value. This company operates a barite quarry on the west side of the Windermere Valley, 5 miles by road from Brisco.

During a 9-month period of operation a crew of four men quarried and shipped 11,063 tons of barite to the company processing plant at Lethbridge.

A new quarry face was started on the surface outcrop below the floor of the present quarry.

BUILDING-STONE

ANDESITE

Haddington Island Quarry†

(50° 127° N.E.) Company office, J. A. and C. H. McDonald Limited, 1571 Main Street, Vancouver; quarry, Haddington Island. Andesite is quarried to obtain dimension stone for building purposes. The stone is drilled to size and broken by blasting with black powder and then moved by derricks to scows, by which is it transported to Vancouver. Seven men were employed.

GRANITE

Vancouver Granite Co. Limited†

Nelson Island (49° 124° N.E.). Company office, 744 West Hastings Street, Vancouver; quarry, Nelson Island. Dimension stone for building purposes and monuments, jetty-rock, and rubble are mined at this quarry. The rock is drilled to size and then wedged or blasted for removal. Three 20-ton-capacity wooden derricks are used to move stone from the quarry face to scows. The blocks are shipped to Vancouver for cutting and finishing. Approximately 1,500 tons of stone was produced from April 5th to October 21st, 1955. The average number of men employed was eight.

* By J. E. Merrett.
† By R. B. King.

Indian River Quarries Limited*

Granite Falls (49° 122° S.W.). Company office, 1255 West Pender Street, Vancouver; quarry office, Granite Falls. John M. Carsnew, superintendent. Jetty-rock, riprap, and rubble are produced by this company. Mining of the high quarry face is being done by coyote-hole methods. Broken rock is loaded by a 1-cubic-yard diesel-driven shovel into wire-rope nets of 10-ton capacity. The net serves as a coarse screen. These are transported by a steam-driven derrick and loaded directly onto scows. Twelve men were employed.

Gilley Bros. Limited*

Pitt River (49° 122° S.W.). Company office, 902 Columbia Street, New Westminster; quarry office, Pitt River. J. H. Gilley, general manager; Francis J. MacDonald, superintendent. Quartz diorite for jetties. dykes, and concrete aggregate is produced by this company. Rock is broken from a quarry face, which is nearly 100 feet in height, mainly by the coyote-hole method of mining. Broken rock is loaded by a 2-cubic-yard diesel-driven shovel into 12-cubic-yard-capacity trucks. The crushing plant consists of a 42- by 60-inch jaw crusher and a 6-inch grizzly with a conveyor-belt for loading scows. Undersize material (—6-inch) is stockpiled. Twenty-seven men were employed.

Little Mountain Quarry*

Chilliwack (49° 121° S.W.). This pit is on the north slope of Mount Shannon and about 1 mile northeast of Chilliwack. It is operated intermittently by the Fraser Valley Dyking Commission to obtain rock to repair dykes along the Fraser River. Rock is broken by coyote-hole methods and is loaded by shovel on to trucks and transported to the dykes. *In 1955 approximately 17,000 tons of rock was broken.*

Valley Granite Products Ltd.*

Cheam View (49° 121° S.W.). Company office, 410 Mayfair Avenue, Chilliwack; plant, Bridal Falls. The quarry and crushing plant are 11 miles east of Rosedale. The quarry is mined in two benches, each about 15 feet high. Vertical blast-holes are drilled with jackhammers. Broken rock is piled under temporary shelters and dried with open-flame kerosene burners. The dried rock is loaded into wheelbarrows and transported to the crushing and screening plant. The plant produces turkey, chicken, and bird grit, stucco-dash, sand-blasting material, filler for asphalt roofing, and sanding material for automotive vehicles. Fourteen men were employed.

Kootenay Granite Products Limited†

Sirdar (49° 116° S.W.). Company office, 603 Eighth Avenue West, Calgary, Alta.; quarry office, Sirdar. L. B. Hausler, manager. This company operates a quarry and processing plant on the Creston–Kootenay Bay Highway 2 miles north of Sirdar. At this newly established operation, granite is mined underground by conventional methods. It is hand-loaded on to a chain-conveyor feeding to a Traylor 18- by 24-inch jaw crusher. The discharge feeds by conveyor-belt to a set of 12- by 36-inch Allis-Chalmers rolls. The product from the rolls is carried by conveyor-belt to the bin-house and discharged on to a 6-deck 4- by 8-foot Niagara screen. The screened products discharge into seven 19-ton-capacity steel hoppers which have bagging facilities attached to their discharge outlets. The plant is designed for a production of 50 tons per hour and produces poultry grit, stucco-dash, sand-blasting material, filler for asphalt roofing, and sanding material for automotive vehicles.

A crusher-house, bin-house, and warehouse were built to house the equipment and for storage space.

The underground workings are ventilated by a 3,000-cubic-feet-per-minute blower. Dust-exhausting equipment is being installed at the crushers and bagging vents.

Power is obtained from the West Kootenay Power and Light Company. Compressed air is produced by a 250-cubic-feet-per-minute Fuller rotary compressor.

* By R. B. King.
† By J. E. Merrett.

The plant operated from May 15th to October 15th. During this period 1,500 tons of granite was mined and 918 tons was processed by a crew of five men.

SLATE

McNab Creek Slate Quarry*

Howe Sound (49° 123° N.E.). Head office, Richmix Clays Limited, 2890 East Twelfth Avenue, Vancouver; quarry, McNab Creek. G. W. Richmond, manager. Slate is mined by drilling and blasting horizontal holes in 30-foot face. Broken slate is hand-loaded into 1-ton cars and dumped directly into scows. Slate is used for flag-stones, roofing granules, and filler. During 1955, 1,731 tons of slate was mined.

CLAY AND SHALE

Bear Creek Brick Company*

Surrey (49° 122° S.W.). Head office, Victoria Tile & Brick Supply Co. Ltd., Vancouver; plant, Archibald Road, Surrey Municipality. James McBeth, plant manager. Surface clay is mined from a small pit adjacent to the plant. Cars are hand-loaded and hauled by winch to the plant. The bricks are formed by a wet-press process and placed in hacks to be weather-dried. Wood-fired scove kilns are built for burning bricks.

Port Haney Brick Company Limited*

Haney (49° 122° S.W.). Company office, 846 Howe Street, Vancouver; plant, Haney. E. G. Baynes, president; J. Hadgkiss, plant manager. This company operates a large plant producing structural tile, drail-tile, facebrick, common brick, and Roman brick. A plastic clay is dug by a ½-cubic-yard gasoline-driven shovel from pit faces about 20 feet high and is transported by truck to a covered air-drying area. The clay is dried in a rotary wood-fired kiln and then conveyed to a dry pan for grinding. Brick and tile are formed by the stiff-mud extrusion process and dried in a controlled-temperature drying-room. The clay products are burned in down-draught beehive kilns. During 1955, 12,941 tons of clay products were produced. Sixty men were employed.

Mainland Clay Products Limited*

Barnet (49° 122° S.W.). Head office, 8699 Angus Drive, Vancouver; plant, Barnet. D. Pitkethly, general manager. Surface clay is mined intermittently from a pit adjacent to the plant and is transported to a covered air-drying area. Some fireclay is trucked from Kilgard. Dry-pressed common brick, Roman brick, and firebrick are burned in rectangular coal-fired kilns.

Clayburn Company Limited*

(49° 122° S.E.) Head office, 302 Credit Foncier Building, Vancouver; plants, Kilgard and Abbotsford. R. M. Hungerford, managing director; P. S. Jagger, plant manager. Two plants are operated by this company—one, in which sewer-pipe and flue-lining are manufactured, is at Kilgard; the other, in which facebrick, refractories, special refractory shapes, and refractory specialties are made, is at Abbotsford.

In the Kilgard plant, sewer-pipe and flue-lining are extruded through dies, pre-dried, and burned in oil-fired down-draught beehive kilns. In the Abbotsford plant, bricks are dry-pressed or extruded through a drier. From the drier the bricks pass into an oil-fired continuous-tunnel kiln 300 feet long. Some of the clay used in the manufacture of refractories is precalcined in a 150-foot oil-fired rotary kiln.

Clay is mined from shale members of the Huntingdon formation in Sumas mountain. Three underground mines and a quarry produce shale for the plant. Room-and-pillar method of mining is used in the underground mines and extensive use is made of roof-bolting for ground support. Holes are drilled with tungsten-carbide-tipped augers which are driven by air-operated drills. Black powder is used in blasting down the shale.

* By R. B. King.

Scrapers, operated by 30-horsepower electrically driven hoists, are used to move broken shale directly to the mine cars.

Clay mined during 1955 totalled 59,560 tons, of which 40,957 tons was used in production of facebrick and firebrick and 18,603 tons was used for sewer-pipe and flue-lining. Twenty men were employed in the mines.

Richmix Clays Limited*

Kilgard (49° 122° S.E.). Office and plant, 2890 East Twelfth Avenue, Vancouver; quarry, Kilgard. G. W. Richmond, manager. Stripping and mining of fireclay are being carried on intermittently at this property. Clay is drilled and blasted, then loaded by a diesel-driven shovel on to trucks and transported to markets. Low-grade clay is stockpiled. During 1955, 7,477 tons of fireclay was shipped. One man was employed.

Fairey & Company Limited.†—Vancouver (49° 123° S.E.). L. T. Fairey, manager. *This company produced a variety of fireclay blocks and shapes and high-temperature cements.* Local and imported raw materials were used.

Baker Brick & Tile Company Limited*

Victoria (48° 123° S.E.). Office and plant, Victoria. J. V. Johnson and D. E. Smith, joint managers. Surface clay is mined by gas shovel and transported by truck to storage bins. Drain-tile, hollow-ware, Roman brick, and flower-pots are formed by soft-mud extrusion process and are dried with waste heat from kilns. Down-draught wood-fired kilns are used to burn the ware. During 1955, 3,600 tons of clay was mined. Eighteen men were employed.

GYPSUM

Gypsum Lime and Alabastine, Canada, Limited‡

Falkland (50° 119° N.W.). Head office, Paris, Ont.; British Columbia office, 1272 West Pender Street, Vancouver. W. M. Tulley, British Columbia manager; Robert Thomson, quarry superintendent. This company quarries gypsum at Falkland, 40 miles east of Kamloops, on the Kamloops–Vernon Highway and on the Vernon branch of the Canadian National Railway. Gypsum is produced from open quarries 500 to 1,200 feet above the railway on the steep hillside north of the village. The production of gypsum averaged approximately 350 tons daily, which was quarried from the Nos. 2, 7, 10, and 11 quarries and was shipped to the company processing plants at Port Mann and Calgary. Work was continuous throughout the year, and a crew of twenty-eight men was employed.

Columbia Gypsum Co. Ltd.§

Windermere (50° 115° S.W.). Company office, 576 West First Avenue, Vancouver; *quarry office, Athalmer.* A. Portman, superintendent. This company acquired the gypsum property from Columbia Gypsum Products, Inc., early in 1955. During an 8-month period of operation a crew of thirteen men quarried and crushed 62,080 tons of *gypsum rock at the deposit on Windermere Creek 10 miles from Lake Windermere* station at Athalmer on the Kootenay Central Railway.

Quarrying is done by drilling successive rows of vertical churn-drill holes, 6 inches in diameter and 158 feet deep, spaced 18 to 20 feet apart, across the quarry face, which is 200 feet wide and 150 feet high. The bottoms of the holes are loaded with priming charges of 40 per cent forcite, and the remaining portions of the holes are loaded with Dynamex spaced by rock-drill cuttings. Millisecond delay blasting-caps are used to detonate blasts. The broken rock is loaded by a diesel shovel on to trucks and delivered to the crushing plant at the mouth of the quarry. Here the rock is crushed, screened, and stockpiled for transport to the railway.

* By R. B. King.
† By J. W. McCammon.
‡ By E. R. Hughes.
§ By J. E. Merrett.

The following equipment was obtained for the quarrying and hauling operations: A 1-cubic-yard Insley shovel; a Mack side-dumping diesel truck and trailer having a combined capacity of 22 cubic yards; and a 315-cubic-feet-per-minute portable air compressor. A 200-foot-long loading-ramp and a winch-house were constructed at the railhead to permit dumping directly into the railway cars.

The major portion of the 50,817 tons shipped was sent to the Canada Cement Company, Exshaw, Alta. Shipments were made also to the B.C. Cement Company, Vancouver; Ideal Cement Company, Irvin, Wash.; Lehigh Portland Cement Company, Metaline Falls, Wash; and Columbia Gypsum Company, Austin, Wash.

LIMESTONE AND CEMENT

Barr Limestone Quarry*

Shames (54° 128° S.W.). Office, 247 East First Avenue, Prince Rupert. Allan E. Barr, operator. This quarry is at an elevation of 800 feet, one-third of a mile east of Shames River and 1 mile north of Provincial Highway No. 16. A road 1½ miles long from the quarry to the loading-ramp at the Canadian National Railway track crosses Highway No. 16 at a point 17 miles west of Terrace.

A detailed description of the quarry was given in the 1954 Annual Report. In 1955 the quarry was operated continuously from January 19th to November 30th, a crew averaging eight men being employed. Production totalled 7,914 tons of limestone, all of which was sold to the Columbia Cellulose Company at Port Edward.

A new sorting plant was built this year, together with 275 feet of chute and 175 feet of branch chute. This facilitates sorting, loading of stone into trucks, and the disposal of waste rock and fines down the slope beyond the access road.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1954, pp. 180–181.]

The Consolidated Mining and Smelting Company of Canada, Limited†

Fife (49° 118° S.E.). Head office, Trail; quarry, Fife. G. S. Ogilvie, property superintendent; Oscar Tedesco, quarry foreman. The limestone quarried here is shipped to Trail for use as flux in the smelter. The quarry is alongside the Kettle Valley branch of the Canadian Pacific Railway half a mile north of Fife. The limestone is blasted from the quarry face and is mechanically loaded into trucks and hauled to a loading-bin at the railway. Operations were continuous throughout the year. The quarry was operated on a 2-shift basis and fifteen men were employed. The limestone shipped in 1955 amounted to 74,620 tons.

Purex Lime Co. Ltd.‡

Nelway (49° 117° S.E.). Company office, Box 168, Salmo. O. Bakka, president. Capital: 200,000 shares, $1 par value. This company was formed in 1953 to develop a limestone deposit on the north half of Lot 9056 near Nelway. The camp, consisting of three buildings, is alongside the Nelson–Nelway Highway about 1½ miles northeast of Nelway. The deposit is a hill situated on Lots 9056 and 9280 and rising about 450 feet above the valley floor (elevation, 2,550 feet). The hill rises precipitously on its east side but slopes more gently on the west. Access to the summit is by a steep road which circles the hill on the north side. In 1955 work was restricted to the drilling in January of two diamond-drill holes. Hole No. 1 was drilled 488 feet from the top west side of the hill in an easterly direction at minus 40 degrees. Hole No. 2 was drilled 600 feet horizontally from the valley floor on the east side of the hill in a westerly direction. It is estimated the bottoms of the holes are on the same horizon about 200 feet apart.

The diamond-drill core was logged and typical samples taken of changes in appearance. The analyses of these samples is shown below. It will be noted that hole No. 1, or the west hole, bottomed in dolomite. Dolomite outcrops on the north end of the hill

* By A. R. C. James.
† By E. R. Hughes.
‡ By J. W. Peck and J. T. Fyles.

forming a band in limestone that thickens from a few feet at the northeast corner of the hill to a few hundred feet a quarter of a mile to the west. The bedding dips gently westward and southward, and it may be inferred that much of the limestone on top of the hill is underlain by dolomite. This is further borne out by the fact that a vertical hole, drilled in 1952 by The Granby Consolidated Mining Smelting and Power Company Limited to the southwest of Purex Lime property, encountered dolomite for approximately the first half of its 1,295-foot depth. Both Purex Lime holes contained good bands of limestone with low dolomite content. Some bands were high in insoluble matter, but this was presumably clay material as visual observation showed argillaceous rather than siliceous limestone. Pyrite mineralization was negligible. Further drilling would be required before the extent of the good bands of limestone can be determined. Selective mining would probably be necessary to produce a satisfactory product for smelter use or for burning for quicklime.

Hole No. 1

No. of Section	Section Length by Appearance	Description of Section	Sample Taken at—	Analysis of Sample: Acid Soluble Calcium Oxide	Acid Soluble Magnesium Oxide	Acid Insoluble Matter
	Ft.		Ft.	Per Cent	Per Cent	Per Cent
1	0– 38	White granular limestone	35	49.2	1.2	8.6
2	39– 80	Pale-green greasy argillaceous limestone, some talc	58	28.2	2.8	38.2
3	81–115	Similar to No. 2 but harder and less greasy	106	47.1	1.1	12.2
4	116–139	Grey limestone	139	46.1	1.6	12.8
5	140–224	Dark grey limestone	207	34.2	2.8	28.7
6	225–320	White granular limestone	270	55.6	0.4	0.6
7	321–390	Dark-grey limestone	354	52.6	0.9	4.1
8	391–437	Grey limestone				
9	438–488	Dolomite	448	31.0	21.4	0.8

Hole No. 2

	Ft.		Ft.	Per Cent	Per Cent	Per Cent
1	0– 50	Overburden and some white granular limestone				
2	51–152	Dark-grey granular limestone, some bands of white	85	50.6	2.8	3.5
3	153–300	Dark-grey limy argillite slightly greasy	190	14.7	2.8	56.3
			275	10.3	3.0	60.1
4	301–405	Dark-grey limestone similar to No. 2	352	47.2	4.8	4.1
5	406–469	Argillaceous limestone similar to No. 3	455	30.1	2.5	35.9
6	470–600	Interbedded argillite, limestone, and quartz	490	6.8	1.5	79.5
			586	20.2	3.3	50.4

Conversion factors for above are: 1 per cent calcium oxide equivalent to 1.785 per cent calcium carbonate (limestone is 56.0 per cent lime and 44.0 per cent carbon dioxide); 1 per cent magnesium oxide equivalent to 2.092 per cent magnesium carbonate.

Agassiz Lime Quarry* Agassiz (49° 121° S.W.). *Hiram Cutler, owner.* Agricultural limestone is produced from this quarry. Limestone is blasted from low quarry faces and is transported by a ¼-cubic-yard loader from the quarry to the crushing plant. The quarry and plant operated intermittently during 1955. One man was employed.

Fraser Valley Lime Supplies.* — Popkum (49° 121° S.W.). Arthur Isaacs, superintendent. Limestone is blasted from the quarry face, hand-loaded into trucks, and transported to a crushing plant. Industrial and agricultural limestone are produced. During 1955, 3,936 tons of crushed limestone was produced. Six men were employed.

Beale Quarries Limited* Vananda (49° 124° N.W.). Head office, 744 West Hastings Street, Vancouver; quarry office, Vananda. W. D. Webster, superintendent. Limestone is quarried to produce pulp rock for paper-mills, agricultural lime, crushed limestone, and stucco prod-

* By R. B. King.

ucts. The quarry is being worked on levels with faces about 15 feet high. Wagon drills are used to drill holes for blasting. Broken rock is loaded with two ¾-cubic-yard diesel-driven shovels and transported by truck to a crushing plant. Approximately 140,000 tons of limestone was mined during 1955. Of this, 80,000 tons was shipped as pulp rock, 46,000 tons was shipped as crushed limestone, 3,500 tons was shipped as agricultural limestone, and 4,500 tons as stucco products. The remaining 6,000 tons was stockpiled. Forty men were employed in the quarry and plants.

W. S. Beale (1955) Ltd.*

Vananda (49° 124° N.W.). Office and quarry, Vananda. Stanley Beale, manager. During 1955 this company succeeded W. S. Beale Limited. Limestone is quarried to produce pulp rock for paper-mills and smelter flux. The quarry is worked with one face nearly 80 feet high and sloping at 45 degrees to the horizontal. Air-leg types of drills are used to drill horizontal holes, parallel to the face, for blasting. Broken rock is loaded with a ½-cubic-yard diesel-driven shovel and transported by trucks to a ramp, where it is dumped on to a heavy-duty vibrating screen which separates pulp rock from finer material. The pulp rock is loaded on to scows; spalls are stockpiled. Seven men were employed. During 1955, 50,000 tons of limestone was produced.

McKay Quarry*

Vananda (49° 124° N.W.). Don McKay, owner. This quarry is on the main road about 2 miles south of Vananda. White limestone is mined and sold for stucco-dash and whiting. Selective mining of irregular white masses of limestone in grey limestone is necessary. During 1955 approximately 6,000 tons of limestone was quarried.

Gypsum Lime and Alabastine, Canada, Limited (Pacific Lime Division)*

Blubber Bay (49° 124° N.W.). Head office, Paris, Ont.; British Columbia office, 1105 West Pender Street, Vancouver; quarry, Blubber Bay; plants, Blubber Bay and Vancouver. On April 30th, 1955, the Pacific Lime Company Limited was purchased by the Gypsum Lime and Alabastine, Canada, Limited, and the operation became known as the Pacific Lime Division. F. W. Harvie, general manager; E. O. Magnusson, plant manager. In November, John H. Robinson was appointed plant manager.

Limestone is quarried nearly 2 miles from the Blubber Bay plant, along the Blubber Bay–Vananda road. The quarry is worked in levels with faces nearly 25 feet high. Wagon drills and Gardner-Denver rotary drills are used to drill horizontal and vertical blast-holes. Broken rock is loaded by a diesel-driven shovel on to 18-cubic-yard-capacity trucks and hauled to the Blubber Bay plant. The limestone is crushed and sized and stockpiled. Part of this is burned in kilns at Blubber Bay and part is loaded on scows and brought to the Vancouver plant for treatment. Limestone which is under size for lime-burning is shipped to pulp-mills and cement plants and also used for smelter flux. Fifty-five men were employed.

British Columbia Cement Company Limited*

Head office, 500 Fort Street, Victoria. N. A. Tomlin, managing director; R. E. Haskins, general superintendent. Quarries are operated at Bamberton (48° 123° N.W.) and Cobble Hill (48° 123° N.W.) on Vancouver Island and at Blubber Bay (49° 124° N.W.) on Texada Island to produce limestone and greenstone, used in manufacturing cement.

At Blubber Bay the quarry faces range from 70 to 85 feet in height. A Bucyrus-Erie churn drill is used to drill vertical blast-holes. These holes are spaced at 20-foot centres, have 25 feet of burden, and are drilled 9 feet below the grade line of the quarry floor. Broken rock is loaded by diesel-driven shovels into 15-ton-capacity Euclid trucks and is transported to the crushing plant. Rock from the crushing plant is stockpiled,

* By R. B. King.

and when required is loaded by conveyor-belt to scows for shipment to the cement plant at Bamberton. Seventeen men were employed.

At Cobble Hill the quarry face is generally about 70 feet high. A Bucyrus-Erie 27 churn drill is used to drill vertical holes. On lower faces, air-leg types of drills are used to drill flat blast-holes. Broken rock is loaded by a diesel-driven shovel into 15-ton trucks and is transported nearly 13 miles to the Bamberton plant. Loading and hauling of the rock is done by contract. Seven men were employed at this quarry.

At Bamberton, rock is mined by drilling both vertical and horizontal holes with wagon drills. Broken rock is loaded by electric and diesel-driven shovels and transported by trucks to the crushing plant. Twenty-nine men were employed.

During 1955, 87,304 tons of limestone was quarried at Blubber Bay, 237,542 tons of limestone was quarried at Cobble Hill, and 171,890 tons was quarried at Bamberton.

Alaska Pine & Cellulose Limited*

Jeune Landing (50° 127° S.W.). Head office, 1111 West Georgia Street, Vancouver. Nils Erickson, quarry superintendent. This quarry is on the east shore of Neroutsos Inlet about 1¼ miles north of Jeune Landing. Limestone is quarried for pulp rock for the Port Alice pulp plant. The quarry is worked by advancing a low face and using air-leg types of drills for drilling blast-holes. Broken rock is loaded with a ½-cubic-yard diesel-driven shovel and transported by truck to a ramp, where it is dumped over a scalping grizzly. The coarse material is loaded on scows and the fine material is stockpiled. During 1955, 16,000 tons of limestone was produced. Three men were employed.

Cobble Hill Lime Products (Bonner's Quarry).*—Cobble Hill (48° 123° N.W.). Norman Bonner, owner and operator. Rock is blasted from a 40-foot face, loaded by hand, and transported to a small crushing plant. The crushed limestone is used mainly for agricultural purposes. The plant produces about 70 tons a month. One man is employed.

MARL

Cheam Marl Products Limited*

Popkum (49° 121° S.W.). Office, Chilliwack. A. M. Davidson, manager. Marl is mined from a deposit on the east shore of Cheam Lake. The level of Cheam Lake has been lowered several feet by a drainage ditch, making more marl available. Marl is mined by a diesel-driven dragline and by scrapers. The marl is sold wet or semi-dry, or is dried in a rotary kiln. Three men were employed.

Popkum Marl Products Limited*

Popkum (49° 121° S.W.). W. A. Munro, manager. Marl and humus are mined by this company from a deposit on the east shore of Cheam Lake. A ¾-cubic-yard dragline digs marl and humus and loads it on to trucks. Some of the material is dried in a sawdust-fired rotary kiln. Wet, semi-dry, and dry humus and marl are produced. Three men were employed during the operating year.

PERLITE

Perlite Mining Corporation Limited†

Uncha Lake (53° 125° N.W.). Company office, 1922, 44 King Street West, Toronto, Ont. President, W. H. Bouck. Early in 1955 this company acquired control of a group of twenty-five claims, including the Shiela, Jimmy, Randy, and Perl groups, located 4 miles south of Uncha Lake. The showings consist of perlite layers within a series of rhyolite flows, at an elevation of from 3,200 to 3,700 feet on the gently sloping northwest flank of Dayeezcha Mountain. The property is reached from Southbank on the south side of François Lake by 12 miles of road to the south

* By R. B. King.
† By A. R. C. James.

side of Uncha Lake and from thence by 4 miles of partly improved access road to the camp near the showings.

The claims were originally located in July, 1953, by C. S. Powney and J. Rasmussen, of Fort St. James, and others. The present company acquired control early in 1955. The property is managed by Technical Mine Consultants Limited. In 1955 work was limited to a period of three and a half months, including one month's work in January and two and a half month's work between August 1st and October 15th. A crew averaging six men was employed under the supervision of C. A. McLeish. The following work was accomplished: 1 mile of access road was constructed and 4 miles of access road was improved; an area 2,500 by 3,500 feet was surveyed and mapped; nineteen trenches were stripped, crosscutting the formation at approximately 150-foot intervals, making a total of 11,000 feet of trenching, of which 8,000 feet exposed bedrock; fourteen rock trenches were blasted to an average depth of 2 feet; and thirty-nine 50-pound samples were cut for examination and testing.

The company reports that the stripping and trenching exposed at least six mineable perlite layers in a zone 2,800 feet long and 1,600 feet wide. The layers are reported to be somewhat irregular in width and attitude, lying interbedded in a folded series of rhyolites striking generally northeast and dipping about 70 degrees to the southeast. The purity of the perlite changes quite rapidly along the strike, with most impurities appearing in the narrower sections. It is reported that the maximum exposed width of at least two layers exceeds 150 feet, and that in some places interbedded rhyolite is sufficiently narrow to permit practical open-pit mining of two or more layers from one pit. Increasing depth of overburden to the northeast made further stripping in this direction impractical. The last trench at the southwest end of the workings exposed three strong layers of perlite. Evidence indicates that the zone extends several hundred feet farther to the southwest.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1953, p. 194.]

SAND AND GRAVEL*

Abbotsford Gravel Sales Ltd. Abbotsford (49° 122° S.E.). Donald MacNeil, superintendent. This pit is 7 miles west and 6 miles south of Abbotsford. Gravel is mined by shovel and scraper from the pit and is either sold as pit run or is crushed, washed, and sized in an adjacent plant. A ready-mix plant furnishes concrete for local sales. Three men were employed.

Dueck's Gravel Pit Clearbrooke (49° 122° S.E.). Dueck Building Supplies Ltd., owner. This pit is about 1 mile north of Clearbrooke. Sand and gravel are washed from a gravel face 15 feet high and are pushed by a bulldozer to a bucket elevator, by which it is elevated to a washing plant. A ready-mix plant furnishes concrete for local sales. Three men were employed.

Foster's Gravel Pit.—Aldergrove (49° 122° S.E.). C. N. Foster, owner. This pit is 3 miles south of Aldergrove. Sand and gravel are mined from low faces by a front-end loader. Pit-run gravel is sold locally.

Border Sand and Gravel Company White Rock (49° 122° S.W.). Office and plant, Boundary Road, R.R. 4, White Rock. T. Lapierre, manager. The gravel pit and washing plant were operated intermittently during 1955. Gravel is mined by blasting low gravel faces and loading loose gravel with an overhead loader. Gravel is washed and sized in a small washing plant.

Colebrook Sand & Gravel Company Limited. — Cloverdale (49° 122° S.W.). Office and plant, R.R. 1, Cloverdale. F. Bray and J. Bray, owners and operators. Sand and gravel are mined by an overhead loader, loaded on to trucks, and hauled to a small

* By R. B. King.

semi-portable washing and screening plant. Sand and gravel for fill, concrete, plaster, and aggregate are produced. Two men were employed.

Corporation of the District of Surrey. — Cloverdale (49° 122° S.W.). John Furiak, works superintendent. Several gravel pits are operated within this township for the purpose of road maintenance and construction. Gravel is mined by diesel-driven shovels or by scrapers and is crushed in portable crushers.

Corporation of the Township of Langley. — Murrayville (49° 122° S.W.). W. Merrell, superintendent of works. Several gravel pits are operated within the township for the purpose of road maintenance and construction. All gravel is mined by diesel-driven shovels and is transported by trucks to portable crushers.

Hornby General Machinery Company.—Langley Municipality (49° 122° S.W.). Office, Cloverdale; pit, Gobsell Road. Harry Hornby, owner. Run-of-pit gravel is mined by a small diesel shovel from low pit faces. Gravel is sold locally. One man was employed. During 1955 approximately 15,000 cubic yards of gravel was produced.

Langley Gravel and Contracting.—Langley Prairie (49° 122° S.W.). H. Gibson Clarke, owner. Gravel is mined from a pit on the southeast corner of Bradshaw and Berry Roads. Run-of-pit gravel is sold locally. One man was employed.

Richmond Bulldozing Co. Ltd.—Port Mann (49° 122° S.W.). Office, 659 No. 4 Road, Lulu Island. S. E. Adernack, owner. This company is operating a pit near Port Mann. Gravel is mined from a low face by a diesel-driven shovel and is either crushed and screened to supply sized products or is sold as pit run. Four men were employed.

S.U.B. Quarries Ltd. Port Mann (49° 122° S.W.). Office, 611 No. 3 Road, Brighouse. The Fraser Valley Lands Ltd. purchased and is operating the Hassel Pit. C. H. Sharpe, pit foreman. Gravel is mined by shovel and sold as pit run for fill and cement. A crushing plant and ready-mix plant were constructed during the year. Three men were employed.

Cewe's Gravel Pit Coquitlam (49° 122° S.W.). Jack Cewe, owner and operator. This pit is about 3 miles north of Coquitlam on Pipeline Road. Gravel is mined from a low gravel face by a ⅜-cubic-yard diesel-driven shovel and is trucked to a small portable crusher. Run-of-pit gravel and crushed products are sold locally or used by an adjacent asphalt road-materials plant. Four men were employed.

Gilley Bros. Limited (Maryhill Division) Coquitlam (49° 122° S.W.). Company office, 902 Columbia Street, New Westminster. J. H. Gilley, general manager; E. Johnston, superintendent. Sand, gravel, and crushed products are produced from this pit and plant on the Fraser River near Coquitlam. Gravel is mined by diesel-driven shovels from 30-foot faces and is trucked by 12-cubic-yard trucks to the crushing plant. Thirty-five men were employed.

Trouten Pit South Westminster (49° 122° S.W.). Office and plant, 10987 Sandell Road, R.R. 11, New Westminster. William Trouten, owner and operator. Gravel is mined from high faces by blasting and loaded by a small diesel-driven shovel on to trucks. A small portable crushing unit is operated intermittently. Four men were employed.

E. R. Taylor Construction Co. Ltd. Burnaby (49° 122° S.W.). Office, Maplewood. The Stride Avenue pit is operated by this company for the Municipality of Burnaby. Gravel is mined and loaded with a ¾-cubic-yard diesel-driven shovel and two overhead loaders and is transported by trucks to a portable crushing plant. In 1955, 50,502 tons of pit-run gravel, 166,413 tons of 1⅛-inch crushed gravel, 42,600 cubic yards of fill, and 35,403 cubic yards of sand were produced.

Deeks-McBride Ltd. Company office, 1051 Main Street, Vancouver. J. W. Sharpe, general manager. Two gravel pits, with crushing and screening plants, were operated during 1955 by this company. One pit is near Coquitlam (49° 122° S.W.) and the other near the mouth of

Seymour Creek (49° 123° S.E.). At the Coquitlam pit, gravel is dug with a 1-cubic-yard-capacity dragline and transported by a conveyor-belt to a jaw crusher and then by conveyor-belt to the washing plant. During 1955 new steel storage bunkers were erected. Ten men were employed. At the Seymour Creek plant, gravel is mined by a ¾-cubic-yard dragline at the edge of Burrard Inlet. Gravel is transported by a conveyor to the plant. The plant produces nearly 1,600 cubic yards of crushed, sized, and washed gravel products in a 16-hour work-day. Twenty-five men were employed.

Coldwater Sand & Gravel Co. Ltd.—Lynn Creek (49° 123° S.E.). Plant, Lynn Creek. T. R. Burnett, superintendent. Gravel is mined from the bed of Lynn Creek by a dragline shovel and is transported by truck to a washing and crushing plant. Three men were employed.

Highland Sand and Gravel Company Limited

Lynnmour (49° 123° S.E.). Company office, Lynnmour. W. J. Barrett-Leonard, manager. This company operated two plants—one at Lynnmour and one at 2962 Lambert Road, Langley Municipality. At the Lynnmour plant, sand, gravel, crushed products, road materials, concrete blocks, and concrete tiles are produced by this company. Material is dug from low gravel faces by a ¾-cubic-yard diesel-driven shovel and is transported by truck to a crushing, screening, and washing plant. This plant has a daily capacity of 800 cubic yards. Glacial till is mined and prepared for road material. During 1955, 105,135 cubic yards of material was produced. Twenty men were employed.

The Langley pit was opened this year, and a crushing and washing plant was constructed. Gravel is mined by scraping, using two 1½-cubic-yard crescent scrapers driven by an electrically powered double-drum donkey-engine. The scrapers alternately bring gravel to the plant feed-hopper as the haul-back line, running through a tail-block, is connected to the scrapers.

Pit-run gravel is fed on to No. 1 conveyor and carried to a scalping screen. This screen is a 4- by 8-foot 2-deck Dillon vibrating screen which gives products of plus 3-inch, 1½-inch, and 3-inch, and minus 1½-inch material. Plus 3-inch material, passing through a chute to a 14- by 24-inch jaw crusher, is crushed to 2½ inches and is passed to No. 3 conveyor. The middlings, 1½- to 3-inch, go directly to No. 3 conveyor. Minus 1½-inch material may go to No. 2 conveyor or to No. 3 conveyor for further crushing. No. 3 conveyor takes material to a 4- by 6-foot single-deck Niagara vibrating screen. The undersize is conveyed by No. 5 conveyor to a radial stacker, while the oversize is carried by No. 4 conveyor to a Symons 3-foot cone crusher, the products of which drop on to No. 3 conveyor.

Minus 1½-inch material is taken by No. 3 conveyor belt to the opposite side of the plant. The material is screened by a 4- by 12-foot 3-deck Dillon vibrating screen, where it is washed and three grades of washed gravel—bird's eye, torpedo, and pea—are produced. Sand and water enter a link-belt 6-foot conical sand separator which discharges sand to No. 6 conveyor. The washed and screened products are conveyed by belts fitted with Stephens-Adamson swivel pilers which throw material about 100 feet from the end of the belts and form piles about 26 feet high.

The plant is constructed entirely of steel, is driven by electric motors, and is operated by one man through push-button controls located near the centre of the plant. The plant has a normal capacity of 1,000 cubic yards in eight hours.

Lynn Gravel Company Limited.—Lynnmour (49° 123° S.E.). Office and plant, Lynn Creek. Gravel is dug by a dragline from the bottom of Lynn Creek and transported by truck to a crushing plant. The crushing plant is capable of crushing 500 cubic yards a day. Three men were employed.

Capilano Crushing Co. Ltd.

West Vancouver (49° 123° S.E.). C. W. Bridge, general manager. Crushed and sized gravel products are produced by this company at its plant on the west shore of the Capilano River. Gravel is mined from the bed of the river by a 1-cubic-yard-

capacity dragline and is transported to the crushing and washing plant by 15-cubic-yard-capacity trucks. Seven men were employed.

Routledge Gravel Ltd. West Vancouver (49° 123° S.E.). Office, Lower Capilano P.O. T. C. Routledge, president. This gravel plant is on the Indian reservation at the lower end of Lower Capilano Road. Gravel is scraped by a 7-cubic-yard scraper from deposits in Burrard Inlet and is conveyed to a crushing, screening, and washing plant. During 1955, 125,000 cubic yards of gravel was mined and 100,000 cubic yards was processed in the plant. Fourteen men were employed.

Construction Aggregates Ltd. Howe Sound (49° 123° N.E.). Office, 628 Carnarvon Street, New Westminster. Pit and plant, Britannia Beach. A. H. Dawe, superintendent. This company operated a gravel pit which is about one-half mile south of Britannia Beach Dock.

Gravel was mined by a bulldozer and an overhead loader, transported by truck to a hopper, then conveyed to scows for transportation. Run-of-pit gravel only was produced. During the operating year six men were employed.

Hillside Sand & Gravel Limited Hillside (49° 123° S.E.). Ray Kehoe, superintendent. This operation is on the west shore of Howe Sound and is accessible by road from Gibsons Landing (49° 123° S.W.). Gravel is mined by washing with a constant flow of water cascading over the high pit face. The gravel is loaded by a ¾-cubic-yard diesel-driven shovel into 15-cubic-yard Euclid trucks and transported to a crushing and washing plant. Sized and washed gravel is loaded on to scows for transportation. Fifteen men were employed.

Butler Brothers Supplies Ltd.—Royal Oak (48° 123° N.E.). Office and plant, Keating Cross-road. Claude Butler, manager. Gravel is dug from gravel faces by diesel-driven shovels and an overhead loader. It is transported to a washing plant or is sold as pit run. In 1955, 146,477 cubic yards of gravel was sold. Eight men were employed.

McIntyre and Harding Gravel Company Limited Saanich (48° 123° N.E.). Company office and plant, Royal Oak P.O., Saanich. Sand, gravel, and washed and sized gravel products are produced from this pit. Gravel is mined by hydraulicking and digging or is dug directly from gravel faces by ½-cubic-yard diesel-driven shovels and is transported to a washing plant by conveyor-belt. A concrete plant for making concrete bricks, building-blocks, and drain-tile is also operated. During 1955, 70,000 cubic yards of gravel was produced. Twenty-five men were employed.

Producers' Sand & Gravel Company (1929) Limited *Albert Head (48° 123° S.E.). Company office, 900 Wharf Street,* Victoria; plant, Royal Bay. A. Parker, plant superintendent. Sand and gravel are mined by using a scraper on a slack-line cableway to loosen packed gravel from the steep, high face. The gravel is loaded by a 1¼-cubic-yard shovel into a hopper, where it is conveyed by a series of conveyor-belts to the plant. Gravel is crushed, screened, washed, and classified into six grades of gravel and two grades of sand. Nineteen men were employed.

A. V. Richardson Ltd. Duncan (48° 123° N.W.). Company office, Duncan. Sand, gravel, and crushed products are produced by this company from a pit on the Cowichan road nearly 4 miles from Duncan. Gravel is mined by digging with an overhead-loading machine and also by scrapers. Gravel is either used directly as fill or road dressing or is washed and sized in an adjoining plant and used for concrete. About 6,000 cubic yards of gravel was mined in 1955. Three men were employed.

SILICA

Oliver Silica Quarry*

Oliver (49° 119° S.W.). Pacific Silica Limited; W. M. Hemphill, president, 3300 First Avenue, Seattle, Wash.; Ivan A. Hunter, manager, Oliver. This silica quarry is on the Gypo mineral claim, owned by The Consolidated Mining and Smelting Company of Canada, Limited, and is 1 mile north of the village of Oliver and about 800 feet west of the main highway. The Interior Contracting Company, Limited, Penticton, has a lease on the property from the owner, and since April 1st Pacific Silica Limited has operated the quarry under a sub-lease. The silica is blasted from the quarry face and is mechanically transported 250 feet to the grizzly at the crusher. The silica is crushed to minus ¼ inch, and is sacked and shipped to Vancouver for use in the building trade for stucco-dash and roofing-rock. A small amount is used for poultry grit and truck sander grit. Not all the silica quarried was marketed because about 40 per cent of it is not suitable for the building trade. The present stockpile of off-colour or waste material may at some future date be used in other lines of industry. Additions to buildings and equipment include a compressor building housing a new compressor which is driven by a 50-horsepower electric motor, an inclined feeder chute with grizzly, and an improved dust-control system. From April 1st to August 31st two shifts of six men per shift were employed, and from September 1st until November 15th one shift of seven men was used. Operations were suspended on November 15th because of inclement weather and had not resumed at the end of the year. From April 1st to the end of the year 2,500 tons of silica was shipped.

SLAG

Granby Slag Dump*

Grand Forks (49° 118° S.E.). The old Granby Company smelter-slag dump at Grand Forks is owned by the City of Grand Forks. The mining, sorting, loading, and hauling of this material are done by the Grand Forks Cartage Company Limited. Slag is blasted from benches 20 feet high at the south end of the dump. After blasting, the slag is hand-loaded and passed over a vibrating screen, and is then hauled by truck to the railway. A total of 355 tons was shipped to Vancouver, Calgary, Alta., and Chewalah, Wash. A crew of three men worked at intermittent periods.

Greenwood Slag Dump*

Greenwood (49° 118° S.W.). P. Falkoski owns part of the northern end of the slag dump at the old British Columbia Copper Company's smelter at Greenwood. The slag is blasted from the face of the dump, mechanically loaded into trucks, and hauled to the railway. The slag is used in the manufacture of rock-wool insulation. Twenty-eight railway carloads, totalling 1,969 tons, were shipped to Vancouver and Calgary. A crew of from three to six men worked at intermittent periods.

Crofton Slag Dump.†—Crofton (48° 123° N.W.). The slag dump from the old Crofton smelter is owned jointly by Mrs. R. F. Castle and H. B. Elworthy. Slag is broken by blasting and then loaded on scows. The slag is used for sand-blasting. Mining is done intermittently, and 1,708 tons of slag was shipped during the operating year.

* By E. R. Hughes.
† By R. B. King.

Petroleum and Natural Gas

CONTENTS

PRODUCTION

Since June, 1954, natural gas has been produced from Pacific Fort St. John wells, Nos. 19, 26, and 31, for distribution in Fort St. John. The gas is dehydrated near the wells, and the gas from wells 26 and 31 is desulphurized in a unit on the outskirts of Fort St. John. Production statistics are given in Tables I, III, VIIA, and VIIIA, pages 17, 18, 24, and 29.

EXPLORATION SUMMARY*

During 1955 the drilling of wells for oil and gas in British Columbia continued mainly in the northeastern part of the Province, but included three wells (abandoned) near Enderby in the Okanagan area and two wells in the Vancouver area (one abandoned and one suspended).

Drilling operations in northeastern British Columbia extended from the Lone Mountain area to the Fort Nelson area. Most of the wells were located north of the Peace River in the Fort St. John district.

The methods of geological investigation employed included surface geological mapping, drilling of wells and test-holes, reflection seismograph, gravity meter, magnetometer surveys, and photogeology.

In November, 1955, the United States Federal Power Commission approved the daily importation into the Northwestern States of 300,000,000 cubic feet of Canadian natural gas. By the end of the year, plans were in progress for laying the 30-inch pipeline from Fort St. John through the Pine Pass, as well as for stepping up the gas exploration programme in northeastern British Columbia.

REVIEW OF GAS AND OIL DISCOVERIES, 1955

Of the thirty-six wells completed in British Columbia, thirteen wells (all in northeastern British Columbia) were successful. Twelve were gas wells and one an oil well.

Texaco N.F.A. (Northern Foothills Agreement) Boundary Lake 1 was completed as an oil well in the Triassic Schooler Creek formation on February 4th, 1955. It flowed 240 barrels a day of 34.5° A.P.I. gravity oil from 10 feet of porous dolomite through a $^{20}/_{64}$-inch choke.

Texaco N.F.A. Boundary Lake 1 is the first commercial oil well completed in British Columbia. It was capped after completion, pending arrangements for marketing the oil.

In addition to the discovery of the Boundary Lake oil area, the discovery of six new gas areas is indicated, namely, Cameron River, Milligan Creek, Paddy, Doig River, Bougie Creek, and North Blueberry. The successfully completed gas wells for these areas

* By S. S. Cosburn.

are respectively: Texaco N.F.A. Cameron River 1, H.B.-B.A. Union Milligan 1, Imperial H.B.-Union Paddy 1, Imperial Calvan Doig River 1, Gulf States Bougie Creek 1, and Canada Southern Alaska Highway 1.

The gas areas of Buick Creek, Fort St. John, Montney, and Nig Creek fields were extended during the year.

Wells Operated, 1955

Name	Well No.	Spudded	Depth, Jan. 1, 1955	Depth, Jan. 1, 1956	Rig Released	Annual Footage	Results
Northeastern British Columbia			Ft.	Ft.			
Anglo-Bralsaman Little Prairie	1	Jan. 29		1,830	Feb. 20	1,830	Abandoned.
Bekami Lake (B.C. Oil Lands)	1	1954	3,801	5,704	Mar. 18	1,903	Abandoned.
Canada Southern Alaska Highway	1	1954	1,030	7,475	June 24	6,445	Gas well, Schooler Creek formation.
Canada Southern Kelly Lake	1	Nov. 1		7,124		7,124	Drilling.
Gulf States Bougie Creek	1	Apr. 5		6,550	Aug. 20	6,550	Gas well, Mississippian.
Gulf States Evie Lake	1	July 4		7,615		7,615	Testing.
H.B.-B.A. Union Milligan	1	Jan. 26		5,986	Mar. 13	5,986	Gas well, Nikanassin.
H.B. Union Chinchaga	1	Jan. 22		4,917	Feb. 22	4,917	Abandoned.
Imperial Calvan Doig River	4-27-88-17	Sept. 10		5,675	Dec. 1	5,675	Gas well, Nikanassin.
Imperial H.B.-Union Paddy	1	Mar. 6		10,034	Aug. 16	10,034	Gas well, Devonian.
Imperial Kahntah	1	Mar. 17		8,439	July 31	8,439	Abandoned.
Imperial Pacific Kilkerran	12-31-78-14	Dec. 22		39		39	Drilling.
Imperial Pacific Parkland	6-29-81-15	Dec. 20		34		34	Drilling.
Imperial Sikanni Chief	1	Feb. 14		9,930	June 3	9,930	Abandoned.
Pacific Aitken Creek	1	Jan. 13		5,125	Mar. 4	5,125	Abandoned.
Pacific Buick Creek	5	1954	3,760	3,760	Jan. 1		Gas well, Nikanassin.
Pacific Fort St. John	37	Mar. 24		6,371	July 4	6,371	Gas well, Permo-Penn.
Pacific Fort St. John	40	Mar. 21		5,317	May 1	5,317	Abandoned.
Pacific Fort St. John	41	May 25		5,471	July 9	5,471	Abandoned.
Pacific Fort St. John	42	July 13		6,440	Sept. 10	6,440	Abandoned.
Pacific Sunray Montney	3	1954	280	6,580	Mar. 10	6,300	Gas well, Gething.
Pacific Sunray Montney	4	Mar. 17		4,943	Apr. 29	4,943	Abandoned.
Phillips Kobes	1	June 30		6,656		6,656	Drilling.
Southern Production Canadian Atlantic	B4-1	Jan. 22		8,207	Sept. 2	8,207	Abandoned.
Southern Production Canadian Atlantic	B13-1	Jan. 7		5,745	Mar. 16	5,745	Gas well, Triassic-Schooler Creek.
Southern Production Canadian Atlantic	B14-1	1954	4,164	6,855	Mar. 27	2,691	Abandoned.
Southern Production Canadian Atlantic	B2-2	Oct. 3		5,300	Dec. 11	5,300	Abandoned.
Stanolind Lingrell	1	Nov. 4		4,100		4,100	Drilling.
Stanolind Sheep Creek	1	Oct. 12		4,485		4,485	Drilling.
Texaco N.F.A. Beatton River	1	Jan. 23		5,420	Mar. 13	5,420	Abandoned.
Texaco N.F.A. Boundary Lake	1	1954	6,925	8,060	Feb. 4	1,135	Oil well, Triassic-Schooler Creek.
Texaco N.F.A. Boundary Lake	2	Aug. 22		8,821		8,821	Drilling.
Texaco N.F.A. Boundary Lake	A14-6	Nov. 19		4,319		4,319	Testing.
Texaco N.F.A. Buick Creek	6	Jan. 12		4,900	Mar. 22	4,900	Gas well, Nikanassin.
Texaco N.F.A. Buick Creek	7	Apr. 2		8,462	Aug. 1	8,462	Abandoned.
Texaco N.F.A. Buick Creek	9	Sept. 19		5,975	Dec. 2	5,975	Abandoned.
Texaco N.F.A. Cameron River	1	Jan. 9		5,124	Sept. 5	5,124	Gas well, Schooler Creek.
Texaco N.F.A. Hay River	1	Jan. 26		5,549	Mar. 15	5,549	Suspended.
Texaco N.F.A. Nig Creek	5	1954	3,444	4,964	Feb. 3	1,520	Abandoned.
Texaco N.F.A. Nig Creek	6	Mar. 1		4,970	Apr. 20	4,970	Gas well, Schooler Creek.
Texaco N.F.A. Thetlaandoa	1	Dec. 30		214		214	Drilling.
Union White-Lloyd Blueberry	1	Feb. 26		7,086	June 19	7,086	Abandoned.
White-Lloyd Indian Reserve	1	Jan. 14		3,351	Feb. 12	3,351	Abandoned.
Okanagan Area							
Enderby	1	1954	1,858	1,957	Jan. 14	98	Abandoned.
Enderby	2	Jan. 19		1,562	Feb. 7	1,562	Abandoned.
Enderby	2A	Feb. 23		2,152	May 12	2,152	Abandoned.
Vancouver-Chilliwack Area							
Great Basins	1	June 29		6,044	Sept. 7	6,044	Abandoned.
Seavan Hazelmere Kuhn	1	Oct. 15		1,394		1,394	Suspended.

Summary.—Total wells operated, 48. Annual footage, 231,768. Results: Oil, 1; gas, 12; abandoned, 23; suspended, 2; completing, 2; drilling, 8.

WELL SAMPLES

Unless otherwise directed, any operator who drills a well* for petroleum or natural gas is required to take samples of the bit cuttings representing interval depths of 10 feet or lesser intervals. The samples are to be washed, dried, and accurately labelled and shipped prepaid to the Department of Mines, Victoria, B.C.

The operator may be required to take samples by means of a core barrel.

All cores taken must be put in suitable boxes, accurately labelled, must be properly protected and stored, and must be delivered as required.

So far as possible, cores taken in 1955 are examined and logged in the field. They have been left in the hands of the operators, who remain responsible for delivering the core when so directed. During the year a Panabode building was erected in Pouce Coupe to serve as a core depot, and storage space is available in it for some of the core taken.

Samples of well cuttings are received at the laboratory at frequent intervals during the drilling of each well. A part of each 10-foot bagged sample is washed, dried, and logged, and is then stored in a glass bottle in sequence with other samples from the same well, so that a complete set of samples from each well is available for examination. A part of each 10-foot sample is sent to the laboratory of the Geological Survey of Canada in Calgary. During 1955, 19,232 samples were washed and bottled.

CONSERVATION†

Petroleum and natural gas are subject to loss or waste unless proper conservation practices are followed in the course of drilling or production. Any procedure that reduces the availability of the resource may be regarded as waste, whether it causes destruction or increases the cost of recovery. Loss or waste may occur in the ground by migration, contamination, reduction of permeability, loss of driving energy, or by change in composition of the hydrocarbon mixture. Waste may occur on the surface by loss of control, by fires, leakage, or improper handling beyond the well. Hazards to other resources or to habitation in the general area may be caused by contamination of the surface and should also be regarded as waste. Consequently, the Government of British Columbia has issued regulations under the "Petroleum and Natural Gas Act, 1954," to enforce the conservation of petroleum and natural gas, and the protection of other resources.

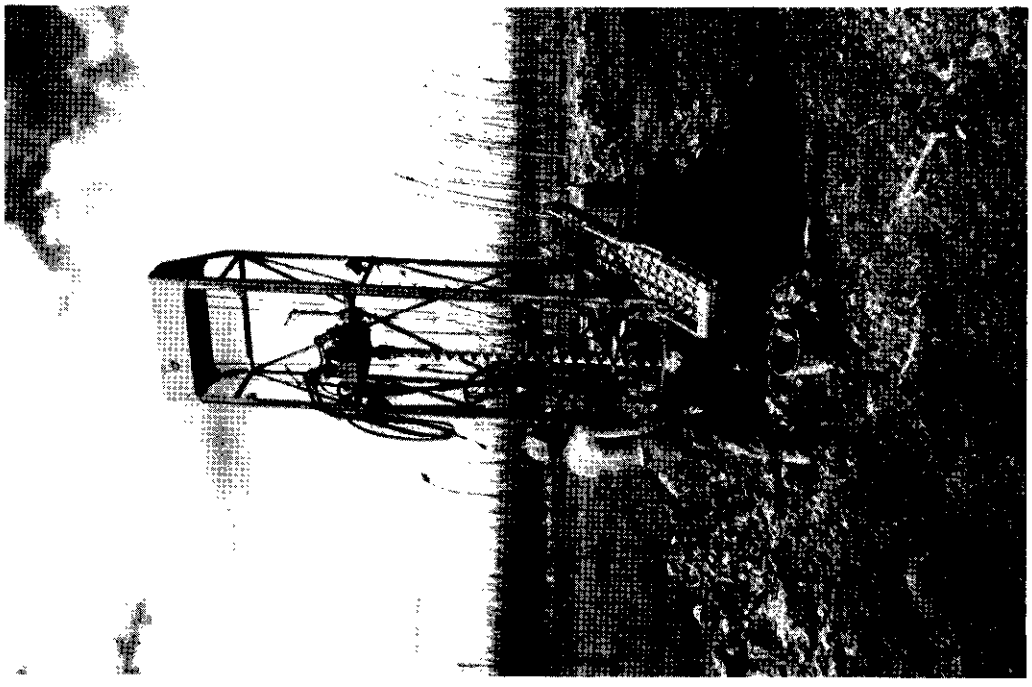
The Department of Mines maintains a Petroleum and Natural Gas Engineer at Dawson Creek who is responsible, under the Chief Conservation Engineer, for the enforcement of Drilling, Production, and Conservation Regulations (Order in Council No. 2422 of October 11th, 1955) and, under direction of the Chief Commissioner, for the enforcement of Geophysical Regulations (Order in Council No. 1793 of July 15th, 1955). He is also required to gather and forward to the Department information concerning the operations of the industry, and to maintain close liaison between the Department and the industry at the field level.

Until October 11th, 1955, the Petroleum and Natural Gas Engineer was responsible for the safety of workmen in the industry, but Order in Council No. 2422 of that date relieved him of this responsibility and placed it on the Workmen's Compensation Board.

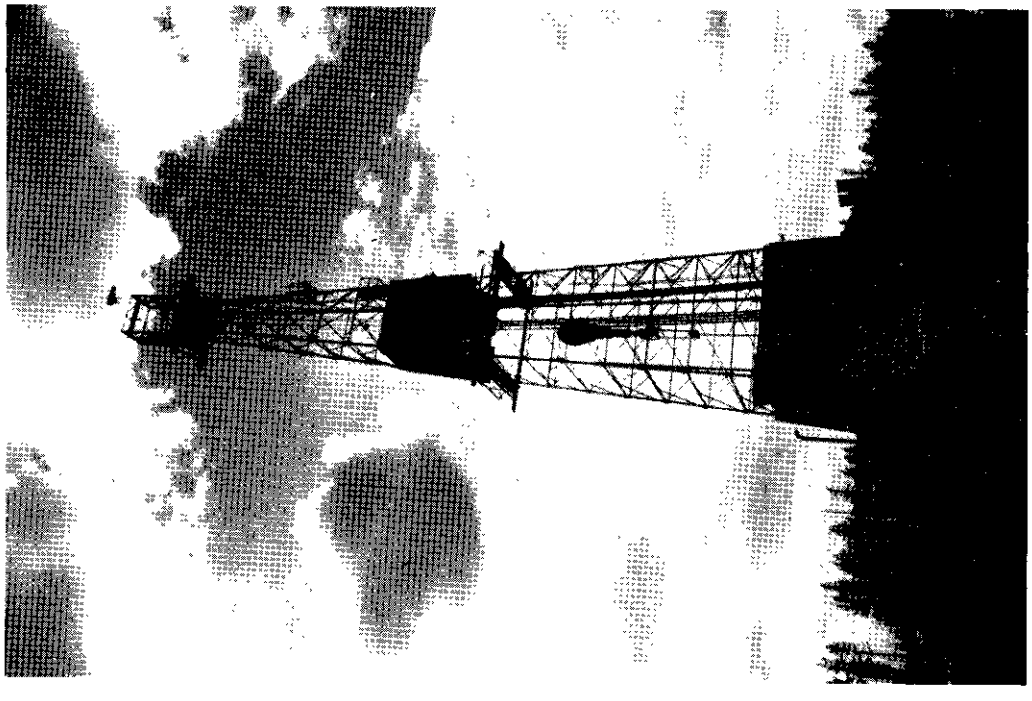
The problem of conservation of petroleum and natural gas is a complex one which has been closely studied by industry and various governments for many years. The need for regulation and constant vigilance is well established historically, and is generally accepted in the industry. However, new tools and different techniques are constantly being developed, and regulations must be flexible enough to take changes into account. To reconcile regulation with flexibility, senior officers of the Department must have reliable information readily available. One source of this information is the Petroleum

* Printed copies of the "Petroleum and Natural Gas Act, 1954," and of Regulations Governing the Drilling, Production, and Working of Wells and the Conservation of Petroleum and Natural Gas may be obtained from the Department of Mines, Victoria, B.C.

† By R. R. McLeod.



Drilling seismic holes in muskeg.



Imperial Kahntah No. 1 well.

and Natural Gas Engineer, who observes and reports on the effectiveness and safety of new techniques, witnesses official tests, and may himself make tests and special studies when required.

Another source of information is the daily report. A system of daily drilling reports is almost universally established in the petroleum industry. Reports are made daily by the person in charge of the well to the operator, to the drilling contractor, and to the regulating authority. In British Columbia this authority is the Department of Mines. These reports should give details of the operations carried out during the day. The daily reports are supplemented by frequent personal inspections by the Petroleum and Natural Gas Engineer.

Inspection Procedure

Normal inspection of a well being drilled involves first a call on the operator's representative at the well, or to the supervisor (toolpusher) in charge of the rig, to establish identity and the purpose of the visit. When the Petroleum and Natural Gas Engineer is well known, this preliminary may be omitted, but he will always make himself known to the driller on duty. The next step is to examine the daily reports and other records. The reports are read and compared for completeness and accuracy, and to bring the Petroleum and Natural Gas Engineer up to date on the events at the well. Any questions which arise will then be put to the driller, the toolpusher, or the operator's engineer or geologist, depending on the nature and scope of the question.

The rig is then inspected to ensure the blowout-preventers, bleed-off lines, fire-extinguishers, and other emergency devices are properly installed and maintained, and that the operations are being conducted in a safe and proper manner. If there is reason to believe that this is not so, test of equipment may be called for and remedial measures ordered where the need is shown to exist.

Following the inspection, the geology of the well is discussed with the well-site geologist in order that the Petroleum and Natural Gas Engineer may gain a better understanding of the conditions likely to exist under the surface, and the problems which may arise from them.

In addition to routine inspections of drilling wells, the Petroleum and Natural Gas Engineer may visit the wells to witness various special operations, such as the setting of casing; drill-stem tests; tests of water shut-off; completion operations; stimulating operations such as shooting, acid treating, and hydraulic formation fracturing; production and potential tests; and abandonment operations. He attends these to ensure that they are carried out in the manner approved by the Department.

General Conditions in 1955

In the area of northeast British Columbia covered by the Dawson Creek office, 25,451,754 acres or 39,768 square miles were under lease, permit, or application at the end of 1955. Over 40,000 square miles were covered by lease, permit, or application during the summer.

The terrain covered varies from normal prairie farm country to northern muskeg and to heavily wooded mountainous country. The area is served by the John Hart and Alaska Highways. Except for these highways and a few roads in the immediate vicinity of Fort St. John and Dawson Creek, the roads are dirt roads, unsuited to heavy traffic except when frozen or very dry. Rain can make a gumbo road hazardous in a matter of an hour or so, and two days of rain will make many of them impassable except to 4-wheel-drive vehicles. The conditions during spring break-up must be experienced to be appreciated.

Drilling, even in the farming area close to Fort St. John, can present many problems to the operator and his drilling contractor during periods of wet weather. Steps are usually taken to lay in sufficient fuel and supplies to last over the break-up and periods

of inclement weather, but, even so, vehicles are needed to get various supplies to the rig during these periods. A medium-sized rig will cost about $1,200 per day when not drilling, so that considerable expense may be borne to get in supplies. Means to this end used during 1955 ranged literally from horses to helicopters. A fairly common means of hauling heavy loads over soft roads is a tracked trailer towed by a tracked tractor. Often ordinary trucks fitted with chains are used, with tracked tractors standing by to pull them through the bad spots, which may extend for miles.

The following distances from the rail-head and main supply centre of Dawson Creek, of four wells operating at the close of 1955, will give an idea of the distances involved:—

Well	Direction	Distance by Air	Distance by Road
		Miles	Miles
Stanolind Sheep Creek No. 1	North 35 degrees west	240	375
Texaco Hay River No. 1	North 1 degree east	190	390
Texaco Thetlaandoa No. 1	North 10 degrees west	250	390
Stanolind Lingrell No. 1	South	62	120

The nearest well in 1955 was 7 miles from Dawson Creek, but to reach most wells much driving was required, in many cases for long distances over bush roads. The Petroleum and Natural Gas Engineer was provided with a Ford sedan and a 4-wheel-drive Fargo power wagon fitted with a winch and a swivel frame, but even the latter vehicle was unable at times to cope with the conditions; however, he found the operators and contractors most co-operative in making space available aboard tractors and aircraft when he was unable to reach wells in his own vehicle.

The extreme mobility of the seismic crews and the wide range of their operations, from Monkman Pass to the Northwest Territories boundary, would demand the use of a helicopter to enable one man to check their work closely. Consequently, and because of the fact that these operations have little or no effect on subsurface conditions, less attention was given to this phase of exploration than to the drilling phase.

Of the forty-eight wells operated during the year, four were out of control for various periods. One of these, Texaco N.F.A. Cameron River No. 1, took fire, destroyed the rig, part of the camp, and many million cubic feet of gas. The fact that the operator of this well, Texaco Exploration Company, and the drilling contractor, Trinity Canadian Drilling, were among the most careful and conscientious in the area points up the uncertainties and hazards of wildcat drilling. The blowout and fire led to a widespread change from manually operated blowout-preventers to automatic power-operated devices, and in some cases to a change in casing programmes.

Inspection of Lode Mines, Placer Mines, and Quarries

By H. C. Hughes, Chief Inspector of Mines

CONTENTS

PRODUCTION

The output of metal mines for 1955 was 9,126,902 tons. This tonnage was produced from fifty-three mines, of which thirty-four produced 100 tons or more.

FATAL ACCIDENTS

During 1955 there were seven fatal accidents connected with actual mining operations in metal mines and quarries. This was four less than in 1954. There were 5,117 persons employed below and above ground in metal mines and 1,091 persons employed in concentrators in 1955.

The ratio of fatal accidents per 1,000 persons employed in mines and concentrators was 1.13, as compared with 1.75 in 1954.

Tonnage mined per fatal accident during the last ten-year period was 701,623 tons.

The following table shows the mines at which fatal accidents occurred during 1955, with comparative figures for 1954:—

Mine	Mining Division	Number of Fatal Accidents	
		1955	1954
Giant Mascot	Golden	1	--
Sullivan	Fort Steele	--	1
Akokli Tungsten	Nelson	1	--
Bralorne	Lillooet	3	3
Pioneer	Lillooet	1	2
Capilano Crushing Co. Ltd.	Vancouver	--	1
Britannia	Vancouver	1	1
Argonaut Co. Ltd.	Nanaimo	--	1
Red Rose	Omineca	--	2
Totals		7	11

The following table classifies fatal accidents as to cause and location:—

Cause	Number	Location
Falls of ground	4	Underground.
Crushed by skip in shaft	1	Underground.
Struck by flying rock from blast	1	Underground.
Fell from motor	1	Underground.
Total	7	

In addition to these fatalities, a man was crushed by a front-end loader handling concentrates. As the man was not an employee of the mining company and the equipment involved did not belong to the mine, this is not counted as a mining accident, although it took place on mining property.

A brief description of all fatal accidents follows.

Abe Loeppky, aged 25, Canadian, single, and employed as a miner at the Britannia mine, was almost instantly killed by a fall of ground in the 044 drift west on the 4650 level in the No. 8 mine on February 28th, 1955, at 4.40 p.m.

The 044 drift is an 8-foot by 8-foot development heading being advanced westerly at the rate of one round a shift. An Eimco 12-B mucking-machine was being used to muck out the round. Eight cars had been mucked out when John Barry, partner of the deceased, on returning from the switch, about 100 feet back in the drift, with an empty car, failed to see Loeppky's light. He investigated and found him pinned beneath a slab of rock of about 2 tons weight and several smaller pieces, near the rear end of the mucking-machine. Help was obtained immediately, but Loeppky was pronounced dead by the doctor on his arrival at the scene.

Investigation revealed that the rock fell from the roof over Loeppky, and that the area it came from was bounded by two intersecting micaceous slips and a felsite dyke.

An inquest was held on March 1st, 1955, and the Coroner's jury returned the following verdict:—

"We, the jury, agree that Abe Loeppky came to his death by a fall of rock while operating a mucking machine at the face of 46-044 Drift West, No. 8 mine, on February 28th, 1955, at approximately 4.45 p.m. with no blame attached to anyone. We recommend that:—

"(1) Proper equipment, such as jacks and other necessary tools, should be placed at station levels to be used for such emergency purposes.

"(2) That in case of major accidents, notify the doctor at once who should proceed to the scene of the accident immediately."

Mike Kopytko, aged 29 years, Ukrainian, married, and employed as a slusher operator by the Giant Mascot Mines Limited, Spillimacheen, was instantly killed when he was caught between the 7 level pocket and the skip while being hoisted on a skip load of muck in the Silver Giant shaft at 8.30 p.m. on June 13th, 1955.

The Silver Giant shaft is a 3-compartment underground shaft sloping at 49 degrees to the horizontal and driven from No. 6 level. It is 560 feet deep on the slope to No. 9 level, with an additional 98 feet below for a sump and loading-pocket. Loading-pockets are also provided below Nos. 7 and 8 levels. Each hoisting compartment is provided with a skip. Only the No. 2 compartment has guides and safety dogs and, consequently, the handling of men was prohibited in the No. 1 compartment.

The sinking programme from No. 8 level sump to No. 9 level sump had been completed four days before the accident. At that time the sinking-bucket had been removed and replaced by the normal skip. The sinking-hoist signal was still in the No. 1 compartment, while that for the No. 2 compartment from Nos. 8 to 9 levels had not yet been installed.

Prior to the sinking programme there was a sign on No. 1 compartment prohibiting its use for transporting men. This was in the way of the sinking-bucket and was removed, and had not been replaced at the time of the accident.

The skip-tender, Keith Jones, had only been on the job four days. On filling the last load at No. 9 pocket before lunch, he climbed on the loaded skip to save time waiting for the return of the empty skip. Kopytko decided to accompany Jones and climbed on with him. On passing No. 9 pocket loading-chute, Kopytko was caught between the chute and the skip.

An inquest was held in Golden on June 21st, 1955, and the Coroner's jury returned the following verdict:—

"The deceased Mike Kopytko met death by accidental means at 8.30 p.m., June 13th, in the inclined shaft of the Giant Mascot Mine, Spillimacheen. The death was caused by a non-compliance to safety regulations.

"Inasmuch as it has come to the attention of the Coroner's jury held to inquire into the death of one Mike Kopytko, at Golden, B.C., this 21st day of June, 1955, it is strongly recommended that a greater degree of safety education be given to the workers of Giant Mascot Mines, Spillimacheen, and that the responsibility of the operating officers of the said mine be exercised to instil a strict adherence to the safety rules and recommendations as laid down by the Inspector of Mines."

The recommendation of the jury is concurred with.

Joseph Carrier, aged 25 years, Canadian, married, with one child, and employed as a miner by Bralorne Mines Limited, was almost instantly killed by a fall of ground in 2051-4E stope at the Bralorne mine on July 22nd, 1955, about 9.10 a.m.

The 2051-4E is a cut-and-fill stope. The vein at the scene of the accident is about 6 feet wide and dipping at 85 degrees. The back of the stope had been advanved to 87 feet above the 20 level and filled with waste to within 7 feet of the back. At the end of the stope there was a cribbed ore-chute and manway and about 36 feet along the stope a cribbed ore-chute, both level with the top of the fill. Beyond the ore-chute, one lift had been taken from the back on the previous shift and this was to be advanced to the end, a distance of about 48 feet. The stope was being worked on a 1-shift basis.

The ground in the stope is poor. There is a false hangingwall between the quartz vein and the true hangingwall, as well as numerous slips at various angles to these walls.

Carrier, the lead miner, and his partner, A. Maltais, had scaled the part of the stope where they were to drill and had not found any loose over the manway. Maltais started to drill over the ore-chute and Carrier began to lay planks over the chute and manway before he commenced to drill. Maltais found his air cut off and, upon investigating, found that a large slab 6 by 7 by 2 feet thick had fallen on top of the manway, breaking the air connection. Carrier's hard hat was seen beneath the edge of the slab.

Rather than go down this manway, Maltais went down another and came up the one where Carrier had been working. He found him on the first platform bleeding severely. Help was obtained immediately and the body removed.

An inquest was held and the jury returned the verdict that "J. Carrier died an accidental death caused by a slab of rock falling from the hangingwall." No blame was attached to anyone.

Both men were regarded as experienced and competent miners.

Stanislaw Kral, Czechoslovakian, aged 22, single, and employed as a miner by Bralorne Mines Limited, was instantly killed when struck by flying rock from the blast of a raise round which broke through into the 1650 drift on September 1st, 1955, at about 3.15 p.m.

The raise was being driven to serve as a manway from the west end of the 1751-14 stope. It is about 23 feet long and almost vertical.

The 1751-14 stope is a shrinkage stope about 170 feet long and 5 feet wide and had been advanced to within about 20 feet of the 1600 level. It had been serviced from the

1700 level by a manway near each end and a manway raise to the 1600 level near the east end, but, because of a fault near the west end, it was decided to block off the west manway and raise to the 1600 level. The raise broke through into the 1651 drift about 20 feet east of the "Y" formed by the 1651 drift, the crosscut to the E vein, and the crosscut to the 53 vein, which crosscuts extend respectively in southwesterly and northeasterly directions.

The nearest other stope in which mining was in progress at the time of the accident was the 1651-13 cut-and-fill stope. The west end of this stope was almost directly over the east manway raise of the 1751-14 stope and about 50 feet above the 1600 sill. About thirty holes were being blasted in the east end of this stope at the time of the accident.

Three men, T. Lawrence, A. Archutick, and S. Kral, were working in the 1751-14 stope. Lawrence was the lead miner. Fifteen holes had been drilled in the west raise, which was to break into the 1600 level on that blast. Thirteen holes were loaded and 12-foot fuse was used; about 1 foot was trimmed from each fuse. At blasting time Lawrence and Kral lit the round. Archutick at that time had gone to the 1600 level. When the round had been lit, Lawrence and Kral left the stope via the east manway raise, proceeded along the 1651 drift over the proposed break-through and met Archutick just past it. Archutick and Kral were to guard the E vein crosscut while Lawrence guarded the 53 vein crosscut. The 1651 drift was guarded by miners from the 1651-13 stope.

Archutick and Kral, after waiting a short time, reported to be about three minutes, returned to the proposed break-through. As they came near it a blast occurred. Kral was knocked down and Archutick, who was about 6 feet behind him, was severely cut about the face. Archutick crawled back to the crosscuts and found Lawrence, who summoned assistance.

No reason could be found to account for Kral and Archutick returning to the scene of the blast without allowing more time to elapse. It is possible that they may have mistaken the shots from the blasting in the 1651-13 stope for their own.

An inquest was held at Bralorne in September, 1955, and the Coroner's jury returned the following verdict:—

"We, the jury, find that Stanislaw Kral came to his death on September 1st, 1955, at Bralorne mine by reason of accident while at work. We find that death was accidental and that no blame is attached to any person or persons. We recommend that general rules *re* explosives and blasting be more rigidly enforced."

David K. Arbuckle, Canadian, aged 33 years, married, and employed as a miner by Akokli Tungsten Mine Ltd., died as a result of injuries sustained when he was struck by a fall of ground in the 3920 north drift of the Valparaiso mine on September 14th, 1955, at about 7.30 p.m. The 3920 north drift had been advanced to a point 230 feet north of the shaft. The first 190 feet had been solidly timbered, and it was decided to halt drifting and extend the timbering to the face because of the sheared and oxidized ground.

Early in the shift, two posts and a cap had been erected 15 feet ahead of the last timbered set and, as a precautionary measure, two 3- by 6-inch lagging, 16 feet long, were placed along the back of the drift. The foreman, R. Welloff, had personally scaled the drift just before this timber was erected. The crew, consisting of A. B. Larsen, R. P. McGregor, and D. K. Arbuckle, were preparing to install an intermediate set when a section of vein and sheared material about 6 tons in weight fell away from a hidden slip plane, broke the lagging, and fell on McGregor and Arbuckle. McGregor received only superficial injuries, but Arbuckle was badly crushed and died en route to the Creston hospital.

An inquest was held in Creston on September 21st, and the Coroner's jury returned the following verdict:—

"David Kirkwood Arbuckle came to his death between the hours of 8 and 9 p.m., September 14th, 1955, en route to Creston Valley Hospital, Creston, B.C., from the scene

of the accident at Akokli Tungsten Mine, Boswell, B.C., as a result of internal and external hæmorrhage due to injuries suffered from falling rock and timber. From evidence given, all due precautions had been taken for the safety of the workman."

Adam Garlinski, Canadian, aged 38 years, married, and employed as a miner by Pioneer Gold Mines of B.C. Limited, was instantly killed by a fall of ground in the 27-65 stope of the Pioneer mine on November 8th, 1955, at about 11.15 p.m.

The 27-65 stope is a horizontal sand-fill stope which had been carried about 40 feet above the 2700 level. It is about 14 feet wide and, at the scene of the accident, the back was about 7 feet above the broken ore. The vein is composed almost entirely of quartz, and in this particular section there is a false hangingwall parallel to and about 3 feet in the vein from the true hangingwall. To control sloughing, rock bolts with head boards or iron mats are used along the hangingwall side of the stope. Access is by means of a cribbed manway and a connection at the north end to the adjacent 22-77 stope. A slusher hoist was set up over the manway and so arranged that ore could be scraped from either end of the stope into an ore-pass on either side of the manway.

A short time before the accident, Garlinski and his partner, M. Van Hemert, had moved a jackleg machine from the south end of the stope to the north end in order that Garlinski could start drilling a new breast round. They both realized there was loose material in the back near the hangingwall, as they had tried to bar it down on their previous shift. Van Hemert started to scrape broken ore from the south end of the stope when he heard rock fall behind him. Upon turning around he could not see Garlinski's light and found him lying on his side beside a large slab of rock. There was a small blood-stained rock near his head. A scaling-bar was found underneath the large slab and a broken plank on the other side. Apparently Garlinski had used the plank to give himself a secure footing while he attempted to bar loose material down. When the large slab fell, it struck the plank, causing him to lose his balance and fall forward. The smaller rock fell immediately afterwards, striking his head and fracturing his skull. The large rock weighed about 1,500 pounds and the small one about 50 pounds.

An inquest was held at Pioneer on November 10th, 1955, and the Coroner's jury returned the following verdict:—

" We, the jury, find that Adam Garlinski came to his death on the 8th day of November, 1955, at the Pioneer Gold Mine while scaling loose ground and being struck on the head by a piece of rock.

" We find that death was accidental, with no blame attached to anyone."

John Oscar Stenberg, Canadian, aged 29 years, married, with one child, and employed as a truck-driver by Associated Enterprises Ltd., Salmo, was instantly killed when the " Payloader " machine, with which he was loading lead concentrates at the Reeves MacDonald mill into a truck, overturned and fell on him at 3.48 p.m. on December 4th, 1955.

The machine was an International Harvester model HA " Payloader " with a bucket capacity of 18 cubic feet. It was used to move concentrates from a pile in the concentrator building to a platform outside and about 10 feet above the ground. A truck was spotted beside the platform. There was a 6- by 6-inch stop-block along the edge of the platform.

Stenberg was seen by a witness, Henry Thomas Beck, to stop the " Payloader " against the stop-block. As he was about to dump the bucket, the back wheels of the machine left the platform and the " Payloader " spun upside down into the truck, the body of which was about 6 feet below the platform. Stenberg was caught in the driver's seat against the outer side of the truck body and was crushed to death.

An inquest was held at Salmo on December 12th, and the Coroner's jury returned the following verdict:—

" We, the jury, find that John Oscar Stenberg met his death by being crushed between the ' Payloader ' and the truck at approximately 3.45 p.m., Sunday, December

4th, 1955. This accident occurred at the loading ramp of the Reeves MacDonald mine concentrator.

" We believe that the deceased met his death by lack of due care and attention and obviously overlooking instructions previously given to him by his employer Mr. Ray Kline. There is no blame attached to any other party.

" We recommend that a safety device, such as a cross-bar, be installed to prevent the bucket of the ' Payloader ' being raised beyond a safe point when dumping."

This verdict is not agreed with, as the machine was apparently badly overloaded.

Stenberg was not employed by the Reeves MacDonald mine, nor was the equipment the property of the mining company, so this cannot be recorded as a mining accident.

Patrick Derham, aged 26 years, Irish, single, and employed as a motorman by Bralorne Mines Limited, was almost instantly killed when he apparently fell off his motor and was crushed by it in the 2177 E. drift of the Bralorne mine on December 23rd, 1955, at about 10 p.m.

There were no actual witnesses to this accident. Derham and his partner, R. K. Lacey, were tramming waste on the 2100 level from a chute adjacent to the Crown shaft to No. 8 stope, a distance of about 1,200 feet. They were using a small 1½-ton battery locomotive. They were eating their lunch about 9.45 p.m. when Derham decided to go to the shaft station for a water-bottle. When he did not return after about ten minutes, Lacey walked toward the station to look for him. He found Derham pinned under the back end of the locomotive about 300 feet from where they had started their lunch. As he could not lift the locomotive, he obtained help and Derham was extricated and taken to the hospital without delay. He was pronounced dead on arrival, although a slight pulse had been detected when he was in the mine.

The locomotive was travelling backward toward the Crown shaft when the accident happened. Derham could have either fallen off the locomotive or his hat could have fallen off and the lamp cord caught under the wheels and pulled him off, as his hat, battery, and lamp were all found beside the track near the scene of the accident. The controller was found in the neutral position. Both locomotive and track were in good condition.

An inquest was held at Bralorne on December 24th, 1955. Medical evidence to the effect that the man died from asphyxia due to compression of the chest wall complicated by internal hæmorrhage was given.

The Coroner's jury returned the following verdict:—

" Death was caused by asphyxiation at Bralorne mine's 2100 level as described in diagram, about 10 p.m., 23rd December, 1955.

" Death was met through misadventure with no blame attached to any individual or individuals.

" In cases of asphyxia this jury recommends that artificial respiration be applied immediately after the removal of cause when any sign of life may exist."

The jury's rider regarding artificial respiration is open to question. No one but a doctor was qualified to state whether or not artificial respiration should have been given. The first-aid men at the scene of the accident in all likelihood used good judgment and followed out their training in not applying it.

FATAL ACCIDENTS AND ACCIDENTS INVOLVING LOSS OF TIME

Seven fatal accidents and 280 accidents involving a loss of time of seven days or more were reported to the Department. These were investigated and reported on by the Inspectors of Mines.

The following table lists these accidents as to mining divisions:—

Mining Division	Number of Accidents
Vancouver	76
New Westminster	2
Lillooet	55
Cariboo	47
Similkameen	6
Osoyoos	8
Greenwood	2
Kamloops	1
Nelson	9
Slocan	10
Revelstoke	2
Fort Steele	37
Golden	15
Atlin	10
Skeena	2
Omineca	3
Liard	2
Total	287

The following three tables classify these accidents as to cause, occupation, and as to parts of the body injured.

ACCIDENTS CAUSING DEATH OR INJURY CLASSIFIED AS TO CAUSE

Cause	Number of Accidents	Percentage of Total
Blasting	4	1.4
Breaking of ladders and staging	1	0.4
Falls of ground	56	19.5
Falling and flying material	13	4.5
Falls from ladders or staging	6	2.1
Slipping and falling	47	16.4
Lifting and handling material	126	43.9
Machinery and tools	22	7.6
Run of ore or waste	1	0.4
Burns or shock	5	1.7
Miscellaneous	6	2.1
Totals	287	100.0

ACCIDENTS CAUSING DEATH OR INJURY CLASSIFIED AS TO THE OCCUPATION OF THOSE INJURED

Occupation	Number of Accidents	Percentage of Total
Underground—		
Barmen	1	0.4
Chutemen	10	3.5
Haulagemen	26	9.1
Miners	124	43.2
Muckers	28	9.7
Timbermen	16	5.7
Repairmen	4	1.4
Trackmen and pipe-fitters	2	0.7
Skip-tenders	3	1.0
Miscellaneous	26	9.0
Supervisors and staff	7	2.4
Surface—		
Shops	17	5.9
Mill	13	4.5
Surface, general	10	3.5
Totals	287	100.0

ACCIDENTS CAUSING INJURY CLASSIFIED AS TO THE PARTS OF THE BODY INJURED

Location	Number of Accidents	Percentage of Total
Head and neck	19	6.6
Eyes	9	3.2
Trunk	33	11.5
Back (including shoulders)	61	21.3
Arms (including wrist)	21	7.3
Hands and fingers	50	17.4
Legs and ankles	52	18.1
Feet	25	8.7
Toes	8	2.8
Gas poisoning	2	0.7
Fatal	7	2.4
Totals	287	100.0

DANGEROUS OCCURRENCES

The following dangerous occurrences were reported as required by section 9 of the "Metalliferous Mines Regulation Act" and investigated by the Inspectors of Mines.

On January 18th, 1955, the cage-tender and two miners were being hoisted from the 5400 level in the Tulsequah Chief shaft. In addition, there were two 8-foot and three 5-foot lengths of steel which projected outside the cage. At a point 30 feet above the 5700 level the 8-foot steel caught on a back wall plate and gouged into it. The hoistman felt the extra drag on the rope and stopped the cage immediately. The men left the cage and climbed down the manway to the 5400 level.

The shaft and hoisting gear were inspected by the master mechanic and senior officials of the mine. The steel was bent and two wall plates and the cage door were damaged. No damage was done to the rope, rope clamps, cage, or other parts of the hoisting equipment.

This occurrence was undoubtedly due to failure to observe the provisions of Rules 171 (*a*) and 174 of the "Metalliferous Mines Regulation Act." Following this incident, strict instructions were issued to skip-tenders, and new arrangements were made for transporting steel in the shaft.

On January 20th, 1955, at the Britannia mine a crack was discovered in the drum of the hoist of No. 1 shaft during a routine inspection. The hoist had been in operation for over forty years. Repairs were made immediately.

On January 27th, 1955, on the 4500 level of No. 8 mine at Britannia, a small electrical fire resulted from a short circuit due to the improper insertion of the battery cord plug into the receptacle for charging batteries. Little damage was done.

On February 17th, 1955, on the 32196-Sub Z-3900 level of the Sullivan mine, a miner was resetting a slusher-block anchor bolt by driving it into the bootleg of a purposely extended drill-hole when a minor explosion occurred. No one was injured. It is believed that some unexploded powder had been blown past the blocking into the bottom of the extended hole and, on being struck with the anchor bolt, detonated. The practice of using extended holes, in which blasting has been done, for setting anchor bolts has been prohibited.

On March 2nd, 1955, in the No. 1 shaft of the Bluebell mine, a high-back supply skip used for transporting materials in the shaft derailed, causing damage to the shaft timbers below the zero level. It is believed the high-back front wheels came off the track due to a combination of speed, inherent weakness in the high-back design for short light loads, and to a high centre-line attachment of the cross-cables to the skip. Some changes in design have been made, and additional operational instructions for loading and hoisting high-back skips have been instituted to avoid a repetition of this type of accident.

On March 22nd, 1955, at the No. 2 ore-pass on No. 6 level of the Silver Giant mine, two miners failed to adequately guard all entrances to the scene of a blasting operation, with the result that a mine mechanic walked into the blast. He received no injuries. The blasting certificates of the miners were suspended for three months for failing to observe safety regulations.

On March 26th, 1955, at the bottom of the surface skipway at the Copper Mountain mine, a crew of workmen were transferring 760 cases of explosives from a railway box car and loading it on a skip for removal to the main explosive magazine. One workman indulged in horseplay which resulted in some of the workmen dropping cases of explosives which they were carrying. He also smoked on top of the skip carrying ninety cases of explosives. He was discharged and his blasting certificate cancelled.

On March 30th, 1955, a piece of fly rock from blasting operations at Bench 3, No. 1 Open Pit at Copper Mountain, was projected over the rim of the pit and went through the roof of a private residence, a straight-line distance of approximately 600 feet. The roof of the house was damaged, as were the floor, a rug, and a refrigerator. Fortunately no one was injured. Satisfactory repairs and adjustments were made by the company. This experience resulted in the adoption of more stringent blasting procedure.

On April 4th, 1955, on Bench 3, No. 1 Open Pit at Copper Mountain, a blaster failed to take the final precautions of personally checking the blast area before pulling the blasting-switch. An automobile which was left in the blast area (because the blasting-whistle was blowing) was damaged by fly rock. The blaster was discharged and his blasting certificate suspended.

On April 11th, 1955, in M-6-3 stope of the Sullivan mine, two miners failed to adequately guard all entrances to the scene of a blasting operation and failed to turn on a blasting warning whistle, with the result that two men walked into the blast. No injuries were received. The blasting certificates of the two miners were suspended for a period of three months for failing to observe safety regulations.

On April 13th, 1955, a small amount of powder and an electric detonator had been placed to break a rock in the No. 1 jaw crusher at Copper Mountain. The operator was

attaching the first leg wire to the blasting-board when an explosion occurred. The operator was in a protected position and was not injured by the blast. The electrical crew could not account for the detonation as there was no indication of stray current or static electricity. The charge might have been hit by a rock falling from the muck hanging above the chute fingers or the charge might have slipped and been squeezed by the jaw of the crusher.

On April 15th, 1955, at the Little Mountain Quarry, Chilliwack Municipality, a coyote blast was prepared for the purpose of breaking about 17,000 tons of rock for dyking. The main crosscut was 70 feet long and from it two tees were driven, one 40 feet long and one 55 feet long. The total powder load was 6¾ tons, placed in seven locations in the workings. The shot was fired with primacord. The shot blew out and scattered rock for over 1,000 feet, doing some damage to roofs of barns and houses in the line of the blast.

At the Noble Five mine of Cody-Reco Mines Limited, in driving 16-23A raise, during the months of March and April, there were several reports that after a shut-down of a few hours a match would not burn. Air samples taken indicated a lowering of the oxygen content due to an influx of carbon dioxide.

On May 13th, 1955, a miner using a jackleg machine was driving 18-189 crosscut at the Cariboo Gold Quartz mine. He lost the sight of one eye as a result of injuries received to his face from a blast which occurred when he attempted to collar a hole in the location of the old cut. The crosscut face had been washed and checked for powder before drilling commenced. The new cut was drilled directly above the previous one and the miner thought it necessary to drill a reliever hole in the old cut.

On May 24th, 1955, on the 800 level of the Silver Giant mine, two miners were lighting eight to ten bulldoze shots. Standard 4-foot fuses, from which 4 inches had been trimmed, were being used. While lighting the last fuse, one of the shots fired, knocking the men down. They received no injuries and were able to get up and leave the area. After a short lapse of time the other shots went off. It is believed that the miners accidentally overtrimmed one fuse or remained too long after commencing to light the fuses.

On June 18th, 1955, in 4249-E2 stope of the Jersey mine of Canadian Exploration Limited, five holes, loaded but not connected up, were detonated prematurely by a lightning discharge that was presumed to have followed a messenger cable to a point near the working-place. No one was in the mine at the time.

On June 22nd, 1955, the power-house and blacksmith-shop at No. 8 portal of the Spider mine of Sunshine Lardeau Mines Limited was totally destroyed by fire. Lightning was suspected as the cause. Buildings were over the regulation distance from the portal and no smoke entered the mine.

On July 2nd, 1955, in the tin plant at the Sullivan concentrator, two pipe-fitters, altering the position of a sulphuric acid pipe-line near the hydroseparator, drained off a quart or more of acid from the line and emptied it into the overflow launder from the hydroseparator. The acid ran on to a concentration of finely ground iron pyrite and immediately generated hydrogen sulphide gas. A strong concentration of this gas was formed and, as there was little or no circulation of fresh air, the men were soon overcome by it. The men were rescued and recovered. Special operating procedures, designed to avoid a repetition of these circumstances, have been adopted for waste acid disposal.

On July 16th, 1955, the tramway weighing station at the Nickel Plate mine was struck by lightning during an electrical storm of unusual intensity and set on fire. The building housed the weigh-scales and the mill service tramway hoist. Building and contents, including the rope on the hoist drum, were destroyed or damaged beyond use.

On July 19th, 1955, at No. 2 Open Pit, Copper Mountain, a pitboss parked a ¾-ton Dodge truck facing down hill on the ground above Bench 1. The vehicle was left in third gear forward with the engine shut off and, reportedly, the brakes applied. The shiftboss got out of the truck to attend to his routine duties. Several minutes later he saw

the unattended vehicle start down hill, but he was unable to stop it, and as a result it continued forward and dropped over the bank on to Bench 1, causing considerable damage to the vehicle. Apparently the brakes were not applied sufficiently and the truck should have been left in reverse gear. The pitboss was demoted.

On July 21st, 1955, a piece of fly rock weighing 3 or 4 pounds was thrown from Bench 5, No. 1 Pit, of the open-pit operations at Copper Mountain. It went beyond the perimeter of the normal blasting zone and struck an occupied residence in the Lower Red Eagle district, a straight-line distance of about 650 feet. The rock broke a window and slightly damaged a heater and the linoleum. There were two women in the house at the time, but they were not injured. The incident was due to an error in judgment in placing and loading the blast-holes. Blasting procedure was revised to prevent a recurrence.

On July 22nd, 1955, an air receiver located outside the compressor-house at Copper Mountain caught fire on the inside. An examination of the valves of the No. 4 Sullivan compressor which supplies air to this receiver did not disclose any indication that a flash had occurred. The fire burning inside the receiver caused it to heat up to such an extent that the paint on the outside caught fire. The compressor and receiver were examined and an investigation was made into the type of oil used. The actual cause of the original ignition was not satisfactorily determined.

On August 8th, 1955, a mill employee entered a fine-ore bin at the Britannia mill to bar down the mill-feed. He was wearing a safety belt and was in view of another employee. The conveyor-belt taking material from the bin was running. Due to the slackness of the rope the workman was drawn knee-deep into the muck. The conveyor-belt was immediately stopped to allow the workman to extricate himself. However, a mill operator below, seeing the belt stopped, started it without ascertaining the cause of the stoppage, and the workman was drawn farther into the muck before the belt could be stopped again. The workman was freed after two hours. Restrictions were placed on starting of belts to prevent further occurrence.

During the day shift on August 19th, 1955, waste was being hoisted in the No. 2 shaft of the Pioneer mine from the 20 sublevel pocket to the surface bin. Shortly before the west compartment skip was to reach the dump, the hoistman was distracted and he allowed the skip to enter the dump at high speed. The overspeed limiting device did not operate, and the skip was stopped by the overwind mechanism just below the sheave-wheel. Two galvanized sheets and the planks supporting them were torn from place but there was no other damage.

On August 25th, 1955, a skip was lowered on a closed spill door just below the 1900 level of the Crown shaft in the Bralorne mine. Muck is hoisted in two compartments with cage-skip combinations. Spill doors are placed across the compartments to divert spill into spill pockets. The position of the spill doors is indicated by a red light in the hoistroom, which goes on when the doors are across the shaft. Apparently the light did not function, and the hoistman, on receiving a call from a lower level, lowered the cage, thinking the spill door was open. The hoist was stopped, but not until enough slack rope had been let out to allow the cable to kink 59 feet above the skip and suffer damage from bending 611 feet higher. Men were prohibited from riding until the rope was replaced and the faulty light switch repaired. This switch has now been replaced by two others which operate independently.

On August 26th, 1955, timber was being transported in the east side cage in No. 2 shaft at Britannia mine. The hood, which had been left open, caught on a guide. The cage was damaged and replaced.

On September 7th, 1955, a 100-cubic-foot Granby car body was suspended below the cage in the No. 7 shaft of the Britannia mine by a long cable attached to the thimble on the hoisting-rope. As it was being hoisted, the car body caught in the shaft timbers and broke loose from the long cable, lodging in the shaft. Only minor repairs were necessary.

On November 2nd, 1955, in 9c stope at the Silver Giant mine, a miner was endeavouring to bar down loose slabs over the stope draw-hole even though he knew muck was being drawn. When the muck moved he was swept down into the draw-hole, where he was trapped in the loose rock for over six hours. He was only slightly injured.

On November 4th, 1955, in 4235 XCW and 48-E-1 working-places in the Jersey mine of Canadian Exploration Limited, forty holes in each working-place had been wired up and connected to a centralized blasting system. Before the rounds could be fired, premature explosions of two and eighteen holes respectively occurred in the working-places, which were approximately 1,000 feet apart. No one was injured. The explosions were apparently caused by electric currents entering the blasting circuit because of a severe electrical storm on surface. The company discontinued centralized blasting and instituted separate blasting of working-places by battery methods. This lessened considerably the chance of electric currents entering the blasting system. (*See* " Investigations into Premature Explosions from Electric Storms.")

On November 5th, 1955, a nipper, while preparing to load timber into the cage in the East compartment of No. 2 shaft at the Pioneer mine, noticed a kink in the rope about 8 feet above the thimble. No satisfactory explanation was given for this kink. It may have occurred on this shift or the previous one as the cage was chaired several times to facilitate loading and unloading heavy equipment.

On November 15th, 1955, the rope in the No. 2 compartment of the Queen shaft in the Bralorne mine broke at the sheave and about 400 feet above the bucket. This bucket was full of muck and was being used as a counterweight while the No. 1 compartment bucket was used for sinking. The rope had been tested and found to be in normal condition three months before the failure and had a factor of safety of 11.5. There was some corrosion and lack of lubrication at the point of failure. Only minor damage was done to the crosshead and shaft timbers just above the blasting set. No one was injured.

On November 20th, 1955, two kinks were found in the rope in the north compartment of the Bralorne Crown shaft. The first was discovered on November 19th when preparations were being made to lubricate the rope, and the other on November 20th just before cutting the rope to remove the first kink. To remove both kinks, 96 feet had to be cut off. No definite reason for the kinks could be established.

On November 29th, 1955, the quarry superintendent at the Windermere quarry of Columbia Gypsum Co. Ltd. was loading a truck from a reciprocating feeder at the surge pile of the quarry. The flow of rock stopped and he climbed on the pile to investigate. The surface of the pile, which had apparently coned with included ice and snow, gave way and he was drawn down to the mouth of the feed-chute by the feeder. He was buried under 6 feet of loose rock for four hours in zero temperature. On being recovered he was found to be suffering only from minor injuries, shock, and exposure.

On December 1st, 1955, in R-8 stope, 4450 level of the Sullivan mine, a miner was collaring a hole in a draw-hole when the drill steel slid three times into a short bootleg. On the third instance an explosion occurred, knocking the man down. He received multiple lacerations of the face, hands, and body. The face had been washed down and the bootleg examined, but some explosive had obviously escaped detection in the bottom of the bootleg.

On December 2nd, 1955, in P-9 stope, 3900 level of the Sullivan mine, two miners prepared two bulldoze shots, one in No. 5 draw-hole and one on the grizzly. One man lit both fuses and guarded one entrance while his partner guarded the other. After the bulldoze in the draw-hole exploded, the man who lit the fuses said he completely forgot the second bulldoze and returned to the grizzly. As he approached, the second shot exploded. He received two puncture wounds in the abdomen.

INVESTIGATIONS INTO PREMATURE EXPLOSIONS FROM ELECTRIC STORMS

The danger in mines of the premature ignition of electric blasts by electric storms has long been recognized. In view of two such occurences this year, either of which might easily have resulted in fatalities, it was decided to hold a meeting to discuss this matter thoroughly and make recommendations as to preventive practices and possible warning methods.

This meeting was held in the office of the Chief Inspector of Mines on November 10th, 1955. The following were present: H. C. Hughes, Chief Inspector of Mines; R. B. Bonar, Senior Inspector of Mines; L. Wardman, Electrical Inspector of Mines; N. Smortchevsky, Chief Electrician, Canadian Exploration Limited; M. A. Thomas, Consulting Electrical Engineer representing Canadian Exploration Limited; and M. D. Saunders, Canadian Industries (1954) Limited.

After a general discussion of the problem of premature firing of electric blasting-caps, both as a result of electric storms and other possible causes, the following recommendations were generally agreed upon:—

(1) One man specially trained and qualified should be appointed by the management to be responsible for the inspection and supervision of electric blasting methods and equipment.

(2) No connection of cap leg wires should be made until just prior to firing the round, and then only after ascertaining that no electric storms are approaching or are in existence. The leg wires of caps in loaded holes should be short-circuited and coiled at the collar of the hole until connection of the blasting-circuit is commenced.

(3) All blasting lead lines should be insulated as well as possible and isolated as much as practicable from all possible conductors of electricity. This would include isolation from pipe-lines, air-lines, etc., as well as from power and lighting lines.

(4) Each working-place should have a separate intermediate or isolating switch.

(5) All blasting lead lines should be sectionalized as much as possible to reduce probability of induced current and potentials.

(6) "Lightning gaps" should be provided by means of removable cord jumpers with plugs and receptacles on each end.

(7) The development of an automatic device for the detection and warning of both the approach and existence of electric storms would appear to be most valuable, as despite all the preceding recommended precautions it is still felt to be very important that all work in connection with electric blasting hook-ups be discontinued and the personnel removed during the duration of electric storms.

PROSECUTIONS

There were no prosecutions in metalliferous mines and quarries in 1955.

Several violations of the provisions of the "Metalliferous Mines Regulation Act" in regard to the use of explosives and blasting procedure resulted in the offenders having their blasters' certificates suspended for various periods, according to the type of offence.

EXPLOSIVES USED IN MINES

The table below shows the quantities of explosives and blasting accessories used in metal mines and quarries in British Columbia in 1951, 1952, 1953, 1954, and 1955:—

	1951 Total	1952 Total	1953 Total	1954 Total	1955 Total	1955	
						Mines	Quarries
High explosives (lb.)	9,162,179	9,935,946	9,237,700	7,652,574	8,420,791	7,979,810	440,981
Blasting-caps	2,570,600	3,159,900	1,890,000	1,815,250	1,982,900	1,831,900	151,000
Electric blasting-caps	163,920	166,740	141,000	232,270	151,685	66,360	85,325
Delay electric blasting-caps (short period)	232,375	250,649	182,771	191,513	283,000	264,600	18,400
Delay electric blasting-caps (sure-fire delays)	105,950	205,140	138,055	70,300	144,875	144,875	.....
Primacord (ft.)	283,000	522,000	647,000	824,000	399,000	379,000	20,000
Safety fuse (ft.)	19,832,300	22,754,200	17,679,000	13,429,800	17,744,900	17,099,700	645,200
Ignitercord (ft.)	151,700	146,600	142,000	206,180	418,800	418,800	.....
Ignitercord connectors	100,900	114,100	114,000	160,501	371,000	371,000	.....

UNDERGROUND DIESEL EQUIPMENT

There were no significant changes in underground diesel equipment in 1955.

The ventilation regulations and procedure for sampling and analysing exhaust gases and mine air have resulted in satisfactory working conditions being maintained where this equipment is used.

AIR-SAMPLING

In addition to routine periodic sampling of diesel exhausts and mine air where diesels were used underground, a total of thirteen samples were taken where special conditions made this necessary. These samples were analysed for oxygen, nitrogen, carbon dioxide, carbon monoxide, methane, and hydrogen as circumstances and conditions indicated.

The decrease in the number of samples taken in recent years is a direct result of improved ventilation to provide better working conditions and reduce dust hazard.

DUST CONTROL AND VENTILATION

Problems in dust control and ventilation have continued to receive the attention of mine operators and Government departments.

Dust counts and ventilation surveys were made by the staff of the Chief Inspector, Silicosis Branch of the Workmen's Compensation Board, and the results of these surveys made available to the Inspectors of Mines.

The following information is taken from " Summary of Dust Conditions at British Columbia Metalliferous Mines during the Year 1955," by the Chief Inspector of the Silicosis Branch of the Workmen's Compensation Board:—

" During the year 1955 seventy inspections were made at metalliferous mines in British Columbia. Fifty-four mining operations were inspected and sixteen of these inspected twice. Included as a portion of the surveys made at the fifty-four mining operations were thirty-nine surveys in crushing plants and thirty-three in assay office grinding rooms. These inspections were made to determine dust concentrations at the various dusty operations, the general underground ventilation, the condition of exhaust systems and other measures adopted for the prevention and elimination of dust. Recommendations and instructions were given for preventive measures to be adopted and for any installations considered necessary to improve conditions found to be unsatisfactory.

" The figure of 300 particles of dust per c.c. of air has been chosen as an objective to work to and not as a condition that would be considered safe in preventing silicosis.

Some operations such as stoper drilling still produce higher averages than 300, and no known practical method has yet been found that will lower the averages below this figure.

"The average dust counts for underground work are divided into three sections: (1) At stoper drilling operations, (2) at leyner, jackleg and plugger drilling operations, and (3) at all other underground operations. Dust counts for crushing plants and assay grinding rooms are kept separately, making in all five categories.

"(1) Stoper drilling operations consistently produce the highest dust concentrations during the time when men are working. Forty per cent of the surveys made in 1955 gave averages of less than 1,000 particles per c.c.

"(2) Leyner, jackleg and plugger drilling operations produce the next highest dust concentrations where men are working underground. Eighty-three per cent of the surveys averaged less than 1,000 particles per c.c. and sixty per cent gave averages below 500 particles.

"(3) All other underground operations represent the averages of all dust counts obtained underground except at drilling operations. They represent the average dust concentration that the greatest number of men are exposed to and are taken at the operations of mucking, hoisting, tramming, timbering, nipping, drawing ore from chutes, scraping, slushing, bulldozing, etc., and in workings where the men spend a portion of their time. Blasting operations produce a large amount of dust but workmen are either not exposed to it or, if exposed, it is only for short periods. Seventy-seven per cent of the surveys made in 1955 gave counts below 300 particles. This is considered very satisfactory.

"(4) Crushing plants: Sixty-four per cent of the surveys made in 1955 gave averages of less than 300 particles per c.c. of air.

"(5) Assay grinding rooms: Eighty-two per cent of the surveys made in 1955 gave averages of less than 300 particles per c.c. of air. This is considered very satisfactory.

"The main measures for dust prevention and elimination are receiving good attention at the mines. The more important of these are good ventilation, thorough wetting of the rock before it is handled in any manner, not subjecting the workmen to dust and fumes from blasting operations, using good exhaust systems in crushing plants and assay grinding rooms, etc.

"Aluminum powder prophylaxis treatments for the prevention of silicosis were given at nine mines during the year. One of these closed in 1955, leaving eight at the end of the year.

"The accompanying graph (p. 124) shows the median of all the averages in the various categories obtained each year since 1937."

MINE-RESCUE, SAFETY, AND FIRST AID

During 1955 the mine-rescue stations at Cumberland, Princeton, and Fernie were fully maintained with modern equipment and an instructor qualified in mine-rescue and first aid was on duty at each station. Each station is equipped with several sets of McCaa 2-hour self-contained oxygen breathing apparatus, at least one set of Chemox 1-hour self-contained breathing apparatus, all-service gas masks, self-rescuers, methane and carbon monoxide detectors of the latest type, one or more H.H. inhalators, and a complete supply of first-aid equipment. Supplies and facilities for charging and servicing all this equipment are maintained.

Training in the use of mine-rescue equipment is given at all stations to all who apply for it, and fully trained mine-rescue teams are given regular monthly practice-training as a unit, not only to keep them familiar with the use of the machines, but to teach them the value of team work in mine-rescue operations.

The mobile mine-rescue unit stationed at Nelson in 1950 continued to be of great assistance in promoting and giving instructions in mine-rescue and first aid at mines

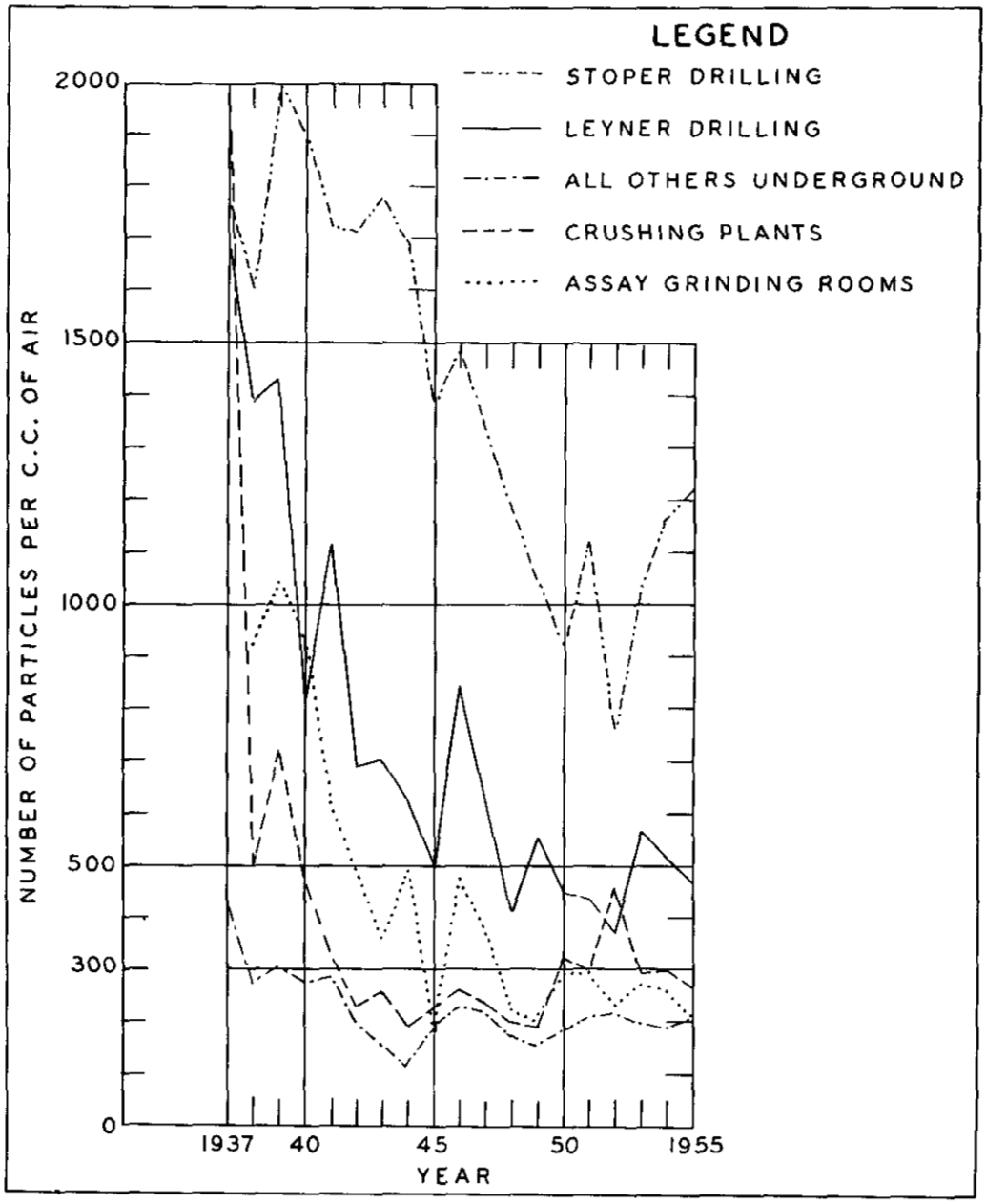


Figure 3. Average dust counts obtained each year since 1937.

tributary to that centre. The new truck, purchased in 1954, proved to be very satisfactory.

Classes in first aid were held at the following mines and localities: Princeton, Copper Mountain, Highland Bell, New Denver, Kaslo, Salmo, Canadian Exploration mine, Riondel, Giant Mascot mine, Mineral King mine, and Estella mine. At these localities a total of 271 seniors and eighty-one juniors took first-aid courses. In addition, some twenty candidates for industrial certificates were given assistance. As the year ended, first-aid classes with a total enrolment of over 100 were in progress at Ainsworth, Nelson, and Procter.

Mine-rescue courses were given at Salmo, Kimberley, Bridge River, Riondel, Kaslo, Ainsworth, and Britannia, and refresher courses in mine-rescue were given at Fernie, Princeton, Giant Mascot, and Mineral King.

Three sets of Chemox oxygen apparatus, one basket stretcher, and a small pyrene fire-extinguisher were purchased from Kelowna Mines Hedley Limited when the mine closed. Two of the Chemox machines were shipped to Yale Lead & Zinc Mines Limited near Ainsworth.

The mobile unit at Nelson answered two emergency calls during the year—one a double drowning at Procter and the second a car-bicycle collision near Nelson. Ambulance service to the Nelson Hospital was provided in the second case.

Special classes in the use of the Chemox apparatus were conducted for the Nelson Fire Department.

The Princeton mine-rescue station was made available to the St. John Ambulance Association for lectures and instruction in first aid, and the Similkameen Branch of the Canadian Institute of Mining and Metallurgy made use of the lecture-room for meetings held throughout the year. The building was also used by the Motor-vehicle Branch for two weeks for the purpose of giving drivers' examinations.

In addition to the mine-rescue equipment maintained at the Government mine-rescue stations, there are several complete sets of McCaa and Chemox apparatus at the Sullivan mine, a set of McCaa at Copper Mountain, and complete sets of Chemox at Wells, the Bridge River camp, and Britannia. Minor amounts of mine-rescue equipment are kept at the operations at Tulsequah, the Toric mine at Alice Arm, the Giant Mascot mine at Spillimacheen, and the Yale Lead & Zinc mine near Ainsworth. This equipment is periodically checked by one of the instructors.

A certificate of competency in mine-rescue work is granted to each man who takes the full training course and passes the examination set by the Department of Mines. During 1955, in addition to the regular teams in training, forty-six men took the full course and were granted certificates, as follows:—

Certificate No.	Name	Where Trained	Certificate No.	Name	Where Trained
2811	Sidney G. Toews	Salmo.	2835	Bernard W. Bradford	Riondel.
2812	William Peligren	Salmo.	2836	Reginald Howard Bush	Riondel.
2813	Thomas Kilford	Salmo.	2837	Angus Gordon Cameron	Riondel.
2814	Kenneth R. Steele	Salmo.	2838	James Elliott Crookshanks	Riondel.
2815	Howard Grinnell Barker	Salmo.	2839	James Bruce Donald	Riondel.
2816	John Frederick Fanset	Kimberley.	2840	George Lawtey	Riondel.
2817	Robert Arthur Spencer	Kimberley.	2841	Cecil Robert Morton	Kaslo.
2818	Bruce Robert Campbell	Kimberley.	2842	Everett John Musgrove	Riondel.
2819	Edward Nigel Doyle	Kimberley.	2843	Charles E. Wood	Riondel.
2820	Angus McIntyre Scott	Kimberley.	2844	Alfredo Barone	Ainsworth.
2821	Alvin Ronald Peterson	Kimberley.	2845	Thomas Bodenchuk	Ainsworth.
2822	Terrant Ogden Bloomer	Kimberley.	2846	Richard Hansen	Ainsworth.
2823	John Alwyn Doyle	Kimberley.	2847	William Hansen	Ainsworth.
2824	Lloyd George Coulter	Kimberley.	2848	Stanley Steven Snyder	Ainsworth.
2825	Myles Norman Anderson	Kimberley.	2849	John Turner	Kaslo.
2826	Lloyd Earl Beach	Pioneer Mine.	2850	Lloyd David Fenske	Mount Sheer.
2827	Paul Coss	Pioneer Mine.	2851	Robert Alstair Fleming	Britannia Beach.
2828	Matti Laukkanen	Pioneer Mine.	2852	Angus John McDougall	Mount Sheer.
2829	Harold May	Pioneer Mine.	2853	Hubert Przybilla	Mount Sheer.
2830	B. C. Murray	Pioneer Mine.	2854	Franz Rahs	Mount Sheer.
2831	Willie F. H. Somerfeld	Pioneer Mine.	2855	Alfonso Paul Rappolder	Mount Sheer.
2832	William John Tonkin	Pioneer Mine.	2856	Kurt Friedrich Traegar	Mount Sheer.
2833	Herbert John Weber	Pioneer Mine.	2857	Joseph J. Wilson	Nanaimo.
2834	Eric Wolfe	Pioneer Mine.			

The Mine Safety Associations in the different centres of the Province, sponsored by the Department of Mines and aided by company engineers and officials, safety supervisors, Inspectors of Mines, and mine-rescue instructors, continued to promote mine-rescue, first aid, and safety education in their respective districts.

First-aid and mine-rescue competitions were held at Cumberland, Princeton, Nelson, Fernie, and Britannia mine. The problems for these competitions are set by the Department of Mines, and the judges are chosen from the staff of Inspectors and mine-rescue instructors.

The Vancouver Island Mine Safety Association held its annual competition at Cumberland on May 28th, 1955. Two teams from Tsable River and a visiting team from Copper Mountain took part in this competition. The Copper Mountain team, captained by Luke Kirby, drew first place.

The Similkameen Valley Mine Safety Association held its annual competition in Princeton on June 4th, 1955. Three teams competed—two from Copper Mountain and a visiting team from Tsable River. The winning team was from Tsable River and was captained by J. Thompson.

The West Kootenay Mine Safety Association held its annual competition at Lakeside Park, Nelson, on June 11th, 1955. Five teams took part in this competition—two from the Bluebell mine, one from Sandon, one from the Yale Lead & Zinc mine, and one from the Canadian Exploration mine near Salmo. The Bluebell No. 1 team, last year's winners, captained by B. C. Ramage, again took first place.

The East Kootenay Mine Safety Association held its annual competition at Fernie on June 18th, 1955. Seven teams took part in this competition—two from Kimberley, two from Michel, one from Fernie, one from Coal Creek, and a visiting team from Copper Mountain. The first prize was won by the Michel Team No. 1, captained by Mario Pettoello. A feature of this competition was the faking of injuries on one of the "patients" by a local man who had taken a course in this work. This added a very realistic touch to the competition.

The Central British Columbia Mine Safety Association held its annual competition at Britannia Beach on June 25th, 1955. Seven teams took part in this competition—two from Bralorne mine, two from Pioneer mine, two from Britannia mine, and one from the Cariboo Gold Quartz mine. The Bralorne No. 1 team, captained by Albert Mracek, took first place.

At all meets, competitions were held in first aid as well as mine-rescue work. In all these competitions, events were held for women and juniors. Representatives from other industries and organizations not necessarily directly connected with mining also participated.

BRITISH COLUMBIA MINING ASSOCIATION SAFETY DIVISION

In 1955 the Mining Association of British Columbia set up a Safety Division, under the supervision of J. B. Biker as Director, with the object of promoting and assisting in establishing and maintaining effective safety programmes at its member mines.

The work of this Division has been in progress since March 15th, 1955.

The major effort of the new organization has been directed to visiting and assisting nearly all member operations, arranging and conducting three supervisor-training classes in accident-prevention policy at Nelson and Vancouver, establishing an office in Vancouver, setting policy for accident reporting by member companies, and effecting a definite understanding and relation with British Columbia Government agencies, especially the Department of Mines and the Workmen's Compensation Board. This is a very worthwhile effort and should result in the establishing of better safety programmes with consequent lower accident frequencies and, therefore, lower compensation costs.

JOHN T. RYAN TROPHY

The John T. Ryan Regional Safety Award for the metal mine with the lowest accident-frequency record for 1954 was won by the Tulsequah mine of The Consolidated Mining and Smelting Company of Canada, Limited, at Tulsequah. In winning this award

the operation achieved the lowest accident record, by Ryan trophy standards, ever made in any mine in British Columbia. The fact that this mine is isolated and in an area where climatic conditions are very severe makes it all the more outstanding. The company's safety organization, officials, and employees are to be highly commended.

The 1954 regional safety award for coal mines was won by the Michel Colliery of The Crow's Nest Pass Coal Company Limited and was presented to the officials and crew at the annual mine-rescue and first-aid competition of the East Kootenay Mine Safety Association that was held in Fernie on June 18th, 1955.

WEST KOOTENAY MINE SAFETY ASSOCIATION TROPHY

Because the West Kootenay District contains many small mines not eligible for the John T. Ryan Safety Awards, and in order to encourage and promote safety in these operations, the West Kootenay Mine Safety Association in 1951 donated a safety trophy for annual competition. In 1955 the area covered by this award was extended to take in all southern British Columbia.

The award is made to the mine having the lowest accident rate and working a total of from 2,500 to 30,000 shifts per year, one-third of these having been worked underground. An accident is taken as one which involves more than four days' loss of time.

The 1955 award was won by the Highland-Bell mine at Beaverdell and was presented at a joint meeting of the West Kootenay Mine Safety Association and the Nelson Branch of the Canadian Institute of Mining and Metallurgy held in Nelson on February 4th, 1955.

Coal

By Robert B. Bonar, Senior Inspector of Coal Mines

CONTENTS

PRODUCTION

The output of the collieries is given in short tons. The gross output of the coal mines of the Province for the year 1955 was 1,484,066 tons, an increase of 36,458 tons or 2.5 per cent over 1954. A total of 326,253 tons came from strip mines at Michel, Tent Mountain (near Corbin), and Blakeburn.

The Vancouver Island District produced 209,784 tons, an increase of 3,864 tons or 1.88 per cent over 1954.

The Northern District production was 35,110 tons, a decrease of 5,821 tons or 14.2 per cent from 1954.

The Nicola-Princeton District production was 74,734 tons, an increase of 43,765 tons or 141.3 per cent over 1954.

The East Kootenay District production was 1,164,438 tons, a decrease of 5,350 tons or 0.4 per cent from 1954.

OUTPUT AND PER CAPITA PRODUCTION, 1955

Colliery and Mine	Gross Output Mined during Year (Tons)	Days Worked	Total Number of Employees	Daily Output per Employee (Tons)	Yearly Output per Employee (Tons)	Number of Employees Underground	Daily Output per Underground Employee (Tons)	Yearly Output per Underground Employee (Tons)
Tsable River Colliery	204,369	240	239	3.56	855	221	3.85	924
Chambers mine	1,562	186	4	2.10	390	4	2.10	390
Loudon mine	555	168	3	1.10	185	2	1.10	277
Lewis mine (Timberlands)	847	202	2	2.09	423	2	2.09	423
Wellington mine (Carruthers)	533	195	2	1.36	266	2	1.36	266
Stronach mine	929	194	4	1.19	232	3	1.58	309
Wellington Blue Flame mine	459	119	2	1.92	229	2	1.92	229
Berkley Creek mine	55	.....	.....	.....	.....	.....	.....	.....
Undun mine	475	147	2	1.61	237	2	1.61	237
Taylor Burson mine (Blue Flame)	11,971	257	20	2.33	598	18	2.58	665
Coldwater Coal mine	1,259	228	4	1.38	315	3	1.84	419
Blakeburn mine (strip)	61,504	291	12	17.60	5,125	.....	.....	.....
Bulkley Valley Collieries	31,460	233	36	3.75	874	24	5.62	1,311
Reschke mine	2,614	180	6	2.42	436	6	2.42	436
Gething No. 3 mine	1,036	115	6	1.50	173	5	1.80	207
Elk River Colliery	308,720	200	369	4.18	836	282	5.47	1,094
Michel Colliery (underground)	590,969	217	707	3.85	836	524	5.19	1,127
Michel Colliery (strip)	233,654	217	48[1]	22.43	4,868	.....	.....	.....
Coleman Collieries (strip)	31,095	.....	12	.....	.....	.....	.....	.....

[1] Does not include men employed in removing overburden.

COLLIERIES OF VANCOUVER ISLAND DISTRICT

The output of Vancouver Island collieries was 209,784 tons. Of this amount, 43,089 tons or 20.5 per cent was rejected in preparation for market and 465 tons or 0.2 per cent was used by the operating companies as fuel under boilers, etc. The total sales

amounted to 173,861 tons, and 6,351 tons was taken from stocks. Of the amount sold in competitive market, 172,944 tons was sold in Canada and 917 tons sold in the United States.

Collieries of the Nicola-Princeton District

The gross total of 74,734 tons produced in the collieries of the Nicola-Princeton District was sold in Canada.

Collieries of the Northern District

The gross total of 35,110 tons produced in the collieries of the Northern District was sold in Canada.

Collieries of the East Kootenay District

The gross output of the collieries in the East Kootenay District was 1,164,438 tons. Of this amount, 114,549 tons or 9.8 per cent was rejected in preparation for market, 16,560 tons or 1.4 per cent was used as fuel under company boilers, etc., and 230,464 tons was used in making coke. Of the amount sold in competitive market, 686,678 tons was sold in Canada and 116,447 tons was sold in the United States.

Output and per Capita Production in the Various Districts, 1955

District	Gross Output Mined during Year (Tons)	Total Number of Employees at Producing Collieries	Yearly Output per Employee (Tons)	Number of Men Employed Underground in Producing Collieries	Yearly Output per Underground Employee (Tons)
Vancouver Island District	209,784	258	813	238	881
Nicola-Princeton District	13,230	24	551	21	630
Northern District	35,110	48	731	35	1,003
East Kootenay District	899,689	1,076	836	806	1,116
Province	1,157,813	1,406	823	1,100	1,052

Note.—The above table deals only with coal mined from underground operations. Coal-stripping operations and the men employed at strip mines are not included.

Output per Man-shift, Underground Mines, 1945–55

Year	Man-shifts[1]	Tonnage	Average per Man-shift (Tons)
1945	627,110	1,518,673	2.42
1946	596,631	1,463,640	2.45
1947	496,727	1,485,476	2.99
1948	434,074	1,281,530	2.95
1949	520,188	1,589,131	3.05
1950	460,159	1,481,813	3.22
1951	442,170	1,434,974	3.24
1952	383,422	1,388,732	3.62
1953	333,922	1,171,932	3.51
1954	280,353	1,064,023	3.79
1955	304,139	1,157,813	3.86

[1] Includes both surface and underground workers.

COLLIERIES OF BRITISH COLUMBIA, 1955—PRODUCTION AND DISTRIBUTION, BY COLLIERIES AND BY DISTRICTS (IN SHORT TONS)

Mine	Gross Output	Washery Refuse	Net Output	Used under Companies' Boilers, etc.	Used in Making Coke	Stocks				Sales				Total Coal Sold and Used[1]
						On Hand First of Year	On Hand Last of Year	Added To	Taken From	In Canada	In U.S.A.	Elsewhere	Total Sales	
Vancouver Island District	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Canadian Collieries (D.) Ltd.—														
Tsable River Colliery	204,369	43,089	161,280	465		21,585[2]	15,234		6,351	167,989	457		168,446	168,911
Chambers mine	1,562		1,562							1,562			1,562	1,562
Loudon mine	555		555							555			555	555
Lewis mine (Timberlands)	847		847							847			847	847
Wellington mine (Carruthers)	533		533							533			533	533
Stronach mine	929		929							929			929	929
Wellington Blue Flame mine	459		459							459			459	459
Berkley Creek mine	55		55							55			55	55
Undun mine	475		475							475			475	475
Totals, Vancouver Island District	209,784	43,089	166,695	465		21,585	15,234		6,351	173,404	457		173,861	174,326
Nicola-Princeton District														
Taylor Burson mine (Blue Flame)	11,971		11,971							11,971			11,971	11,971
Coldwater Coal mine	1,259		1,259							1,259			1,259	1,259
Blakeburn mine (strip)	61,504		61,504							61,504			61,504	61,504
Totals, Nicola-Princeton District	74,734		74,734							74,734			74,734	74,734
Northern District														
Bulkley Valley Collieries	31,460		31,460			21	1,466	1,445		30,015			30,015	30,015
Reschke mine	2,614		2,614							2,614			2,614	2,614
Gething No. 3 mine	1,036		1,036							1,036			1,036	1,036
Totals, Northern District	35,110		35,110			21	1,466	1,445		33,665			33,665	33,665
East Kootenay District														
Crow's Nest Pass Coal Co. Ltd.—														
Elk River Colliery	308,720	27,753	280,967	3,847	1,450					275,149	521		275,670	280,967
Michel Colliery (underground and strip)	824,623	83,643	740,980	12,713	229,014	1,160	900		260	383,587	115,926		499,513	741,240
Coleman Collieries (strip)	31,095	3,153[3]	27,942							27,942			27,942	27,942
Totals, East Kootenay District	1,164,438	114,549	1,049,889	16,560	230,464	1,160	900		260	686,678	116,447		803,125	1,050,149
Coal														
Grand totals for Province	1,484,066	157,638	1,326,428	17,025	230,464	22,766	17,600	1,445	6,611	968,481	116,904		1,085,385	1,332,874
Coke														
Crow's Nest Pass Coal Co. Ltd.—														
Michel Colliery	177,030					22,766	15,850		6,916	117,945	66,001		183,946	

[1] Includes coal used in making coke and coal used under company stationary and locomotive boilers, etc. [2] Includes inventory overrun of 1,280 tons. [3] Estimated.

Collieries of British Columbia, 1955—Men Employed, Distribution by Collieries and by Districts

Mine	Supervision and Clerical			Miners			Helpers			Labourers			Mechanics and Skilled Labour			Boys			Total Men Employed		
Vancouver Island District	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.
Canadian Collieries (D.) Ltd.—																					
Tsable River Colliery	12	1	13	131	.....	131	.....	.....	.....	58	13	71	20	4	24	.....	.....	.....	221	18	239
Chambers mine	1	.....	1	3	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4
Loudon mine	.....	1	1	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	3
Lewis mine (Timberlands)	.....	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Wellington mine (Carruthers)	.....	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Stronach mine	.....	.....	.....	3	.....	3	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	3	1	4
Wellington Blue Flame mine	.....	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Berkley Creek mine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Undun mine	.....	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Totals, Vancouver Island District	13	2	15	147	.....	147	.....	.....	.....	58	14	72	20	4	24	.....	.....	.....	238	20	258
Nicola-Princeton District																					
Taylor Burson mine (Blue Flame)	4	1	5	10	.....	10	1	.....	1	2	1	3	1	.....	1	.....	.....	.....	18	2	20
Coldwater Coal mine	.....	1	1	3	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	4
Blakeburn mine (strip)	.....	2	2	.....	.....	.....	.....	.....	.....	.....	10	10	.....	.....	.....	.....	.....	.....	.....	12	12
Totals, Nicola-Princeton District	4	4	8	13	.....	13	1	.....	1	2	11	13	1	.....	1	.....	.....	.....	21	15	36
Northern District																					
Bulkley Valley Collieries	2	3	5	17	.....	17	4	.....	4	1	2	3	.....	5	5	.....	2	2	24	12	36
Reschke mine	1	.....	1	5	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	6
Gething No. 3 mine	.....	.....	.....	3	.....	3	2	.....	2	.....	1	1	.....	.....	.....	.....	.....	.....	5	1	6
Totals, Northern District	3	3	6	25	.....	25	6	.....	6	1	3	4	.....	5	5	.....	2	2	35	13	48
East Kootenay District																					
Crow's Nest Pass Coal Co. Ltd.—																					
Elk River Colliery	21	16	37	152	.....	152	48	.....	48	28	46	74	33	22	55	.....	3	3	282	87	369
Michel Colliery (underground)	41	30	71	251	.....	251	144	.....	144	24	61	85	64	88	152	.....	4	4	524	183	707
Michel Colliery (strip)	.....	8	8	.....	.....	.....	.....	.....	.....	.....	30	30	.....	10	10	.....	.....	.....	.....	48	48
Coleman Collieries (strip)	.....	1	1	.....	.....	.....	.....	.....	.....	.....	1	1	.....	10	10	.....	.....	.....	.....	12	12
Totals, East Kootenay District	62	55	117	403	.....	403	192	.....	192	52	138	190	97	130	227	.....	7	7	806	330	1,136
Grand totals for Province	82	64	146	588	.....	588	199	.....	199	113	166	279	118	139	257	.....	9	9	1,100	378	1,478

Note.—U.=Underground; A.=Above ground; T.=Totals.

Coal-preparation Plants

There were no additions or extensive alterations made to existing plants in 1955. For full details of plants *see* 1954 Annual Report.

Coke-making

Coke is made at only one plant in the Province, that of the Michel Colliery, The Crow's Nest Pass Coal Company Limited, Fernie. There were no alterations or extensions made at this plant during the year. For full details *see* 1954 Annual Report.

Briquetting

In the third week of February, 1954, the first successful briquetting plant in the Province was brought into production on a 24-hour basis at the Michel Colliery of The Crow's Nest Pass Coal Company Limited, Fernie. The plant comprises two Comarck-Greaves units and has a capacity of 50 tons per hour. It utilizes slack coal from both the Elk River and Michel Collieries. For further details of this plant *see* 1954 Annual Report.

LABOUR AND EMPLOYMENT

In 1955, 1,478 persons were employed in and about the coal mines of the Province, an increase of 44 over 1954.

Because of the 5-day week in force throughout the Province at the larger mines, and the legal holidays, the maximum number of working-days is rated at 241. In the Vancouver Island District the one large mine, the Tsable River mine, worked 240 days. In the East Kootenay District the collieries averaged 207 working-days for 1955.

COMPETITION FROM COAL PRODUCED OUTSIDE OF BRITISH COLUMBIA

In 1955 the shipment of Alberta coal and briquettes to British Columbia totalled 932,764 and 31,714 tons respectively. The following table shows the amount of Alberta coal brought into British Columbia during the past ten years:—

Year	Short Tons	Year	Short Tons
1946	982,413	1951	898,533
1947	899,403	1952	1,021,484
1948	945,700	1953	859,385
1949	891,132	1954	891,194
1950	873,558	1955	932,764

Of the 1,085,385 tons of British Columbia coal marketed, 303,029 tons was sold for domestic and industrial use in Alberta, Saskatchewan, Manitoba, Ontario, and Yukon Territory; 350,196 tons was sold for railroad use in Canada; 116,904 tons was exported to the United States; and 2,925 tons was sold for ships' bunkers.

The amount sold for domestic and industrial use in the Province was 312,331 tons.

ACCIDENTS IN AND AROUND COAL MINES

In 1955 five fatal accidents occurred, as compared with one in 1954. The number of fatal accidents per 1,000 persons employed was 3.38, compared with 0.69 in 1954, 3.22 in 1953, 1.78 in 1952, 3.11 in 1951, 2.21 in 1950, 0.43 in 1949, 2.04 in 1948, 0.82 in 1947, and 1.73 in 1946. The average for the 10-year perior was 1.86.

The number of fatal accidents per 1,000,000 tons of coal produced in 1955 was 3.44, compared with 0.94 in 1954.

The following table shows the collieries at which fatal accidents occurred in 1955, with comparative figures for 1954:—

Name of Company	Name of Colliery	1955	1954
The Crow's Nest Pass Coal Co. Ltd.	Michel Colliery	1	1
The Crow's Nest Pass Coal Co. Ltd.	Elk River Colliery	4	..
Totals		5	1

The following three tables classify the fatal accidents in coal mines as to cause, quantity of coal per accident, and inspection districts:—

Fatal Accidents Classified as to Cause

Cause	1955		1954	
	Number	Per Cent	Number	Per Cent
By falls of roof and coal	2	40.00	....	.....
By falling into coal-chute	..	.....	1	100.00
Asphyxiated by outburst of coal	2	40.00	....	.....
Haulage (underground)	1	20.00	....	.....
Totals	5	100.00	1	100.00

Fatal Accidents Classified as to Quantity of Coal Mined

Cause	1955		1954	
	Number of Fatal Accidents	Coal Mined per Fatal Accident[1]	Number of Fatal Accidents	Coal Mined per Fatal Accident[1]
		Tons		Tons
By falls of roof and coal	2	578,906	....	.....
By falling into coal-chute	....	.....	1	1,064,023
Asphyxiated by outburst of coal	2	578,906	....	.....
Haulage (underground)	1	1,157,813	....	.....
Totals	5	231,562	1	1,064,023

[1] Excludes coal from strip mines.

NOTE.—There were no fatal accidents in strip-mining operations in the years 1955 and 1954.

Fatal Accidents Classified as to Inspection Districts

District	Number of Deaths from Accidents				Totals	
	Falls of Roof and Coal	Falling into Coal-chute	Asphyxiated by Outburst of Coal	Haulage (Underground)	1955	1954
Vancouver Island	....	....	....	....	....	....
Nicola-Princeton	....	....	....	....	....	....
East Kootenay	2	1	2	1	5	1
Northern	....	....	....	....	....	....
Province, 1955	2	....	2	1	5	....
Province, 1954	....	1	....	....	....	1

RATIO OF FATAL ACCIDENTS

District	Accident Death Rate			
	Per 1,000 Persons[1] Employed		Per 1,000,000 Tons[2] of Coal Mined	
	1955	1954	1955	1954
Vancouver Island	.....	.....	.....	.....
Nicola-Princeton	.....	.....	.....	.....
East Kootenay	4.64	0.95	5.54	1.24
Northern	.....	.....	.....	.....
Province, 1955	3.55	.....	4.32	.....
Province, 1954	.....	0.73	.....	0.94

[1] Excludes strip-mining personnel. [2] Excludes strip-mine coal.

In 1955 there were five fatal accidents at the coal mines in the Province; all occurred underground.

On March 9th, 1955, Ludwig Steinman and Willy Weltzin, both aged 25 years, single, Germans, and employed as miners by The Crow's Nest Pass Coal Company Limited, were asphyxiated by being buried in coal from an outburst in 13 split off No. 6 room, 1 slope, No. 3 mine, Elk River Colliery.

Roy Clements, bratticeman, visited the face at 12.30 p.m. After completing his work in 13 split, he was proceeding to the next working-place. When he reached the bottom of the split, he heard two reports, and both miners came running down the split thinking the face was about to blow. The men all sat down for about ten minutes and then returned to the face, where everything appeared normal except for a pocket of explosive gas near the roof. Clements warned the miners of the gas and advised them to leave the place. He then went to report the gas to the overman. He was proceeding by No. 11 split along No. 6 room when he heard a series of reports and knew the face had blown. He ran along No. 6 room, the dust following him as far as No. 6 split. As he could see no sign of the miners, he reported the occurrence to the overman. Chemox apparatus was obtained and an investigation and rescue operations were started immediately. The bodies of both men were found in No. 6 room around the corner of No. 13 split under about 3 feet of coal and about 130 feet from the face. The entire split and about 20 feet of No. 6 room were filled almost to the roof with fine coal.

It was found on removal of the expelled coal that a large portion of the face had blown 75 feet ahead of its original position, and it is estimated that about 500 tons of coal and a large quantity of methane gas was given off.

On August 28th, 1955, about 8.45 a.m., John Cairns, Canadian, aged 39, married, and employed as a fireboss at No. 1 East mine, Elk River Colliery, died suddenly at his home as a result of having been struck on the head by a rock on August 25th, 1955, about 1 a.m., in No. 3 room, No. 1 East mine.

The mine was idle and Cairns and a timberman's helper were timbering in No. 3 room. Cairns had made room for two legs of a set of timber and was stepping back when a piece of rock about the size of a man's fist fell from between the lagging supporting the roof and struck him behind the left ear, making a small cut about half an inch long. He was wearing a hard hat at the time. He complained of a headache during the shift, but did not stop work and also worked the remainder of the week. He also complained of severe head pains several times during the rest of the week, but did not report the accident to the doctor.

Dr. M. McRitchie, of Fernie, was called in by Cairn's wife on Sunday morning, August 28th, but he apparently had died just before the doctor arrived.

An autopsy was performed and a clot of blood 1½ inches in diameter was found underneath the wound and between the skull and brain covering. As no other abnormalities were found, the doctor was of the opinion that pressure from this clot on the brain was the cause of death.

On November 15th, 1955, at 11.20 a.m., Edward Hunter, Canadian, aged 44, married and employed as a miner at the Michel Colliery, was fatally injured when he was struck by a fall of ground at the face of No. 10 pillar-extraction room in "A" East mine, *Michel Colliery.*

The working-place was being angled to the rise off No. 10 room for the purpose of extracting a pillar. The coal is 10 feet thick and the roof at this particular point was very fractured and broken. The working-place had been advanced about 15 feet and the roof was supported by posts and cap pieces. A conveyor was used to take the coal from the face.

Hunter and his partner, Cecil Yakula, were working at the face, Yakula shovelling coal and Hunter preparing a place to set another post. Yakula did not actually see the rock fall but, on turning around while shovelling, saw Hunter lying on the floor severely injured. He pulled his partner clear and summoned help. Hunter was taken to the Michel Hospital, where he died at 6.30 a.m. the following morning. He sustained multiple skull fractures and a dislocated hip. Both men were experienced miners.

On November 30th, 1955, at about 3.30 p.m., Giuseppe Silletta, Italian, aged 30 years, married, and employed as a rope-rider at No. 9 mine, Elk River Colliery, was fatally injured when he was crushed between a 10-ton car and the roof at or near the junction of No. 1 slope and the supply parting.

The slope dips at an angle of 14 degrees. The tipple, a surface extension of the slope, has a single track and a bin to dump 10-ton bottom-dump cars. It is covered by a snowshed. The single-drum hoist is about 80 feet from the portal and there is a safety cut-out switch just in front of the hoist. The supply parting leaves the slope about 40 feet in from the portal and swings to the right; all underground workings are closely timbered. The clearance between the top of the 10-ton car and the timbers varies from 4 to 30 inches. The cars are provided with a rubber-covered platform at each end and with handholds for the rope-rider.

Just before 3.30 p.m., Peter Joinson, loader, assisted Silletta to couple four cars of supplies behind two empty mine cars on the supply road. After coupling the trip, Silletta told Joinson he was going to take the trip to the top of the slope in preparation for the afternoon shift and asked him to turn the switch so that the trip would be ready for lowering down the slope. Joinson followed the trip up, turned the switch, and found Silletta's hard hat just below the switch. He turned the hat in to Henry O'Neil in the firebosses' office. He also looked under the cars, but could see no one, so he assumed Silletta had gone out of the mine. The trip was brought to rest at the top of the slope when it operated the cut-out switch. It was brought out at the inquest that this method of stopping the trip was common procedure.

John Kasnik, afternoon shift rope-rider, entered the slope about 4 p.m. and found Silletta's body in the first car of the trip at the top of the slope. The " bell-ringer " was missing from the hook on front of the first car and was afterwards found on the slope about 15 feet above the switch.

Apparently Silletta mounted the steps on the first car, signalled the hoistman to raise the trip, and, while it was moving, must have raised himself up to look around. He was caught in a low place between the roof timber and the car and thrown into it. An autopsy disclosed several fractured ribs at the top of the chest and a broken neck.

Including the foregoing fatal accidents, 292 accidents involving loss of seven days or more were reported to the Department by the management of the various mines. All these accidents were investigated and reported by the District Inspectors of Mines.

The following three tables classify the accidents in coal mines in 1955 as to occupation of the men involved, as to cause, and as to injury. The fatal accidents are included in the totals:—

ACCIDENTS CLASSIFIED AS TO OCCUPATION

Occupation	Number of Accidents	Percentage of Accidents
Underground—		
Miners	161	55.14
Drillers and foremen		
Haulagemen	73	25.00
Truckmen and mechanics	4	1.37
Supervisors	4	1.37
Timbermen	12	4.11
Coal-cutters	2	0.68
Miscellaneous	14	4.80
Surface—		
Shops	4	1.37
Surface	12	4.11
Preparation and coke-ovens	6	2.05
Miscellaneous		
Totals	292	100.00

ACCIDENTS CLASSIFIED AS TO CAUSE

Cause	Number of Accidents	Percentage of Accidents
Fall of ground	76	26.03
Fall of material and flying material	18	6.16
Lifting and handling equipment and material	104	35.62
Machinery and tools	23	7.88
Slipped and tripped	47	16.10
Falling off staging and platforms	2	0.68
Miscellaneous	22	7.53
Totals	292	100.00

ACCIDENTS CLASSIFIED AS TO INJURY

Injury	Number of Accidents	Percentage of Accidents
Head and neck	24	8.22
Eyes	1	0.34
Trunk	64	21.90
Back	23	7.88
Arms	13	4.45
Hands and fingers	57	19.52
Legs	72	24.66
Feet	35	12.00
Toes	3	1.03
Totals	292	100.00

EXPLOSIVES

The following table shows the quantity of explosives used in underground coal mines in 1955, together with the number of shots fired, tons of coal produced per pound of explosive used, and the average number of pounds of explosive per shot fired (these quantities include all the explosives used for breaking coal and rock work in coal mines):—

Vancouver Island District

Colliery	Quantity of Explosives Used (Pounds)	Coal Mined (Tons)	Total Number of Shots Fired	Average Tons of Coal per Pound of Explosive Used	Average Pounds of Explosive per Shot Fired
Tsable River Colliery	100,800	204,369	127,000	2.02	0.79
Chambers mine	1,100	1,562	1,800	1.42	0.61
Loudon mine	740	555	800	0.75	0.92
Lewis mine (Timberlands)	1,500	847	1,325	0.56	1.13
Wellington mine (Carruthers)	600	533	860	0.88	0.69
Stronach mine	950	929	1,100	0.97	0.86
Wellington Blue Flame mine	350	459	700	1.31	0.50
Berkley Creek mine	75	55	80	0.73	0.93
Undun mine	250	475	500	1.90	0.50
Totals for district	106,365	209,784	134,165	1.97	0.79

Nicola-Princeton District

Taylor Burson mine (Blue Flame)	6,100	11,971	6,000	1.96	1.01
Coldwater Coal mine	1,250	1,259	730	1.00	1.71
Totals for district	7,350	13,230	6,730	1.80	1.09

Northern District

Bulkley Valley Collieries	17,650	31,460	24,600	1.77	0.71
Reschke mine	1,200	2,614	1,200	2.17	1.00
Gething No. 3 mine	1,000	1,036	2,000	1.03	0.50
Totals for district	19,850	35,110	27,800	1.77	0.71

East Kootenay District

Elk River Colliery	8,050	308,720	9,321	38.35	0.86
Michel Colliery (underground)	129,100	590,969	99,310	4.58	1.30
Totals for district	137,150	899,689	108,631	6.56	1.26

Province

Totals for Province	270,715	1,157,813	277,326	4.28	0.94

Quantity of Different Explosives Used

	Lb.
Monobel of different grades	257,215
Permissible rock powder	13,500
Total	270,715

MACHINE-MINED COAL

In 1955, mining-machines produced approximately 411,467 tons or 35.5 per cent of the total output from underground mining. A total of 326,253 tons of strip-mined coal was removed by mechanical means.

District	Machines Driven by—		Type of Machine Used	
	Electricity	Compressed Air	Chain Undercutting	Puncher Type
Vancouver Island	....	....	....	....
Nicola-Princeton	....	6	....	6
Northern District	2	1	2	1
East Kootenay	....	18	5	13
Totals	2	25	7	20

In addition to the above, 211 air picks were used in the mines of The Crow's Nest Pass Coal Company Limited.

SAFETY LAMPS

There were 1,331 safety lamps in use in the mines of the Province. Of this number, 119 were flame safety and 1,212 were approved electric lamps, mostly of the Edison type.

Approved Safety Lamps—Electric and Flame

The following is a list of approved safety lamps, electric and flame:—

The Wolf lamp, flame type.

The Koehler lamp, flame type.

The Edison electric lamp (cap) as Approval No. 18 of the United States Bureau of Mines, and all Edison lamps up to and including Model P, carrying the Approval Certificate No. 26 of the United States Bureau of Mines; Model R-4, Approval No. 29.

The Wheat electric lamp and having Approval No. 20, as issued by the United States Bureau of Mines.

The Wolf electric lamp, No. 830C.

The electric lamp manufactured by the Portable Lamp and Equipment Company, under Approval No. 27 of the United States Bureau of Mines.

M.S.A. single-cell trip lamp, carrying United States Bureau of Mines Approval No. 1009, approved for use on haulage trips in mines.

The Davis M.L. model pneumatic electric lamp.

ELECTRICITY

Electricity is used for various purposes on the surface and underground at six coal mines. A total of 15,112 horsepower was used in and about these mines. Detailed information as to how and where this power is used is given in the report of the Electrical Inspector of Mines.

VENTILATION

Information regarding the quantity of air passing in the main airways and working-places in the various mines is given in the reports of the District Inspectors. Blasting operations are not allowed in working-places where methane can be detected by the use of a flame safety lamp.

Although it has been necessary for the District Inspectors to issue orders prohibiting blasting in several instances, the ventilation in general, as found during inspection visits, was adequate to meet requirements.

METHANE DETECTION

The principal methods used to detect small percentages of methane in the mines are by the use of the M.S.A. detector and by gas analysis.

Regular tests are made on every shift in the working-places and the roadways by the firebosses and other certified mine officials, principally by means of the flame safety lamp. Every candidate for a miner's certificate must show, over and above the other necessary qualifications, that he has a thorough knowledge of the flame safety lamp, of handling it safely, and of the method of testing for methane before he is given a certificate.

AIR-SAMPLING

In addition to regular tests made by use of the flame safety lamp and methane detectors, the Inspector of Mines in each district takes mine-air samples regularly in main return airways and return airways of the various splits, so that a complete record may be kept of the condition of the air passing through the mine. Air samples are also taken by the Inspector and mine officials when there is an abnormal issuance of gas in working-places, and to ascertain the condition of the atmosphere in gob areas and old workings.

INSPECTION COMMITTEES

The provisions of the "Coal-mines Regulation Act," section 65, General Rule 19, require that an inspection committee of workmen shall inspect the mine regularly on behalf of the workmen and make a true report of the conditions found. In all the larger mines of the Province this rule is fully observed, and copies of the reports are sent to the Inspector for the district. The work of these committees is valuable and assists in furthering the interests of safety at the various mines.

COAL DUST

The danger of accumulations of coal dust on the roadways and in the working-places is fully realized, and as a rule the regulations regarding the control of coal dust are adequately carried out. Large quantities of limestone dust are used continually in the larger mines to combat this hazard. It is used in the roadways, working-places, and for the tamping of shots.

Dust samples are taken regularly from roof, sides, and floor of mine roadways and analysed. The reports of the analyses are forwarded to the District Inspector each month. In 1955, 1,694 dust samples from the various mines were analysed, and in all these samples the incombustible content was well over the 50 per cent as required by the "Coal-mines Regulation Act."

DIESEL LOCOMOTIVES

Early in August, 1950, the first diesel underground locomotive to be used in any mine in British Columbia made its trial runs in No. 9 mine, Elk River Colliery, The Crow's Nest Pass Coal Company Limited.

The locomotive is a 15-ton 100-horsepower North British type, and is fully permissible for use in coal mines.

MILLISECOND DELAY DETONATORS

In February, 1951, an amendment to the "Coal-mines Regulation Act" was passed to allow, with the permission of the Chief Inspector of Mines, more than one shot to be fired at a time in any coal mine or district of a mine. For further details *see* 1954 Annual Report.

DANGEROUS OCCURRENCES

On February 4th, 1955, while six cars of coal were being lowered on the surface incline at No. 1 East mine, Elk River Colliery, the first four cars became uncoupled from the trip and ran out of control for a distance of 450 feet before derailing at the safety switch at the bottom of the incline. Two of the cars were severely damaged and 30 feet of snowshed wrecked. A spreading of the draw-bar on the fourth car which allowed the pin to be released was thought to be the cause of the accident.

At about 4 a.m. on June 8th, 1955, the fireboss on shift in No. 6 Right entry district, Tsable River mine, noticed a slight haze and tar-like odour in the extracted area of this section. Tests by a gas detector indicated 0.002 per cent carbon monoxide.

The area, about 200 feet from a previously sealed off fire area, was immediately sealed off by temporary brattice-board stoppings, followed on completion by the erection of permanent block stoppings.

On August 25th, 1955, a large boulder weighing approximately 3 tons was inadvertently pushed over the rock dump at the No. 3 pit in the Baldy Mountain stripping operations, Michel Colliery. The rock rolled down the mountainside for a distance of half a mile, narrowly missing two houses near the foot of the mountain. Damage was confined to a few sections of broken fences around a field and garden near the houses.

On August 31st, 1955, a mobile diesel drilling unit used at the stripping operations on Baldy Mountain, Michel Colliery, got out of control and tumbled down a bank to a disused roadway 40 feet below. The accident caused the diesel fuel to ignite, but the fire was soon extinguished by the use of available fire-fighting equipment. The machine was a total loss.

On November 17th, 1955, a link of a coupling broke on a trip of six loaded cars being hoisted on No. 1 slope, No. 3 mine, Elk River Colliery, allowing five cars to run back down the slope. The cars were derailed by the drag fastened to the rear of the last car, and the damage was confined to three displaced timber supports and three damaged cars.

On November 21st, 1955, the odour of an incipient fire and a slight trace of carbon monoxide was detected in the return airway from an abandoned room off No. 6 Right entry, Tsable River mine. The area involved concerned the last two rooms off the entry, and these were effectively sealed off by temporary brattice board and cloth stoppings, followed immediately by the erection of permanent block seals.

On November 29th, 1955, while a trip of five loaded cars was being hoisted on No. 1 slope, No. 4 mine, Elk River Colliery, the draw-bar on the second car spread and the weight of the last four cars bent the pin, thus uncoupling the cars. Two of the cars overran the drag and ran back down the slope for about 200 feet, where they derailed and knocked out seven sets of timber. Fifteen cars of rock were loaded from the resulting cave. The cars were severely damaged.

On December 3rd, 1955, a small fire was discovered in the lower screen of No. 4 drier at the preparation plant at Michel Colliery. The fire was immediately extinguished, and the damage was very slight. Subsequent investigation disclosed that the hot gases used for drying the coal had not been by-passed from the drier during a temporary stoppage of the plant, and this had caused the coal to become overheated.

On December 3rd, 1955, a large rockslide occurred in No. 4A pit at the Baldy Mountain stripping operations, Michel Colliery. The slide came from the lower part of the hangingwall above the coal seam, and it is estimated that 1,500 cubic yards of rock came down. Indications of warning had been given, and both men and equipment had been moved prior to the occurrence.

On December 24th, 1955, a fire at the Reschke mine, Hudson Hope, destroyed the screen-motor house, tipple, and bunkers, together with about 50 tons of coal that was in the bunkers. The fire was apparently due to the overheating of the coal heater in the screen-motor house.

BUMPS AND OUTBURSTS

On February 8th, 1955, an outburst of gas and coal occurred at the face of No. 3 Right room, off No. 1 slope, No. 3 mine, Elk River Colliery. Sufficient warning was given by the impending outburst to allow the workmen to retreat to a place of safety. Fifty tons of coal was discharged from the face, together with considerable methane gas.

On March 9th, 1955, a major outburst of gas and coal occurred at the face of No. 13 split, off No. 6 Right room, off No. 1 slope, No. 3 mine, Elk River Colliery, which caused the death of two miners by asphyxiation.

Subsequent investigation disclosed that although the customary warnings had been given by the impending outburst, the two men involved had gone back to the face after the warnings had subsided. More than 500 tons of coal was expelled from the face, which filled the split to within 2 feet of the roof for a distance of 110 feet. A large quantity of methane gas was given off during the occurrence. This flow continued for a period of twelve hours following the outburst.

During recovery operations it was found that the seat of the outburst had advanced 75 feet ahead of the original face, and that the roof had taken a sharp upward trend in that direction. A large amount of expelled coal was of a pulverized nature and the remainder consisted of fines.

On April 14th, 1955, a minor outburst of gas and coal occurred at the face of No. 11 room, off No. 3 slope, "A" East mine, Michel Colliery. No one was injured and material damage was limited to one set of timber being dislodged at the face. Fifteen tons of coal was liberated, together with a quantity of methane gas for a short period.

On April 26th, 1955, an outburst of gas and coal occurred at the face of No. 10 room, off No. 3 slope, "A" East mine, Michel Colliery. The incident occurred a few minutes after the miners had left the face at the end of their shift but before they had left the mine. An investigation made soon after the outburst occurred revealed that the ventilation of the district was normal except for a quantity of explosive gas at the face of No. 10 room. Approximately 150 tons of coal was ejected from the face, leaving a cavity in the corner at the high side rib about 15 feet wide that tapered from 9 feet to 1 foot as it extended 21 feet ahead of the face.

On May 4th, 1955, an outburst of gas and coal occurred at the face of No. 11 room, off No. 3 slope, "A" East mine, Michel Colliery. Warnings were given of the impending outburst and the men retreated to safety. A large quantity of explosive gas was liberated and continued to issue for an hour following the outburst. Subsequent investigation disclosed the outburst had taken place in the top section of the seam, and a cavity existed over the coal for 30 feet ahead of the face. It is estimated that 45 tons of coal was ejected by the outburst, and approximately 200 tons was loaded before a solid face was reached.

On June 21st, 1955, an outburst of gas and coal occurred at the face of No. 7 split, off No. 6 room, off No. 3 slope, "A" East mine, Michel Colliery. No one was injured and no material damage was done, although it was estimated that 20 tons of coal was ejected from the face, together with methane gas, which was given off for a short period and affected two working-places. It was stated that the customary warnings of the impending outburst were absent, but that the outburst was accompanied by a loud report, which was heard throughout the district. The split in question was bisecting a large pillar 200 feet square. Extensive gobs were on the inby side and to the rise of the pillar.

PROSECUTIONS

Peter Rakas, miner, Michel Colliery, was prosecuted on July 15th, 1955, under General Rule 43 (*a*), section 65 of the " Coal-mines Regulation Act," for having a match in his possession underground. He was found guilty and fined $10 and costs.

SUPERVISION OF COAL MINES

During 1955 seventeen companies operated twenty-six mines, employing 1,100 men underground. In the supervision of underground employees there were 4 managers, 15 overmen, 2 shiftbosses, and 62 firebosses, or approximately 1 official for every 13 men.

"COAL SALES ACT"

LIST OF REGISTERED NAMES OF BRITISH COLUMBIA COALS, APPROVED BY THE CHIEF INSPECTOR OF MINES, IN ACCORDANCE WITH THE PROVISIONS OF THE "COAL SALES ACT."

Registered Name of Coal	Colliery and Location	Producing Company
Comox	Tsable River mine, Comox Colliery (Cumberland)	Canadian Collieries (D) Ltd.
Hi-Carbon	Mixture of Canadian Collieries coal and B.C. Electric coke	Canadian Collieries (D) Ltd.
Old Wellington	No. 9 mine (Wellington)	Canadian Collieries (D) Ltd.
Chambers-Extension	Chambers-Extension	R. H. Chambers.
Cassidy-Wellington	Cassidy mine (Cassidy)	A. H. Carroll.
Taylor Burson	Blue Flame No. 2 mine (Princeton)	Taylor Burson Coal Co. Ltd.
Hat Creek	Hat Creek (Lillooet)	Canada Coal and Development Co. Ltd.
Bulkley Valley	Bulkley Valley (Telkwa)	Bulkley Valley Collieries.
Crow's Nest, Elk River	Elk River (Coal Creek)	Crow's Nest Pass Coal Co. Ltd.
Crow's Nest, Michel	Michel (Michel)	Crow's Nest Pass Coal Co. Ltd.
Coldwater	Coldwater No. 3 mine (Merritt)	S. Gerrard.
Black Prince	Black mine (Princeton)	R. B. Savage.
Bowron River Coal	Bowron River mine (Prince George)	Central Industries Ltd.
Comac	Tsable River Colliery (Cumberland) and McLeod River Colliery (Alberta)	Canadian Collieries (D) Ltd.

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS

FIRST-, SECOND-, AND THIRD-CLASS CERTIFICATES AND MINE SURVEYORS' CERTIFICATES

The Board of Examiners, formed on July 10th, 1919, consists at present of H. C. Hughes, Chief Inspector of Mines, chairman; Edward R. Hughes, Inspector of Mines, member; and Robert B. Bonar, Senior Inspector of Mines, secretary and member.

The meetings of the Board are held in the office of the Department of Mines in Victoria. The examinations are held in accordance with the amended rules of the Board of Examiners and approved by the Minister. The examinations are held at least once a year, and more often if necessary. Regular examinations were held in 1955 on the following dates: May 11th, 12th, and 13th at the Fernie and Princeton centres, and on November 24th, 1955, a special examination was held at the Fernie centre.

The total number of candidates at these examinations was as follows: For first-class certificates, 3 (2 passed); for second-class certificates, 1 (passed); for third-class certificates, 10 (6 passed); for mine surveyors' certificates, 1 (failed).

The following were the successful candidates: First class—Vans H. Hulbert and Glyn Parry; second class—Albert Littler; third class—Joseph J. Serek, Gordon Murdoch, Peter Kinakin, Richard J. Bryant, William Cytko, and Ronald White.

In addition to the above, an interchange certificate was granted without full examination to the following candidate who held coal-mine official certificates of equal rating from other Provinces or from Great Britain: First class—Zupito D'Amico.

All officials, before engaging in multiple blasting with millisecond delay detonators, are required to obtain a permit to do so from the Board of Examiners (Coal-mine Officials). This permit is issued only after the applicant has successfully passed oral and practical examinations in such work.

Examinations for Certificates of Competency as Coal-miners

In addition to the examinations and certificates already specified as coming under the Board of Examiners, the Act further provides that every coal-miner shall be the holder of a certificate of competency as such. Examinations are held regularly in coal-mining districts, and no certificate is granted where the candidate has failed to satisfy the Board as to his fitness, experience in a coal mine, and a general working knowledge of the English language.

During 1955 there were fifty-three candidates for coal-miners' certificates, two of whom were unsuccessful.

In addition to the certificates granted above, substitute certificates were issued to those who had lost their original certificates.

Permits to act as coal-miners, as provided by the Act, have been granted to younger men by Inspectors in their respective districts. This method allows promising men with less than one year's experience underground to work at the coal face as miners under the guidance of an experienced miner.

The Board of Examiners desires to thank the different coal-mining companies for the use of their premises for holding examinations where necessary.

NOTES ON COAL MINES

VANCOUVER ISLAND INSPECTION DISTRICT

By R. B. Bonar

The gross output of coal from the Vancouver Island Inspection District was 209,784 tons, an increase of 3,864 tons or 1.88 per cent over the 1954 output. Only one large coal mine, the Tsable River mine, is now in production on the Island. Operations in the once important Nanaimo coalfield are now restricted to seven very small mines, providing employment for no more than twenty men. These mines operate in outcrop, pillars, and barriers left during earlier working.

The Island coal-mining industry has suffered a rapid decline in the past few years. Production has declined by as much as 60 per cent since 1951. This condition has resulted from loss of markets due to competition from other fuels, high costs of production, and from the depletion of reserves in the Nanaimo coalfield.

It is pleasing to report that 1955 has been a year free from fatal accidents in the Vancouver Island coal mines, the third such year in succession. There were six accidents classified as serious, three of which occurred underground at Tsable River mine, one at the preparation plant at Union Bay, and two at other surface departments at Union Bay.

In addition to the above, sixty-three minor accidents have been reported and investigated. Two dangerous occurrences took place at Tsable River mine—one on June 8th and the other on November 21st, both arising from gob heating. These are described elsewhere in this report.

The annual mine-rescue and first-aid meet organized by the Vancouver Island branch of the British Columbia Mine Safety Association was held at Cumberland on May 28th. Two teams from Tsable River mine and a visiting team from Copper Mountain mine participated in the mine-rescue competition, and a high standard of performance was maintained. The winning team was the Copper Mountain team, captained by Luke Kirby.

NANAIMO (49° 123° S.W.)

Chambers No. 5 Mine, Extension

R. H. Chambers and associates, operators; R. H. Chambers, manager. This mine is in Section 14, Range 7, in the Douglas district, near Extension. The area was first opened up as a stripping operation in the latter part of 1952 and comprised a small section of the Wellington seam lying close to the surface in the vicinity of the old Vancouver slope workings. By the end of 1954 all available surface coal was depleted, and early in January, 1955, the present slope was started to test the continuity of the seam underground. At the end of 1955 the slope had reached a point about 400 feet from the portal in coal which varied in thickness from 6 to 8 feet. Rooms started to the left off the slope were cut off by a fault which was found to converge on the slope. To offset this convergence the slope was turned to the right to parallel the fault. The last crosscut to the left off the slope indicates that the fault has diverged from its original line. This will make possible continuation of the slope on its original bearing.

Several rooms have been started to the right off the slope but as yet have been driven only a short distance as most of the work has been concentrated on driving the slope to its limit with the object of extracting the coal on the retreating system. The height of the coal at the face of these rooms is 4 feet.

The coal is mined by picking out the middle band of carbonaceous shale by the use of hand-picks. It is then blasted and hand-loaded into cars which are hauled up to the tipple by a gasoline-driven hoist. A small shaker screen sorts the coal into over 2-inch, 1- to 2-inch, and under 1-inch sizes.

Total production in 1955 was 1,562 tons over a working period of 186 days with a crew of four men. Working conditions were found to be satisfactory in the course of inspections, and no accidents were reported.

No. 8 Mine, Timberlands

Glyn Lewis, operator and fireboss. This property comprises two small mines operating in the Wellington seam in a small area of outcrop coal that was left when No. 8 mine was abandoned by Canadian Collieries (Dunsmuir) Limited. The seam outcrops on the side of a ridge parallel to and immediately south of the Nanaimo River valley at an elevation of 540 feet above sea-level. The coal measures dip southward at 8 degrees. The two mines are one-third of a mile apart.

The new mine, which commenced production in May, 1951, is in Range 1, Section 2, of the Cranberry district. It is operated in the Wellington seam in an area of coal outcrop about 1 acre in extent, which is bounded on the west by a thrust fault that also formed the western boundary of the old No. 8 mine. The seam in this area is 6 feet thick, including two thin rock bands. The total production of coal in 1955 came from this mine.

The coal is blasted off the solid and hand-loaded into cars which are hauled to the surface by a small gasoline-driven hoist. A shaker screen sorts the coal into lump, nut, and pea sizes. Total production in 1955 was 847 tons over a working period of 202 days with a crew of two men. Working conditions were found to be satisfactory, and no accidents were reported.

Blue Flame, Wellington (Timberlands) Mine

F. Vlasich, operator and fireboss. This mine is on Lot 194 in the Bright district, about 600 feet west of the Timberlands road and 16 miles by road from Nanaimo. It is operating in the western outcrop of the Wellington seam about half a mile south of the Nanaimo River. The coal ranges from 2 to 3 feet thick and is overlain by a bed of mudstone ranging from 10 inches to 2½ feet thick. In places as much as 10 inches of top coal lie above the mudstone. The main roof is a massive conglomerate. The formation dips 45 degrees to the northeast.

The layout and method of operating this mine have been described in previous Annual Reports. In 1955 the mine operated for seven months. Coal is extracted on the retreating system by driving raises from the level to where the coal pinches out, a distance of about 30 feet. By the end of the year the extraction was within a short distance of the bottom of the slope. It is expected that the reserves of coal will be depleted and the mine abandoned early in the coming year.

Total production in 1955 was 459 tons over a working period of 119 days with a crew of two men. Conditions were found to be satisfactory in the course of inspections, and no accidents were reported.

Berkley Creek Mine

R. H. Chambers and A. Vanger, operators; H. Kirkpatrick, fireboss. This mine is in the Cranberry district, near the old White Rapids mine. It is close to the Nanaimo Lakes road, 15 miles by road from Nanaimo. The mine was brought into production in October, 1954, and operated in the Wellington seam. The layout and method of operating this mine were described fully in the 1954 Annual Report.

This mine only operated during the month of January, 1955, in which time 55 tons of coal was produced.

Undun Mine

J. Unsworth and A. Dunn, operators; A. Dunn, fireboss. This mine, which was brought into production in August, 1954, is three-quarters of a mile northwest of the village of Extension. It operates in the Wellington seam, and the output comes from the mining of pillars and small areas of coal left near the outcrop in the workings of the old Extension No. 6 mine. The Wellington seam is of variable thickness, but the coal is of excellent quality. The measures dip about 10 degrees southwest. The roof is a strong conglomerate.

The coal is blasted off the solid and hand-loaded into cars which are hauled to the surface by a small gasoline-driven hoist. Production in 1955 amounted to 475 tons over a working period of 147 days with a crew of two men. Working conditions were found to be satisfactory in the course of inspections, and no accidents were reported.

Big Flame Mine

Albert Addison, operator; B. Richardson, fireboss. This mine is in Range 5, Section 13, of the Cranberry district. Reopening of the mine, formerly known as the Clifford Coal mine, was commenced early in the year. By the end of the year the main adit had been cleaned up and retimbered where necessary to the face.

There was no production of coal, and no accidents were reported for 1955.

NORTH WELLINGTON (49° 124° S.E.)

Loudon No. 6 Mine

W. Loudon and associates, operators; J. McArthur fireboss. This mine is about 1 mile southeast of Wellington and has been opened up by a slope driven in a small area of outcrop coal in the No. 2 Upper Wellington seam adjacent to the old No. 9 mine workings. Early in the year the slope broke through to the old workings.

The coal is blasted off the solid and hand-loaded into cars which are hauled to the surface by a small gasoline-driven hoist. Production in 1955 amounted to 555 tons over a working period of 168 days with a crew of three men. Working conditions were found to be satisfactory during the course of inspections. One accident on the surface was reported.

Carruthers and Wakelam No. 3

R. B. Carruthers and W. Wakelam, operators; R. B. Carruthers, fireboss. This mine, near the Loudon mine, is also in the No. 2 or Upper Wellington seam adjacent to the abandoned workings of the old No. 9 mine. Production in 1955 amounted to 533 tons over a working period of 195 days with a crew of two men. Working conditions were found to be satisfactory in the course of inspections. No accidents were reported.

Stronach No. 2 Mine

Charles Stronach, operator; H. Gilmour, fireboss. This mine is in a section of the No. 2 or Upper Wellington seam adjacent to the old No. 9 mine. Most of the output comes from the mining of pillars and small areas of coal left in the earlier workings. Production in 1955 amounted to 929 tons over a period of 194 days with a crew of four men. Working conditions were usually found to be satisfactory in the course of inspections. No accidents were reported.

COMOX (49° 124° N.W.)

Canadian Collieries (Dunsmuir) Limited.—Company office, Union Bay. F. Ronald Graham, chairman of the board; R. Whittall, president; E. O. T. Simpson, general manager; W. W. Johnstone, district superintendent. In 1955 this company operated one mine on Vancouver Island, the Tsable River mine.

Tsable River Mine.—S. J. Lawrence, manager; T. Ecclestone, overman; L. Cooper and James Weir, shiftbosses; W. Bennie, J. Cochrane, A. Cullen, M. Frobisher, W. High, L. Hutchinson, and C. Lewis, firebosses.

The layout and method of operating this mine are fully described in the 1954 Annual Report. In 1955 all production came from the extraction of pillars formed by earlier development in the seam.

Because all attempts to find the continuation of the No. 2 seam beyond the second fault system had been unsuccessful, the management decided to penetrate the fault zone by means of a rock tunnel and then diamond drill to locate the seam. An inclined rock tunnel was started to the rise off No. 10 Right entry, Diagonal slope district, and was driven for about 50 feet. Diamond-drill holes located the seam above the rock tunnel,

indicating a thrust fault. The tunnel was continued on the same gradient, and near the end of the year penetrated the seam, which proved to be about 9 feet thick with two 1-inch partings or bands of dirty coal. The development of this new area was done with all possible speed, and early in the year the two levels started from the top of the rock tunnel on the strike of the seam had been driven for about 350 feet where they encountered another fault zone. The displacement on this fault has not yet been determined.

All the coal, both in development and pillar-extraction workings, is blasted off the solid. Electrical multiple blasting with millisecond delay detonators is used throughout the mine. A total of 94,800 pounds of Monobel No. 4 explosive and 127,000 detonators were used during the year.

Total production in 1955 amounted to 204,369 tons over a working period of 240 days with a crew of 221 men underground and eighteen on the surface.

Conditions at the mine have usually been found to be satisfactory in the course of inspections.

First-aid arrangements have been maintained at a satisfactory standard. A suitably equipped first-aid room is provided on the surface, and an ambulance car is held in readiness for emergencies. Five employees hold industrial first-aid certificates, and twenty-four employees hold other first-aid certificates.

Two mine-rescue teams of six men each are maintained, and these attend periodic practices at the Cumberland mine-rescue station.

Sixty-three accidents were reported and investigated, four of which were classed as serious. This represents a decrease of 30.7 per cent in the number of lost-time accidents compared with 1954, and is due to the intensified safety programme put into effect by the management. The management was ably assisted and advised in this work by the Director of the Safety Division of the British Columbia Mining Association. Two dangerous occurrences were reported, both due to heating in gob areas, and are described fully under Dangerous Occurrences in the Coal section of this report.

Five accidents, including two serious, were reported from the surface departments of the company at Union Bay and were investigated.

Regular inspections of the mine were made each month by the inspection committee appointed by the workmen, and copies of its reports were forwarded to the office of the District Inspector through the courtesy of this committee.

NICOLA-PRINCETON INSPECTION DISTRICT

By E. R. Hughes

The increased use of strip-mine coal from Blakeburn at The Granby Consolidated Mining Smelting and Power Company Limited's steam-electric power plant at Princeton was directly responsible for the increase in coal production in this district, from 8,087 tons in 1953 to 30,969 tons in 1954 and 74,760 tons in 1955. The Granby Company's 17,500-kw. power plant uses an average of 210 tons of coal daily, which, at the end of 1955, was supplied almost entirely from the Mullin strip mine at Blakeburn. Taylor Burson Coal Company Limited at Princeton and the Coldwater Coal mine at Merritt continued to produce coal chiefly for local domestic use. Search for a commercial coal seam was conducted without success on Lot 377, which is held by B. Vittoni and N. F. Robb, in the vicinity of Blakeburn. Coal Licences Nos. 32 and 71, covering respectively 57.9 acres in the Princeton coalfield and 320 acres in the Tulameen coalfield, were transferred on December 16th from Michael J. Mullin to Mullin's Strip Mine Ltd. Coal Licences Nos. 69 and 70, covering respectively Lots 297 and 298 at Blakeburn, were transferred on December 16th from Edward Mullin to Mullin's Strip Mine Ltd. Coal Licence No. 29, covering Lot 4221 in the Shorts Creek area, was forfeited on October 24th. No development work was reported from the Cliffview Colliery Limited at Enderby,

nor from the White Lake coalfield where Coal Licences Nos. 67 and 68, covering 2 square miles, are held by John Luttin.

No compensable accidents or dangerous occurrences were reported, nor were there any prosecutions under the " Coal-mines Regulation Act " during the year.

The Similkameen Valley Mine Safety Association held its twenty-fifth annual field-day competitions at Princeton on Saturday, June 4th. The mine-rescue competition was held in the forenoon at Princeton Memorial Park, and the first-aid events were held in the auditorium at the Princeton school. The mine-rescue event was won by the Cumberland team, captained by J. Thompson. A Copper Mountain team captained by Luke Kirby won the mine-rescue competition at Cumberland on May 28th, and another Copper Mountain team captained by Leslie Williamson competed in the East Kootenay Mine Safety Association's mine-rescue competition at Fernie on June 18th.

Princeton (49° 120° S.W.)

Taylor Burson Coal Company Limited

Blue Flame No. 2 Mine.—James Fairley, overman; Thomas Bryden, fireboss. This mine is about 10 miles by road south of Princeton, and about half a mile west of the Hope–Princeton Highway. The portal is 1,750 feet northeasterly from the portal of the old Blue Flame No. 1 mine. The main adit was driven northwestward on a level course for 80 feet, crosscutting the measures. On reaching the seam the main slope was driven 480 feet to the full dip, which here averages approximately 14 degrees. Six levels were turned off to the right from the main slope, and one level was started to the left. The main slope followed the axis of a northwesterly plunging anticline, and when the face had reached within 180 feet southeast of an extracted-pillar section in the old No. 1 mine, it was found that the quality of the coal and the physical condition of the strata were not favourable for further dip development. The No. 6 Right level face was advanced 60 feet north from the bottom of the main slope when crushing so adversely affected operations that further development in the lower workings was discontinued. Contact with the old workings was made in No. 5 Right level and in two places in the No. 2 Right level.

Pillar coal was in the process of being extracted from the developed area below No. 3 Right level on May 18th when tests indicated the presence of from 0.002 to 0.02 per cent of carbon monoxide in the gob area. This was attributed to leakage from a sealed-off area in the abandoned workings of the old No. 1 mine which was closed over twenty years ago. The extraction of the available pillar coal was well advanced when the carbon monoxide was discovered, so the workings below No. 2 Right level were then sealed off as a safety precaution.

Development work consisted of driving No. 2 Right level to a distance of 1,270 feet from the main slope. Further advance on this level was then stopped because of being in inferior coal near the outcrop. At 160 feet from the face of No. 2 level a roadway was turned off to the right and driven 50 feet, at which point a vertical raise was driven to the surface, a distance of 25 feet. This raise was equipped with a ladderway, thus forming the third exit from the mine. A small fan, equipped with a 7½-horsepower compressed-air engine, was installed at the collar of the new exit, and this provided sufficient ventilation for the needs of this small shallow mine. At distances of 550, 760, and 880 feet from the main slope, on No. 2 Right level, there were started three slopes known respectively as Nos. 1, 2, and 3 slopes. No. 1 slope was driven 200 feet. No. 2 and No. 3 slopes were each driven 400 feet and were stopped at a fault which formed an effective barrier between the present workings and the old No. 1 mine.

The coal-bearing zone is about 35 feet thick, and mining is confined to a 6-foot section near the centre of the zone. There are seven thin rock and clay partings, totalling 4 inches, in the part of the seam that is mined. A TD-24 Canadian Ingersoll-Rand com-

pressor with 500-cubic-foot capacity and a TD-18 Jaeger with 365-cubic-foot capacity supply the compressed-air requirements of the mine. There were no major additions to the mine or surface equipment. The total production of coal in 1955 was 11,794 tons. The greatest monthly production was 1,456 tons in December, when eighteen men were employed.

COALMONT (49° 120° S.W.)

Blakeburn Strip Mine

Mullin's Strip Mine Ltd.—Edward Mullin, manager, Princeton. On December 16th, Coal Licence No. 69, covering Lot 297, and Coal Licence No. 70, covering Lot 298, were transferred from Edward Mullin to Mullin's Strip Mine Ltd., and Coal Licence No. 71, covering the east half of Lot 295, was transferred from Michael J. Mullin to Mullin's Strip Mine Ltd. These three licences cover 2½ square miles and include most of the area underlain by the abandoned workings of the former Coalmont Collieries Limited Nos. 3, 4, and 5 mines at Blakeburn. They are about 5 miles by road from the railway at Coalmont. The present stripping of overburden and removal of coal is confined to Lot 298. Overburden is light in this area, and the coal removed is that remaining between the outcrop and the old workings. On December 27th the face of the open pit made contact with the underground workings of the abandoned No. 3 mine. Where contacted the old workings appeared to be standing in good condition. After examination, the opening to the old workings was filled with debris. A D-8 bulldozer is used to remove the overburden and the coal, and a TD-14 2-yard loader is used to load the coal into trucks. The entire production is trucked to the Granby Company's steam-electric power plant near Princeton. Twelve men were employed, including nine truck-drivers. Operations were continuous throughout the year, and 61,530 tons of coal was produced. The largest monthly output was in August, when 9,827 tons was shipped.

MERRITT (50° 120° S.W.)

Coldwater Coal Mines

This property, 1 mile south of Merritt, is operated by the owners, S. Gerrard and partners. Fireboss (on permit), S. Gerrard. Activities were again confined to the Coldwater No. 5 mine and consisted of splitting pillars and extracting remnants of coal left between the abandoned Middlesboro No. 5 mine and the surface, in the area adjacent to and west of the old water-tank and about 250 feet west of the portal of the old Middlesboro No. 4 mine. The seam varies from approximately 4 to 5 feet thick and includes two partings consisting of 3 inches of bone and 1 inch of hard shale. This is a coking coal. The coal is blasted from the solid and is hand-loaded into 1-ton cars which are hauled up the slope by a gasoline-operated hoist on the surface. Ventilation is natural and is sufficient for this small operation. No methane has been detected in the mine workings. The total production of coal in 1955 was 1,259 tons. In December 183 tons was produced and three men were employed.

ENDERBY (50° 119° N.E.)

Cliffview Colliery Limited.—Edward W. Pechr, president; S. A. Lundman, secretary; N. S. Johnson, director, all of Enderby. Development at this property was suspended in December, 1954, and has not since been resumed.

WHITE LAKE (49° 119° S.W.)

White Lake Coalfield.—Coal Licences Nos. 67 and 68, covering 2 square miles in the White Lake coalfield, are held in the name of John Luttin, Keremeos. These licences were renewed for a further period of one year from January 27th, 1955. No work was reported to have been done at this property in 1955.

EAST KOOTENAY INSPECTION DISTRICT

By D. R. Morgan

The production of coal in the East Kootenay Inspection District during 1955 was 1,164,438 tons, a decrease of 5,350 tons from the 1954 production. Most of this was obtained by The Crow's Nest Pass Coal Company Limited, whose mines, situated at Michel and Coal Creek, produced 1,133,343 tons, an increase of 94,655 tons over the 1954 output. The remainder of the production was obtained from a large stripping operation carried out on the interprovincial boundary on Tent Mountain by Coleman Collieries Limited. These workings are on both sides of the British Columbia-Alberta boundary, and the production of coal from the British Columbia side in 1955 was 31,095 tons, a decrease of 100,005 tons from the 1954 output. The production of both companies was curtailed owing to the present state of the coal market; the production from Tent Mountain was further reduced by the fact that most of the mining was done in Alberta.

The accident record for the district in 1955 was not very encouraging, despite the fact that a more intensive safety programme had been instituted to continue the improvement obtained in 1954. This was achieved at Michel Colliery, but there was an increase in the number of accidents for the whole district. Twelve serious accidents were reported under section 59 of the "Coal-mines Regulation Act," and four of these resulted in the deaths of five men. This was four more fatalities than in 1954. All the accidents occurred underground. Minor accidents involving the loss of one or more days totalled 302, of which 259 occurred underground and 43 on the surface, a total of 66 more than in 1954. The serious accidents were classified as follows: Six caused by falls of rock and coal (two fatal), four involved haulage and machinery (one fatal), and one accident caused by an outburst of coal and gas resulted in the death of two men. No accidents were reported from the British Columbia side of the stripping operation on Tent Mountain.

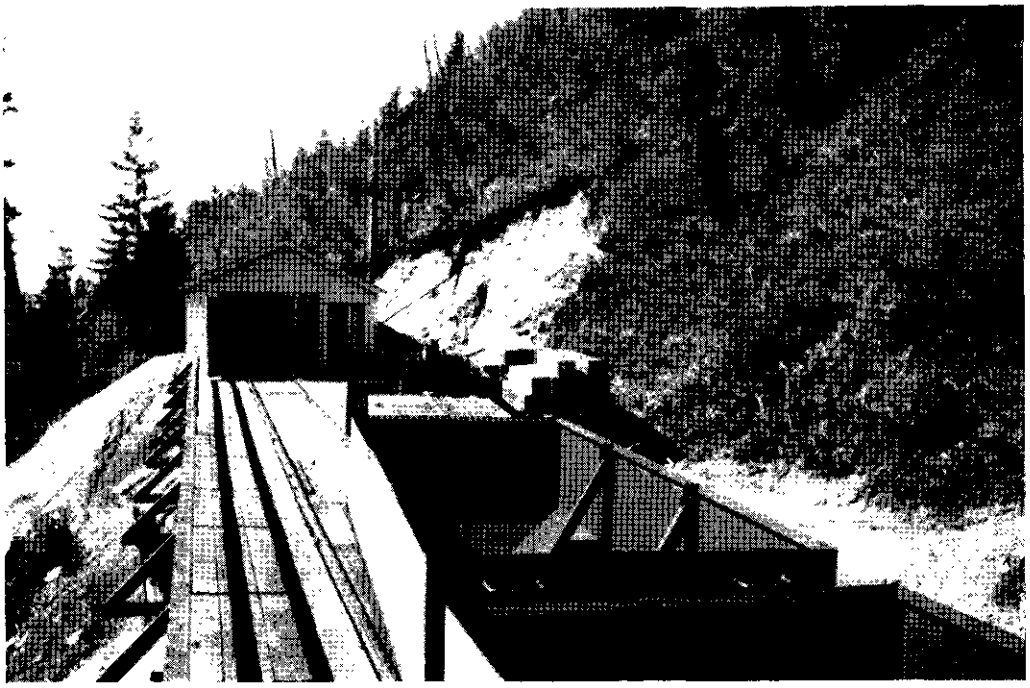
A mine-rescue and first-aid competition was held under the direction of the East Kootenay Mine Safety Association at Fernie on June 18th. Seven teams from Fernie, Michel, Kimberley, and Copper Mountain entered the mine-rescue competitions, and the British Columbia Department of Mines shield was won by the Michel No. 1 team, captained by Mario Pettoello. In the first-aid competitions there were 131 entries, and the men's first-aid cup and shield were won by the Sullivan mill team from Kimberley, captained by R. I. Ralph. Presentation was made by the Chief Inspector of Mines to the Michel Colliery of the regional Ryan trophy for the best safety record in 1954 for the coal mines of British Columbia.

The Crow's Nest Pass Coal Company Limited

T. G. Ewart, president, Fernie; Thomas Balmer, vice-president, 305 Great Northern Railway Building, Seattle, Wash.; H. H. Gardner, general manager, Fernie; James Littler, general superintendent, Fernie; W. R. Prentice, secretary, Fernie; R. A. Colleaux, treasurer, Fernie. This company has conducted large-scale coal-mining operations in the Crowsnest Pass area of the East Kootenay District since 1897, and the present operations include two collieries. Michel Colliery, the larger of the two, consists of extensive underground workings at Michel and a surface-stripping operation on Baldy Mountain near by. It includes a by-product and a briquette plant on the site of the colliery. A brief synopsis of the operations follows.

MICHEL COLLIERY.—(49° 114° N.W.) William Chapman, manager; Irving Morgan, senior overman; Walter McKay, safety inspector; Glyn Parry, afternoon overman.

This colliery is the oldest operation in the district and has the largest output. It is situated on the Crowsnest branch of the Canadian Pacific Railway, 24 miles east of Fernie. There are five mines, each mine being named according to the seam in which it is located and the direction in which it is developed. Four of the mines are developed from a pair of long cross-measure rock tunnels driven into the synclinal structure of the



Ten-ton cars at "A" North mine, Michel.

Stripping overburden on Baldy Mountain.

coal seams on the south side of Michel valley, and the other, the "A" North mine, is developed on the north side of the valley. Each mine is ventilated by an independent fan. In general the method of working is by the room and pillar, and the pillars are extracted in some instances by a modified longwall system. The chief motive power in use underground is compressed air, which is supplied by three electric and two steam-driven compressors on the surface. Two other compressors also supply high-pressure air for operating compressed-air locomotives used on the main haulage roadways in the majority of the mines. Electricity is used in parts of some of the mines for operating conveyors and pumps on the main and secondary roadways, and is being introduced to a larger scale in "A" North mine. The production of coal from all the mines is cleaned and treated for market at a modern preparation plant, a description of which is included in another part of this report.

The combined underground operations of the colliery are under the direct supervision of seven overmen and twenty-seven firebosses.

"A" East Mine.—William Gregory, overman; Frank McVeigh, Frederick Nash, Robert Woods, Harry Saunders, David Thewlis, Sr., and Gordon Murdoch, firebosses.

This mine in "A" seam is on the eastern limb of the Michel syncline and is developed on the left side of the rock tunnels. The seam ranges from 10 to 12 feet thick and dips at an average of 20 degrees in a southwesterly direction. The coal is of good quality and is friable and gassy; the roof is weak and requires careful attention for its support. The mine is worked on the room-and-pillar method, and the pillars are extracted on the retreat.

In general the coal in the rooms is mined by compressed-air picks, shortwall coal-cutters, or blasted off the solid by the use of millisecond delay detonators, and is loaded by means of duckbill conveyors. The pillars are extracted by the shortwall method, and, as the coal is friable, pneumatic picks are used and only occasional shots are necessary. The coal from the pillars is loaded by hand on to shaker-conveyors and transferred to loading points in the rooms by shaker, chain, and belt conveyors. From these loading points the coal is hauled in trips of cars by compressed-air hoists to the main east level, and from there to the surface by compressed-air hoists via the main rock tunnel.

During 1955 the daily production of coal from the mine averaged 550 tons with a crew of 110 men. Most of the production was obtained from two sections of dip workings known as No. 1 and No. 3 slope districts, and the remainder from a small section of pillar workings above the main levels. No. 3 slope district has been the major producer for many years, but, following extensive pillar extraction, operations in this district are rapidly nearing completion. The present operations are confined to dip workings in a small section below No. 7 room that was developed in 1954 to prolong the life of the district, and the pillars left to support the main slope remain to be worked. The No. 1 slope district is located outby No. 3 slope district and is being developed preparatory to completion of the latter district. The main slope has been driven to the base of the syncline, and it is the intention to develop rooms and pillars on both limbs of the syncline. Those on the inby or Sparwood limb, however, will be restricted due to the presence of the old "A" South workings. The conditions prevailing in general at the mine were found to be satisfactory during the course of inspections, but difficulties were experienced during one period from the occurrence of outbursts of gas and coal in the No. 7 room section of No. 3 slope district. Several large outbursts occurred, as reported under Dangerous Occurrences,and in an effort to combat the dangers of these phenomena it was decided by the Chief Inspector of Mines and the management to adopt shock blasting at all working-places showing any indications of an impending outburst. A number of rounds of shots were fired by means of millisecond delay detonators when the mine was idle, but the results to date have not been sufficient to decide the effectiveness of this method.

The mine is ventilated by an electrically driven aerodyne fan which delivers 100,000 cubic feet of air per minute at a 4.6-inch water-gauge. The ventilation was usually found to be satisfactory, although at times difficulties were experienced in coursing the air to the faces of the pillar extraction in No. 3 slope district due to leakages of air through the extensive gobs. On a few occasions various quantities of methane were found at some of the faces, a condition due to defective bratticing. Immediate remedial steps were taken on each occasion.

"A" West Mine.—Harry Corrigan, overman; James Walsh, Thomas Krall, Reginald Taylor, Stanley Menduk, Joseph Fortunaso, John McInnes, Mario Pettoello, Robert Taylor, Richard Hughes, and William Cytko, firebosses.

This mine is in the "A" seam on the eastern limb of the Michel syncline. It is entered on the right side of the rock tunnels, and all the present workings are toward the outcrop. The seam is of good quality, ranging in thickness from 10 to 28 feet, and dipping at an angle ranging from 20 to 35 degrees in a westerly direction. It is worked by the room-and-pillar system, with all the pillars being extracted on the retreat.

The mine is the largest operation at the colliery, and its layout is so arranged that most of the production is obtained from the rooms, which are driven on the strike of the seam. During advancement the coal at the faces of the rooms is mined by shortwall coal-cutters and then blasted. In all the working-places on the pitch of the seam the coal is blasted off the solid by means of millisecond delay detonators. The broken coal is loaded from the rooms by duckbill conveyors on to chain or shaker conveyors, and is transferred to a central loading-point on the main west level by a series of belt-conveyors. All the production of the mine is loaded at this point, and large trips are hauled to a parting in the rock tunnel by compressed-air locomotives. Both compressed air and electricity are used for driving the equipment in this mine, the use of electricity being confined to operating belt-conveyors on the main No. 4 incline.

During 1955 the average daily production was 900 tons with a crew of 150 men. Most of the activities were in the upper section of the main No. 4 incline, where the coal is 28 feet thick; the pillars are extracted by the caving system. All the roadways in this section are driven on the footwall of the seam, and the top coal is supported by timber sets. On extraction of the pillars the sets are withdrawn, and the coal is allowed to fall or is blasted on to the roadways. The rooms are driven at 45-foot centres from the development raises, and the workings are partitioned into panels leaving 60-foot chain pillars to support the main roof. In some instances these pillars are extracted later from the other panels outby. Considerable extraction has already taken place in this area, and the two panels off the No. 7 right belt-road were completed early in the year. Three other panels off the No. 3 left belt-road are in advanced stages of pillar extraction, and to counteract the loss in production on depletion of these reserves, the main No. 4 incline is being advanced toward the outcrop to develop a series of panels above the 4,600-foot elevation. The intention is to develop to the right of the incline first, and No. 9 belt-road together with a companion level are already being driven. The seam in the other section of the mine, which is known as No. 4 belt-road, is of normal thickness, and the pillars are extracted in the ordinary manner. Very little gas is given off by the coal due to its proximity to the surface, and the conditions in general were found to be satisfactory.

The mine was ventilated until October, 1955, by a Sirocco double-inlet fan which produced 65,000 cubic feet of air per minute at a 1.5-inch water-gauge. Since that time the ventilation system has been placed on the No. 3 seam fan, following the abandonment of a mine in that seam. The latter fan, which is electrically driven, is of the axivane type and delivers 80,000 cubic feet of air per minute at a 3.2-inch water-gauge.

"A" North Mine.—John Whittaker, overman; Thomas Slee, Henry Eberts, Sidney Hughes, and Andrew Davey, firebosses.

This mine is operated in the "A" seam on the north side of Michel valley, approximately half a mile east of the preparation plant. At present it is in early stages of develop-

ment, and is worked by a crew of thirty-two men producing 150 tons per day. It is anticipated the mine will develop into a large operation.

The seam is 12 feet thick where normal, and the dip ranges from 15 to 20 degrees in the present location. The mine is being developed on a modified room-and-pillar system, and it is intended to extract the pillars both on the advance and retreat. Present operations are confined to development work, and three companion levels are being driven along the strike of the seam. Off these main levels two inclines are being driven toward the outcrop and rooms are being developed from the inclines. The coal at all the faces is mined with pneumatic picks or blasted off the solid by means of millisecond delay detonators. It is loaded by hand on to shaker and chain conveyors and transferred to various points on the main level, where it is loaded into 10-ton bottom-dumping cars. These cars are taken from the mine by battery locomotives and unloaded into a bin of 50-ton capacity on the surface outside the mine portal. From this bin the coal is trucked to the preparation plant along the old Erickson strip-mine road.

Progress during 1955 was considerably hampered by the thinning of the seam at various points on the main levels and inclines, and by the presence of several small faults. This entailed a great deal of rock work in having to rip the roof or floor in order to maintain sufficient height for the haulage. Much attention has been given to the erection of steel supports in sections of the main level which were reinforced by roof bolts, and their installation has proven successful. The electrical equipment which was introduced into the mine in 1954 has been extended on both the levels and inclines, and the portable compressor used for supplying compressed air for the pneumatic picks has been moved into the mine on the main level. All the equipment is of the permissible type, and its operation has been satisfactory. On the surface a long steel bridge was completed in 1955 which will facilitate the haulage of the coal from the mine to the preparation plant. The bridge extends across the valley, and at a later date the mine will be entered by a new portal driven below the present entry on the same elevation as the bridge. On completion the entire production will be hauled across the bridge by diesel locomotives and along a bank on the south side of the valley to the preparation plant. Two 75-horsepower diesel locomotives have been purchased for the work.

The mine is ventilated by an electrically driven fan which delivers 30,000 cubic feet of air per minute at a 0.5-inch water-gauge. This quantity has been found to be sufficient for the present requirements of the mine.

No. 3 Mine.—The operations at this mine were abandoned in September, 1955, and the material and equipment have since been withdrawn. All the workmen were transferred to the other mines.

A description of the workings is included in the 1954 Annual Report. Since the closure of the mine the main fan for ventilating the workings has been utilized for ventilating the "A" West mine. The main roadways are being kept under repair for this purpose.

" B " South Mine.—William Davey, overman; Thomas Taylor, Henry Batchelor, Robert Doratty, Ronald Saad, and John Krall, firebosses.

This mine is in the " B " seam on the western limb of the Michel syncline. The seam averages 5½ feet thick, is of excellent quality, and dips at 30 degrees beneath a roof of strong shale. The method of working is by a modified room-and-pillar system with pillar extraction on the retreat.

The mine comprises two sections of workings known as the " B " South Level and " B " South Slope districts. It has been one of the most important operations at the colliery for many years due to the excellent coking quality of the coal, and in 1955 produced an average daily production of 740 tons with a crew of 145 men.

Most of the production in 1955 was obtained from the " B " South Level district, which has been developed toward the outcrop from the main south level. It consists of a large panel of workings 1,500 feet wide, and was developed from three raises driven on

the pitch of the seam for a distance of 2,290 feet. Further advancement of the raises was stopped in 1954 due to the presence of numerous rock bands in the seam in that locality, and activity since that time has been concentrated on the extraction of pillars from the rooms on both sides of the raises. This work is rapidly nearing completion, and the pillars at the present time have been extracted to the vicinity of the main incline pillars left to support the raises. These will also be extracted. Other operations in the district include small extractions of incline pillars left from past workings at various points on the outby side of the main south level. The coal at the faces is mined by shortwall coal-cutters or is blasted off the solid by means of millisecond delay detonators. It is conveyed to loading points on the main level by angle chutes, and shaker, chain, and belt conveyors.

The " B " South Slope district is developed on the dip side of the main south level and is entered by No. 3 haulage slope, along which the entire output of the district is hauled. Rooms are driven in pairs along the strike from the slope, and are connected by crosscuts and " splits " which later form shortwall faces for extracting the pillars. The coal at the faces is mined with pneumatic picks, and because it is friable no shot-firing is necessary. It is conveyed to loading points on the rooms by conveyors and hauled in trips of cars to the main south level by compressed-air hoists. Considerable extraction of pillars took place during 1955 from both No. 3 and No. 5 rooms, and the slope at present is being extended to develop another area of workings below these rooms. Conditions in general were found to be satisfactory during the course of inspections.

The mine is ventilated by an axivane fan which delivers 74,000 cubic feet of air per minute at a 4.5-inch water-gauge, of which 40,000 cubic feet is directed to the incline district and the remainder to the slope district. These quantities were found to be sufficient for the requirements of the workings, although on a few occasions small quantities of methane were found at the faces of some of the working-places in the slope district. These were usually due to defective bratticing and were immediately removed.

"A" South Mine.—Vans H. Hulbert, overman; Roger Pasiaud and Herbert Parsons, firebosses.

This is a new operation off the main rock tunnel that was commenced in October, 1955, for the purpose of extracting a large area of coal left in the "A" seam, above the elevation of the abandoned workings in the old "A" South mine. It is the intention to enter the area by means of rock tunnels from two inclines to be driven in the underlying No. 1 seam, and a large barrier pillar will be left to isolate the two workings.

The operation at present is at the initial stage of working in the rock tunnels preparatory to entering the No. 1 seam. The workings are ventilated by the No. 3 seam fan.

In 1955, 122,000 pounds of Monobel No. 4, 7,100 pounds of CXL-ite, and 99,336 electric detonators were used at the colliery in coal and rock blasting. Twenty-six misfired shots were reported.

Four hundred and sixty-two tons of limestone dust were used for application to the roadways at the various mines to minimize the coal-dust hazard and for tamping shots. Monthly mine-dust samples were collected at all the mines and analysed. All the samples were above the minimum requirements of incombustible content.

Monthly examinations were made by the miners' inspection committees at all the mines, and a regular meeting was held at the colliery office each month by the pit safety committee. All the report books kept at the various mines in accordance with the " Coal-mines Regulation Act " were examined periodically and found to be in order.

BALDY MOUNTAIN STRIP MINES.—William Chapman, manager; C. M. Matson, foreman.

These operations are on Baldy Mountain near Michel. In 1955 No. 4A and No. 3 open pits were operated on a contract basis by Mannix Ltd., of Calgary.

All the production in 1955 was obtained from the No. 4A pit, with an average daily output exceeding 1,000 tons. The pit is high on the side of the mountain facing Elk River valley. It is a large mine, in production since early in 1953, and operations are rapidly

nearing completion. The coal is 40 to 60 feet thick, and the overburden has been removed to a predetermined cut line which provides a slope ranging from 45 to 60 degrees in the wall above the pit. Extraction is along the strike of the seam, and the coal is loaded by power shovels into 15-ton trucks which haul the coal to the preparation plant. Conditions in general were found to be satisfactory during the course of inspections, with the exception of a few occasions when difficulties were experienced because of the friability of the strata over the coal. Several rockslides occurred, and some small sections of the pit had to be abandoned.

Operations in the No. 3 pit were commenced in July, 1955, and activity to date has been confined to the removal of overburden. The pit is at a lower elevation and to the south of the No. 4A pit. A large area has been surveyed, and considerable overburden has already been removed. The pit is expected to be ready for production by the time operations in the No. 4A pit are completed. Numerous holes have been drilled to prove the seam, and the coal is expected to range from 40 to 50 feet in thickness.

BY-PRODUCT PLANT.—George Lancaster, superintendent. This plant is operated on the colliery-site at Michel, and a description of the plant is included in the 1954 Annual Report. The batteries were in constant operation during 1955 and produced 177,030 tons of coke, an increase of 8,047 tons over the 1954 output. Periodic inspections were carried out, and conditions in general were found to be satisfactory.

BRIQUETTE PLANT.—Charles Sivell, superintendent. This plant is adjacent to the preparation plant at Michel Colliery, and was first put into operation in 1954. The operation of the plant is governed by the number of days worked by the mines. The production of briquettes in 1955 was 166,828 tons, an increase of 13,976 tons from the 1954 production. A description of the plant is included in the 1954 Annual Report.

ELK RIVER COLLIERY.—(49° 114° S.W.) James E. Morris, manager. This colliery is on Coal Creek, 4 miles east of Fernie, and is connected to the Canadian Pacific Railway by a branch line operated by the Michel, Fernie and Morrissey Railway, a subsidiary company of The Crow's Nest Pass Coal Company Limited. The colliery comprises four mines, which are driven from the outcrops of their respective seams, and are all on the south side of the valley. The coal from all the mines is brought to the same landing on the surface, and is treated on the site in a modern preparation plant which is capable of treating more than 2,000 tons per 8-hour shift. No alterations were made on the surface in 1955, and a description of the preparation plant is given in the 1954 Annual Report.

The combined underground operations are under the direct supervision of three overmen, one assistant overman, and fifteen firebosses. A brief description of the mines follows, in descending order of the seams worked.

No. 1 East Mine.—Arnold Webster, overman; Leonard Brett, Eric Singleton, and Ronald White, firebosses. This mine is in No. 10 seam, and is half a mile east of the present preparation plant. It is the oldest producing mine at the colliery, and has been in operation since 1911, when it was part of the old Coal Creek Colliery. The old section of the mine was abandoned in August, 1954, and the present workings are confined to a small area on the west side of the old workings.

The mine continues to be an important producer, and an average daily production of 400 tons was obtained during 1955 with a crew of seventy-five men. The coal ranges from 12 to 25 feet thick, of which the top 12 feet is worked and is of good quality. It is very friable and is worked by pneumatic picks, no shot-firing being necessary. Both development and extraction of pillars are in progress, and the coal at the faces is loaded directly into cars which are hauled by horses to the partings near the main slope. From the partings the cars are hauled in 6-car trips to the new portal by a 100-horsepower electric hoist on the surface and lowered to the No. 4 landing, from where it is taken in large trips to the preparation plant by steam locomotive.

The mine is ventilated by an electrically driven Sirocco double-inlet fan which delivers 126,000 cubic feet of air per minute to the mine workings at a 2-inch water-

gauge. Of this quantity, 98,000 cubic feet is supplied to the active workings and the remainder is circulated through abandoned workings. The underground conditions were found to be fairly good during the course of inspections.

No. 9 Mine.—Daniel Chester, overman; Albert Littler, Ralph Larner, William Waller, Harry Miller, Henry O'Neil, and Louis Sclippa, firebosses.

This mine in No. 9 seam has been developed from four main entries driven from the outcrop. The entries are at a high elevation on the mountain, and the workings have developed to both dip and rise of the levels. It is a large mine, worked on the room-and-pillar system, but geological structures encountered during the past few years have restricted further large-scale development, and the present operations are confined mainly to extraction of pillars. In an effort to maintain production and prolong the life of the workings, it was decided to advance the No. 1 and No. 5 slopes into the old No. 2 mine workings in the same seam where it was known that many large pillars remained. Advance bore-holes were drilled from both slopes, and an entry was made from the slopes early in 1955. Roadways are being driven to extract some of the pillars in the near future.

The mine continues to be one of the major producers at the colliery, and during 1955 the daily output averaged 475 tons with a crew of 109 men. The seam is 9 feet thick, of excellent quality, and pitches at 15 degrees under a hard sandstone roof. The coal at the faces is cut by pneumatic picks and radial-punching machines, or is blasted off the solid by means of millisecond delay detonators. The coal is conveyed from the faces by conveyors and loaded into cars at various points. The trips of cars are brought to the main level by compressed-air hoists, and are taken out of the mine by a 100-horsepower diesel locomotive. On No. 1 slope, which was driven as a separate entry, the coal is loaded into 10-ton bottom-dumping cars which are hauled up the slope by a 300-horsepower electric hoist on the surface. The cars are unloaded on a ramp outside the mine, and the coal is conveyed by a short belt-conveyor to a retarding conveyor, which transports the entire production of the mine down the mountainside to the preparation plant.

The mine is ventilated by two axivane fans, of which one delivers 64,000 cubic feet of air per minute at a 5.3-inch water-gauge to the main workings of the mine, and the other 23,100 cubic feet per minute at 1.2-inch water-gauge to the No. 1 slope section. These quantities were found to be sufficient for the needs of the workings. Small quantities of methane were found near the roof at some of the faces on a few occasions during the course of inspections, but were usually due to defective bratticing.

No. 4 Mine.—James Brown, assistant overman. This is a small mine operated in the No. 4 seam. The seam is 8 feet thick and of good quality, but the erratic distribution of ash and frequent occurrence of thin rock bands in the coal complicate its preparation for market. The seam dips at 15 degrees and is overlain by a shale roof which in many places is so fractured as to require close timbering.

The mine is operated on the room-and-pillar system, the pillars being extracted on the retreat. The rooms are driven 12 feet wide on a slight grade in favour of the load, and are connected by "splits" driven on the pitch, which are later utilized as shortwall faces for extracting the pillars. The coal is mined with pneumatic picks, radial-punching machines, and blasted by means of millisecond delay detonators. It is loaded on to cars or conveyors by hand, and the cars are formed into trips on the partings and taken out of the mine by compressed-air hoists.

The mine had an average daily output of 130 tons with a crew of twenty-six men during 1955, and most of the activities were directed to the development of a small area of workings off No. 1 slope, to the dip of the main level. Conditions in general were found to be satisfactory, although at times difficulty was caused by an influx of surface water from the roof at the working-faces.

The mine is ventilated by an electrically driven double-inlet Sirocco fan which delivers 35,200 cubic feet of air per minute at a 0.3-inch water-gauge. Normally the mine is ventilated by the exhaust system, but the fan is reversed in the winter months

to act as a blower to prevent ice forming on the main haulage level and the slope. The emission of gas from the coal is slight because of its nearness to the surface.

No. 3 Mine.—James Anderson, overman; Roger Girou, David Brown, Brindley Morris, Kenneth Kniert, William Verkerk, and Michael Tymchuk, firebosses.

This mine is in the No. 3 seam, which is the lowest worked in the colliery at the present time. It is developed from four main entries, and the workings are on both the dip and rise side of the main levels. The seam is 17 feet thick under normal conditions, but thickens considerably toward the inner end of the main levels. The seam dips 20 degrees on the average, and only the top 10 feet is worked. The coal is friable and is mined with pneumatic picks, only occasional shots being necessary. It is very gassy, and a large circulation of air has to be maintained at the faces at all times in order to dilute the gases effectively. The mine is worked on the room-and-pillar system.

The average daily production from the mine in 1955 was 400 tons with a crew of sixty-five men. Most of the output was obtained by the extraction of pillars in the No. 1 slope district. Mining conditions have been found to be more favourable in this section than in other parts of the mine, but considerable difficulties were experienced during one period early in the year by occurrences of outbursts, as is reported in more detail under Dangerous Occurrences. One of these was of major magnitude and caused the death of two workmen, who were buried when over 500 tons of coal was expelled from the face of a working-place. In an effort to combat the dangers of these phenomena, it was decided to adopt shock blasting at all working-places which showed any indications of an impending outburst. Several rounds of shots were fired by means of millisecond delay detonators, but although a fairly large quantity of gas has been released by the shot-firing on a few occasions, the results have not been sufficiently positive to determine the efficacy of the method. Further advancement in this section of the mine was stopped shortly afterwards due to the presence of a fault and dirty coal, and further tests could not be carried out. The pillars have since been withdrawn without incident.

With the exception of No. 5 incline section, all the workings from the main level toward the outcrop in the mine have been abandoned for the time being. The No. 8 incline was in operation for a short period at the start of 1955, but the heavy cost of maintaining the roadways under roof pressures became so excessive that it was decided to stop advancement. These inclines were being driven into a large area of virgin coal, and extreme difficulties had been experienced due to the breaking of timber supports under heavy roof pressures. No. 5 incline is a section of workings being developed between the No. 4 and No. 8 inclines. It is a small area, and conditions up to the present have been found to be fairly good.

The mine is ventilated by an electrically driven aerodyne fan which delivers 82,600 cubic feet of air per minute at a 2.5-inch water-gauge. This was found to be sufficient for the needs of the mine, and conditions in general were found to be fairly good during the course of inspections. Minor difficulties were experienced on a few occasions from the ventilation in the slope district, but were usually found to be caused by defective bratticing or leakages in the various stoppings.

During 1955, 7,850 pounds of Monobel No. 4, 200 pounds of CXL-ite, and 9,321 electric detonators were used at all the mines at the colliery in coal and rock blasting. Four misfired shots were reported.

To neutralize the coal dust, 143 tons of limestone dust was applied to the underground roadways of the mines and used in shot-firing. Monthly mine-dust samples were collected from all the mines and analysed. All the samples were above the minimum requirements of incombustible dust.

Monthly inspections were made at all the mines by the miners' inspection committee, and a copy of each inspection report was forwarded to the office of the District Inspector through the courtesy of the committee members. Meetings were held at the colliery office each month by the safety committees. All report books kept at the various mines in

accordance with the "Coal-mines Regulation Act" were examined regularly and were found in order.

Coleman Collieries Limited (49° 114° N.W.) D. B. Young, general manager, Coleman, Alta.; Arni S. Halldorson, mine superintendent, Coleman, Alta. This company is engaged in a stripping operation on the interprovincial boundary on Tent Mountain near Corbin. Most of the operation is in Alberta, but it extends into British Columbia, chiefly on coal properties owned by The Crow's Nest Pass Coal Company Limited. Three pits have been in operation, but activities on the British Columbia side in 1955 were confined to the No. 2 pit. The seam is in the form of a syncline, and after removal of overburden the coal is extracted from the limbs of the syncline as the depth of the operation increases. The thickness of the seam varies, but it is believed, from information furnished by several drill-holes, that in some places it is more than 100 feet thick.

There was no activity in the No. 4 pit on Lots 7215 and 7002 in British Columbia during 1955, but it is expected that operations will be resumed at a later date.

The conditions in general were found to be satisfactory during the course of inspections. Nearly all the roadways are on the Alberta side of the boundary, and the production from all the mines is transported by trucks to the company's preparation plant at Coleman.

NORTHERN INSPECTION DISTRICT

By A. R. C. James

The coal mines of the Northern District produced a total of 35,109 tons of coal in 1955, a decrease of 14 per cent from the 1954 output. There are two main reasons for this decline: the change-over from the use of coal to oil at the Columbia Cellulose plant at Prince Rupert, resulting in the loss of an important contract by Bulkley Valley Collieries Limited, and the continued lack of market for coal in the Peace River District due to the use of natural gas and other competitive fuels.

The number of operating producers remains the same as in 1954, namely, one company in the Telkwa coalfield and two small operations in the Hudson Hope area of the Peace River District. The number of men employed in coal-mining has declined as a result of lay-offs at Bulkley Valley Collieries following the termination of the Columbia Cellulose contract.

The accident rate for the district remained generally satisfactory; only one accident, involving a fractured right arm, was classified as serious.

TELKWA (54° 127° N.E.)

Bulkley Valley Collieries Limited Company office, Telkwa. F. M. Dockrill, managing director; A. H. Dockrill, superintendent; F. Bond and L. Gething, firebosses. This is a private company mining coal on a royalty basis on property comprising six Crown-granted lots, Nos. 388 to 392 and No. 401. The property is on Goat Creek, a tributary of the Telkwa River, about 7 miles southeast of Telkwa. The mine is connected by a good road with the Canadian National Railway and Highway No. 16 at Telkwa.

The total production in 1955 was 31,459 tons of coal. This represents a 14-per-cent decrease on the 1954 output. The major factor in this decline was the loss of the very important Columbia Cellulose contract in August, when that company changed over entirely to the use of oil at its Prince Rupert plant. Since the loss of this contract the management has been endeavouring, with considerable success, to secure a domestic market for its coal in Prince George, Prince Rupert, and in the communities along the railway between those cities. By December the average daily production reached 90 tons with a crew of sixteen men underground and five on the surface. The mine was in operation 235 days in 1955.

The No. 4 mine was in operation in 1955. After the loss of the Columbia Cellulose contract it was decided to permanently close the No. 2 mine, which in any case had not been worked since the beginning of 1954. Apart from a very small amount of coal remaining in some outcrop pillars, this mine is effectively worked out. It produced a total of over 84,000 tons of coal in the years 1944 to 1954.

The No. 4 mine is on Lot 401 on the west bank of Goat Creek. The seam being worked is 6 feet 8 inches thick and, except for irregular thin lenses of pyritic material, the seam section consists of clean coal. It is overlain by a thick bed of strong grey shale. The coal measures strike in a northerly direction and dip eastward at 5 degrees. As developed up to the present time, the mine broadly comprises two parallel main entries driven up-dip on the seam in a westerly direction for 850 feet. At a point 500 feet from the portal two levels, set off from the right main entry at 50-foot centres, have been driven 1,000 feet in a northwesterly direction. Rooms have been set off west at 40-foot centres from these levels and have been driven approximately 250 feet up-dip on the seam, the pillars between the rooms being extracted on retreat. The total amount of development work completed in 1955 was 4,480 feet.

The coal is blasted off the solid with millisecond delay detonators or, where conditions are suitable, it is undercut first by a coal-cutter. One Mavor & Coulson and one Anderson-Boyes coal-cutting machine is in use. Shot-holes are drilled with Siemens-Schuckert or Victor rotary electric drills, four of which are in use. Transportation of the coal from face to tipple is done entirely by conveyors, the main conveyors being of the troughed-belt type.

The coal is screened with a Tyler Tyrock 3-deck vibrating screen which was installed in August. Four sizes of coal are produced for sale, namely, lump, egg, nut, and stoker. The bunker capacity is 230 tons and comprises five bins.

Conditions in the mine were usually found to be satisfactory in the course of inspections. One serious accident was reported; this was caused by a piece of coal sloughing off a face and striking a workman, resulting in a fracture of the right arm. No methane was detected during inspections. The mine is ventilated by a 30-inch Sirocco axial-flow fan which circulates approximately 10,000 cubic feet of air per minute.

CARIBOO

Bowron River (53° 121° N.W.)

Central Industries Limited

Company office, 409, 713 Columbia Street, New Westminster. Earl N. Lehna, managing director. This is a private company formed at the end of 1952 to continue development of the coal lands held under licence by Bowron Coal Company Limited. These coal lands comprise part of Lots 9592 and 9596 on the Bowron River, about 30 miles due east of Prince George. A short description and history of the property was given in the 1954 Annual Report.

No new work was done in 1955. At the end of 1954 a drilling programme was carried out in the vicinity of Mine Creek, the positions of the drill-holes ranging from 2,700 to 3,800 feet northwest of the adit portal on the west bank of Bowron River. The object of this drilling programme was to try to locate the seam found in the underground workings near the river bank. The holes were drilled on and near the extension of the strike line of this seam. The company kindly sent the writer a copy of the drill logs, and a brief summary of these may be of interest. Ten vertical holes were drilled with a Keystone churn drill. The total footage drilled was 999 feet, and the deepest hole was 223 feet. Overburden, comprising sand, gravel, and clay, ranged from 8 to 68 feet thick, and in most of the holes was over 49 feet thick. Below the overburden the drill-holes disclosed a succession of shales, conglomerates, and sandstones, with occasional thin coal seams. In No. 1 hole drilling was stopped due to inflow of water and insufficient casing

after drilling 3 feet into a coal seam at a depth of 107 feet. In none of the other drillholes, however, was there any indication of a coal seam of mineable thickness.

PEACE RIVER (56° 122° S.E.)

King Gething Mines

Quentin F. (King) Gething, operator and fireboss. This property is on Lot 1039, on the southeastern slope of Portage Mountain; it is 12 miles by road from Hudson Hope and 72 miles from Fort St. John. The mine was described in detail in the 1954 Annual Report. In 1955 it was operated in the winter months as in previous years. Mining has been mainly confined to the upper level, which is now 600 feet long, and to a pair of rooms which have been driven 160 feet up-dip from the level. In November a crew of five men was employed. Production in 1955 was 1,036 tons.

Conditions in the mine were found to be fairly satisfactory in the course of inspections. No methane was detected. No accidents were reported.

Reschke Coal Ltd.

Company office, Fort St. John. Ed Summers, operator; J. Smillie, fireboss. This property is at about 2,600 feet elevation on the steep southern end of a spur of Butler Ridge, 1 mile north of the Peace River. It is 23 miles by road from Hudson Hope and 83 miles from Fort St. John. The seam at present being worked is 4 feet thick and dips at 46 degrees due west. Both roof and floor of the seam are a silty shale.

The layout and method of working were described in detail in the 1954 Annual Report. The main level has not been advanced this year, and operations are continuing in Nos. 20, 21, and 22 rooms. The first two of these rooms were, at the time of the writer's visit in November, being driven up-dip to the surface, a total distance of 600 feet from the main level. When these rooms have been driven through to surface, it is intended to make one of them into a permanent manway and service raise.

The coal is blasted off the solid, using millisecond delay detonators, and is transported by gravity chutes into cars on the main level. The mine worked during the winter months only, and in November a crew of eight men was employed. Production in 1955 was 2,614 tons. Conditions were found to be satisfactory in the course of inspections, and no methane was detected. No accidents were reported.

Inspection of Electrical Equipment and Installations

Under the "Metalliferous Mines Regulation Act," "Coal Mines Regulation Act," and "Petroleum and Natural Gas Act, 1954"

By L. Wardman, Electrical Inspector of Mines

CONTENTS

ELECTRIC POWER

In 1955 electric power was used by thirty-six mining companies in operations at twenty-seven mills, thirty-two lode mines, six coal mines, three coal-cleaning plants, one coking plant, two non-metallic mines, and in six quarries. Forty-eight wells were drilled, using electric power for lighting and for driving motors on small pumps and shale shakers.

LODE MINES

The kva. generating capacity of privately owned power plants at those mines which were operated in 1955 was as follows:—

Prime Mover	Generator Kva. Capacity
Steam turbines	17,500
Diesel engines	10,859
Water-wheels	13,295
Total	41,654

The electric power produced by these plants was approximately 224,787,848 kilowatt-hours during 1955. These figures are approximate because many of the small power plants are not equipped with recording meters and, therefore, the power generated by these plants was estimated. During 1955, 88,692,151 kilowatt-hours of electric power was purchased from public utilities. It will be noted that, compared with the 1954 figures for kilowatt-hours produced and purchased, there is an increase in the kilowatt-hours produced and a decrease in the kilowatt-hours purchased. This change is brought about by The Consolidated Mining and Smelting Company of Canada, Limited, now listing the power obtained from its generating division as company-generated power instead of purchased power. The total power consumed in 1955 is approximately the same as was consumed in 1954.

In addition to the aforementioned generating capacity, 7,382 horspower used for direct mechanical application was produced by the following means:—

Prime Mover	Horsepower
Diesel engines	4,657
Water-wheels	1,800
Gasoline engines	925
Total	7,382

The connected load at operating lode mines and mills has gradually increased since 1951, when statistics of this load were first taken. The connected load for 1955 at those properties which were in operation was approximately as follows:—

Equipment	Horsepower
Hoists	6,722
Scraper hoists	5,623
Ventilating fans	3,958
Pumps	3,965
Rectifiers and M.G. sets	8,467
Air compressors	18,250
Crushing equipment	10,119
Sink-float equipment	1,048
Milling and concentrating equipment	42,406
Conveyor systems	852
Workshop equipment	2,771
Miscellaneous equipment	10,070
Total	114,251

For surface and underground haulage there were in use 126 battery locomotives, 103 trolley locomotives, and 6 diesel locomotives.

Placer Mines

Electric power was used at two placer mines. The generating capacity was as follows:—

	Kva.
Diesel-engine-driven generators	110
Hydro-electric	600
Total	710

The connected load was as follows:—

Equipment	Horsepower
Shaft hoists	40
Ventilating fan	5
Air compressors	70
Trommel screens	10
Miscellaneous	45
Total	170

One battery locomotive was used for underground haulage.

Non-metallic Mines and Quarries

Electric power was used at eight non-metallic mines and quarries for loading, crushing, separating, and conveying materials removed.

Coal Mines

Electric power was used at six coal mines for surface and underground operations, at three coal cleaning and washing plants, and at one coking plant.

The distribution of power was as follows:—

Surface

	Horsepower	
Compressed air	5,775	
Ventilation	1,105	
Hoisting	1,075	
Haulage	313	
Coal washing and screening	3,136	
Pumping	440	
Briquetting	642	
Coke production	1,182	
Miscellaneous	240	
Total		13,908

Underground

Ventilation	40	
Hoisting	35	
Haulage	160	
Pumping	303	
Coal-cutters	100	
Coal-loaders	20	
Conveyors	430	
Compressors	100	
Miscellaneous	16	
Total		1,204
Total for surface and underground		15,112

Gas and Oil Wells

Forty-eight exploratory wells were drilled for gas and oil in 1955. The number of drilling rigs in operation was considerably less than the number of wells drilled, because the rigs were moved from well to well.

The drilling rigs used in this work are equipped with electric power for lighting the rig, cabins, and trailers, and for running several small pump and shaker motors. The draw-works, rotary table, and mud-pump are run from a main drive which is powered by as many as three diesel engines in parallel to give 400 to 700 horsepower. A second mud-pump is driven by one or more diesels producing from 375 to 700 horsepower.

The main electric power and light plant is usually a 30-kva. 110/220-volt 3-phase 60-cycle generator driven by a 40-horsepower diesel engine. On many rigs there is a stand-by plant of 15 to 24 kva. driven by a 20- to 30-horsepower diesel.

The electrical equipment on the drilling rigs is usually as follows: Two 5-horsepower motors driving shale-shakers; one 3- or 5-horsepower motor driving an air compressor; one or two 3- or 5-horsepower motors driving boiler-feed water-pumps (sometimes steam pumps or injectors are used or a combination of any two of the three); a 5-horsepower motor driving the rig water-pump; and a 1-horsepower motor driving the fuel-pump if gravity feed is not used.

Regulations in the " Petroleum and Natural Gas Act, 1954," require that electrical equipment located within 25 feet of the well hole, or inside the derrick or derrick building, on or over the shale-shakers, shall be as follows: All motors shall be of the totally enclosed type; all switches, control, and overcurrent protective devices shall be of the vapour-proof type; and all lamps shall be protected with an approved guard. Conduit with vapour-proof fittings and threaded joints or type S cable with vapour-proof glands

may be used for wiring. Conduit is normally used in the power plant, but on the rig type S cord is used.

During inspection of these rigs, it is infrequent that equipment not of an approved type is found in use. However, the rugged use to which the equipment is subjected and the frequent dismantling for transportation makes it necessary to maintain an active maintenance programme to keep the equipment in approved condition.

MINE ELECTRICAL INSTALLATIONS

Following is a brief general description of new electrical installations and of alterations and improvements to existing installations, together with mention of some of the irregularities found at the time of inspection.

LODE MINES

Taku River

Tulsequah Mill (Tulsequah Mines, Limited)

(58° 133° N.W.) A 14-circuit lighting-panel was installed in the mill to take care of extra lighting-circuits. This panel and the old 12-circuit lighting-panel are fed from a 200-ampere 110/220-volt service. The old cook-house service was replaced with a 200-ampere 110/220-volt service and gutter box. This service feeds a 14-circuit multibreaker for lighting in the cook-house, a 30-ampere 4-circuit panel for lighting in the engineering office, and a 60-ampere sub-feeder for appliances in the meat-cutting room. An electrical fire-alarm system was installed in No. 1 bunk-house. Two new residences were built and wired, and an addition to the recreation hall for two bowling alleys was built and wired. In the mill power-house an 860-cubic-feet-per-minute Canadian Ingersoll-Rand compressor driven by a 125-horsepower 514-r.p.m. motor was reconditioned and put in service. A 315-cubic-feet-per-minute compressor formerly used was relegated to stand-by service.

Big Bull (Tulsequah Mines, Limited)

(58° 133° N.W.) Operations were suspended at the end of the year but may be resumed in May, 1956, for a short period. One of the two 156-kva. diesel-driven electric generating units was moved to the Tulsequah Chief mine. The 2-kw. M.G. cap-lamp-battery charging unit and the 15-kw. portable diesel-driven generating set were removed from the property.

Tulsequah Chief (Tulsequah Mines, Limited)

(58° 133° N.W.) A new haulage adit at the 5200 level was driven 2,800 feet by the end of the year. To provide power for this extra work, a 156-kva. diesel-driven generating unit and switchboard, taken from the Big Bull mine, were installed in the power-house. The alternator on this unit is a 156-kva. 60-cycle 600-volt Westinghouse, and the diesel engine is a 205-horsepower size 4 Ruston-Hornsby.

An additional 5-kva. transformer was installed for the lighting load on the surface at the 5400 level. A power-line was run down the hill to the 5200 adit to supply power for locomotive-battery charging, lighting, and for a fan driven by a 15-horsepower motor. A 5-kva. transformer was installed for lighting. A new ore-bin and trestle were built on the river bar at the 5400 portal and wired for lighting.

On the 5400 level, 400 feet from the portal, a station was built for charging a 3½-ton Titan A locomotive battery and Mancha B batteries. A 15-horsepower Hertner M.G. set and a 5-horsepower M.G. set were installed for this purpose. Power is supplied to the station through a No. 6 B. & S. gauge rubber-insulated steel-wire-armoured cable at 550 volts potential. Lighting was installed along the first 600 feet of the level.

On the 5200 level, 900 feet from the portal, a charging-station for a 3½-ton Titan A locomotive battery was built and a 15-horsepower Hertner M.G. set was installed.

Alice Arm

Toric (Torbrit Silver Mines Limited)

(55° 129° N.W.) A Canadian Ingersoll-Rand slusher driven by a 50-horsepower 440-volt 3-phase 60-cycle motor was installed on the 800 level. First used for sinking a 16-degree winze, it later will be used for removing ore. A 3,500-r.p.m. pump driven by a 25-horsepower 440-volt 3-phase 60-cycle motor was installed to pump water from the Kitsault River to the mine camp. The pump delivers 430 U.S. gallons per minute against a 170-foot head.

At the time of inspection a transformer enclosure at the mill and the one at the power plant required completing to prevent entry of unauthorized persons; additional lighting-circuits were required in the assay laboratory to reduce the load on those in use; the retardation cams on the hoist Lilly controller required shaping to conform to the retardation curve of the hoist; and the blasting-circuit leads required shorting between blasts to comply with code regulations.

Hazelton

Silver Standard Mines Limited

(55° 117° S.W.) The mill was operated from March 11th to November 17th, 1955. No alterations or additions were made to the mill electrical installations during that time. In the mine an aerofoil fan driven by a 7-horsepower motor was installed on the 1300 crosscut. Nine hundred feet of cable was installed to supply this fan. An aerofoil fan driven by a 5-horsepower motor was installed at the 1509 working. Two thousand three hundred feet of cable was installed to supply this fan. A fourth Mancha trammer was purchased and put into service.

At the time of inspection it was found necessary to prohibit the use of electric lamps for testing circuits. Electric lamps placed across a circuit of higher voltage than the rated voltage of the lamps may explode and cause injury.

Cords containing a grounding conductor and polarized grounding-type plug caps were required on the portable tools.

Cariboo

Wells-Barkerville (53° 121° S.W.)

Cariboo Gold Quartz and Aurum (The Cariboo Gold Quartz Mining Company Limited).—The surface transformer-station at the Aurum mine was moved away from the snowsheds on to the rock dump. All battery locomotives have been provided with a guard over the controller handles to prevent their being inadvertently knocked into the running position.

Bridge River

Bralorne (Bralorne Mines Limited)

(50° 122° N.W.) Electrical work consisted of rebuilding the underground substation for the new Queen mine. This station will consist of six 50-kva. 4,600–440-volt and three 100-kva. 4,600–2,300-volt oil-filled transformers. Three battery locomotives were added to the haulage equipment.

At the time of inspection several motors and other pieces of electrical equipment required equipment grounds; the floor of the Crown substation was very wet and required drainage; and the blasting-switch used for blasting in the Queen shaft was arranged to ground the blasting-leads between blasts. The grounding of blasting-leads provides for picking up stray current and can result in premature blasts when a round is connected up. The grounding arrangement was removed.

Pioneer (Pioneer Gold Mines of B.C. Limited) (50° 122° N.W.) Four double-outlet battery-charging rectifiers were installed, one each on the Nos. 26, 27, 28, and 29 levels, and the trolley system on the No. 25 level was extended 600 feet, from the No. 3 shaft pocket to the No. 2 waste dump and station. A second-hand 2,000-ampere 550-volt oil circuit-breaker was installed in the Pioneer substation to replace a lower-capacity breaker.

Three 50-kva. and one 37½-kva. 2,200–110/220-volt transformers were installed in the domestic power distribution circuits to take care of extra load.

At the time of inspection it was found that switching on the "man-on" switch on one of the hoists rendered the master switch inoperative. It is required that the master switch be operative at all times, and this condition was corrected.

Four thousand feet of 10-conductor neoprene-sheathed neoprene-covered armoured cable has been purchased to replace signal cable which has deteriorated. Sixteen thousand feet of 3-conductor 2/0 B. & S. gauge armoured cable was purchased to replace power cable which had deteriorated.

Tulameen River

Summit Camp (49° 121° S.E.)

Silver Hill Mines Ltd. The new building was completed and the milling equipment installed. The plan of the building and the layout of equipment was practically identical with that of the Kootenay Base Metals Limited mill at Fort Steele and is listed on page 318 of the 1951 Annual Report. All the Kootenay Base Metal equipment was transferred.

The mill was completed in the autumn of 1955, but severe cold weather prevented it being put into operation.

Copper Mountain

Copper Mountain (The Granby Consolidated Mining Smelting and Power Company Limited).—(49° 120° S.W.) Electrical work during the year consisted mainly of maintenance. At the time of inspection it was found that the open wiring in the mine required attention. At the mill the No. 5 transformer-station required a suitable system for disposal of the oil in the event of spillage.

Hedley

Nickel Plate and French (Kelowna Mines Hedley Limited).—(49° 120° S.E.) Operation of these properties terminated on September 23rd, and all equipment was subsequently removed and sold.

Fairview Camp

Fairview (The Consolidated Mining and Smelting Company of Canada, Limited).—(49° 119° S.W.) This mine was closed temporarily in January, 1954, and was reopened in May, 1955. The electrical equipment was overhauled, but no major alterations or additions were made.

Beaverdell

Highland Bell (Highland-Bell Limited).—(49° 119° S.E.) No alterations or additions were made to the electrical installations. An infraction of the electrical code was the lack of grounding conductors on the frames of several pieces of electrical equipment. Some maintenance work was required on the mill wiring.

SALMO

Iron Mountain (49° 117° S.E.)

Jersey, Emerald, Feeney, and Dodger (Canadian Exploration Limited)

Electrical work consisted of the following: The overhead line to the Dodger 4400 level portal was extended to the Dodger 4600 level portal and Dodger 4200 level portal. A new indoor-type substation was constructed at the 4600 level portal. It is equipped with a 200-ampere 20-mva. 5,000-volt oil circuit-breaker, a 75-kva. dry-type 2,300–460-volt 3-phase transformer, and a 100-ampere 600-volt fused switch. In addition to the oil circuit-breaker, 35-ampere high-tension fuses and lightning-arresters are provided on the high-tension side. This station supplies a 60,000-cubic-feet-per-minute fan driven by a 60-horsepower motor in the Dodger 4400-level mine.

A 75-kva. 2,300–460-volt 3-phase dry-type transformer was installed in substation 408 to replace a 30-kva. askarel-filled transformer, and a 150-kva. 2,300–460-volt 3-phase nitrogen-filled transformer was installed in substation No. 410 to replace a 75-kva. askarel-filled transformer.

Four new substations were built underground, as follows: No. 415 substation at the end of the north drift in the Jersey 4200 level mine consists of two 45-kva. 2,300–460-volt 3-phase askarel-filled transformers in parallel, a 200-ampere 20-mva. high-voltage oil circuit-breaker, and five low-voltage air circuit-breakers supplying two 50-horsepower fan motors, one 20-horsepower fan motor, and a 5-kva. lighting transformer.

No. 414 substation in the east drift of the Jersey 4200 level mine consists of a 200-kva. 2,300–460-volt 3-phase askarel-filled transformer, a 200-ampere 20-mva. high-voltage oil circuit-breaker, and a 6-circuit low-voltage panel supplying three 50-horsepower and two 20-horsepower fan motors.

No. 422 substation is at the end of the Dodger 4200 level north drift. It is equipped with a 100-kva. 2,300–460-volt 3-phase askarel-filled transformer, a 200-ampere 20-mva. oil circuit-breaker, and a 6-circuit air break switch panel supplying a 5-kva. lighting transformer, locomotive-battery charging station, and a 20-horsepower fan motor.

In the underground repair-shop, three 7½-kva. 440-volt askarel-filled transformers were installed to supply lighting and heating circuits. The primary buses supplying these transformers also supply welders, motors, and a new 60-kva. electric steam generator. Power for the transformers and equipment is supplied from substation No. 409. The 45-kva. transformer in this station was replaced with a 100-kva. transformer to take care of the extra load.

Approximately 3,600 feet of No. 4 B. & S. gauge 3,000-volt paper-insulated lead-sheathed armoured cable was installed to supply various substations.

In addition to the above equipment, two 25-horsepower slushers were installed in the Dodger 4200 mine and one 500-foot-head 100-gallons-per-minute pump was installed in the Jersey 4100 mine to supply water for the Jersey 4200 mine, the Dodger 4200 mine, and the main camp area.

All centralized blasting systems were removed, and blasting is now done by plunger or condenser blasting-machines.

At the tungsten mill a 375-cubic-feet-per-minute compressor driven by a 75-horsepower motor was installed, and ten 10-horsepower motors driving twenty flotation cells were replaced with ten 15-horsepower motors.

At the lead-zinc mill a new conveyor driven by a 15-horsepower motor was installed to by-pass the mill crushing plant. Crushing is now done at the crushing plant in the mine.

At the time of inspection the protection of cables in the Emerald mine shaft required improving, and in one pumproom ready access to the switchgear was blocked by the pump motors. An insulating platform was required in one substation to prevent con-

tact with the wet floor of the station. Several blasting-switches were found unlocked, contrary to regulations. The centralized blasting system was in use at the time of inspection, and it was observed that several electric blasting-cables were strung in contact with power and lighting cables, water-pipes, and air-pipes. The stringing of electric blasting-cables in such a manner is conducive to their picking up stray or induced currents. Instructions were given to have these cables strung well away from all potential conductors.

After this inspection the second of two dangerous occurrences influenced the management to discontinue the use of a centralized blasting system and institute a system whereby a minimum of cable is used and the blast is fired with a blasting-machine.

The first dangerous occurrence took place in the week-end shut-down from 8 a.m., June 18th, to 8 a.m., June 19th. At 8.10 a.m. on June 19th the mine foreman visited the 4249-E2 stope, where three slashes had been drilled, partly loaded, and connected. He found that five holes had been detonated. Investigation provided no evidence that the holes had been blasted by any person with or without authority.

On Saturday afternoon June 18th, a severe electric storm had taken place. An electrician in the north end of the mine reported that glow discharges were being emitted from the messenger cables, and at times the glow discharges developed into arc discharges. It is thought that a discharge similar to those seen by the electrician ignited the five holes.

A warning procedure was set up whereby the shiftbosses would watch the weather and would remove all crews from loaded or partly loaded faces in the event of an electric storm. The management was advised that, if it was necessary to leave partly loaded faces over a shut-down period, the leg wires should not be connected but should be coiled up at the collar of the hole to present the least possible length of wire for collection of static electricity, and thus reduce the chance of collection of a charge of sufficient intensity to detonate a cap.

The second dangerous occurrence took place in the Jersey 4200 mine on November 4th at 3.35 p.m. The course of events was as follows:—

At 3.25 p.m. a storm was observed approaching from the north. At this time a round of forty holes in the 4257 crosscut and a round of forty holes and a slash of twenty holes in the 48-E-1 working were loaded and connected, and the intermediate isolating-switches had been closed. Between 3.25 and 3.30 p.m. three telephone messages were received by the underground shiftboss notifying him of an approaching storm. At 3.30 a telephone message was received by the shiftboss informing him that an electric storm was in progress. The crew was checked off and the blaster was sent back to fire the blast. At 3.35 p.m. the blast went off while the blaster was trying to unlock the blasting-switch. At 3.45 the crew left the mine.

Inspection of the loaded faces by the afternoon shiftboss and his blaster showed the following: In the 4257 crosscut, two holes were fired; in the 48-E-1 round, eighteen holes were fired; in the 48-E-1 slash, no holes were fired.

Examination of the blasting system showed no evidence of current having entered the blasting-leads from the mine electrical system. The pattern in which the eighteen holes detonated seemed to indicate that an electrostatic charge collected by the blasting system had discharged to earth in a watercourse which crossed the face, and in so doing had fired the loaded holes in that area.

As already mentioned, the centralized blasting system was removed. Now, when a face is loaded and connected, the blasting-cable is taken to the face on a reel, connected, and then reeled back to the blasting-station. The purpose of this procedure is to present as little length of cable as possible for the collection of static while the men are at the face. The system of warning the underground shiftboss is still in force, and no loading or connecting is done during an electric storm. The company electrical engineer is designing an instrument which, it is hoped, will warn of the build-up of an atmospheric electric charge.

Aspen Creek (49° 117° S.E.)

H.B. (The Consolidated Mining and Smelting Company of Canada, Limited)

Operations at this property were suspended in March, 1953, at which time most of the construction work on the mill had been completed. In April, 1955, the mill and the mine equipment were put into operating condition, and the first ore was put through the mill on May 9th, 1955. Electrical work done during 1955 consisted of the following: A mine ventilating fan was installed at the Zincton portal. It is driven by a 100-horsepower 550-volt motor. A pole-type substation was built to supply the fan motor. It consists of three 50-kva. 2,300–575-volt transformers for power and one 7½-kva. 2,300–230/115-volt transformer for lighting.

A Canadian Ingersoll-Rand slusher was installed underground. It is driven by a 50-horsepower 550-volt motor.

A pumping-station was installed for pumping water from Sheep Creek. Two 40-horsepower 550-volt motors drive the two pumps. Three 25-kva. 2,300–550-volt power transformers and one 5-kva. 2,300–230/115-volt lighting transformer were moved from the 2300 level camp to the pumping-station.

The three 25-kva. transformers removed from the 3500 level camp were replaced by three 20-kva. 2,300–550-volt transformers.

The 5-kva. lighting transformer for the camp residences was replaced by a 25-kva. transformer to take care of the increased load.

A new blacksmith-shop was built and wired with a 100-ampere lighting service.

NELWAY

Reeves MacDonald Mines Limited

(49° 117° S.E.) Operations at this property were suspended on July 15th, 1953, and were resumed in October, 1955. The electrical as well as other equipment was overhauled prior to commencing operations. At the time of inspection, December 3rd, most of the equipment was found to satisfactorily conform with code standards. However, enclosures or guards were recommended for exposed live parts at a height of less than 7½ feet above the floor in one substation, and the equipment on the levels off No. 1 shaft required maintenance work. Grounding conductors were required on several motors in the mill.

SOUTH KOOTENAY LAKE

Sanca (49° 116° S.W.)

Valparaiso (Akokli Tungsten Mine Ltd.)

A small mill was built and put into operation in July. Power is purchased from the West Kootenay Power Company at 2,300 volts potential. A substation was built containing three 50-kva. 2,300–440-volt G.E. transformers for power and one 60-kva. 2,300–220/110-volt transformer for lighting. The following equipment was installed: An Ingersoll-Rand 90-B air compressor driven by a 100-horsepower motor; a Pacific 8- by 15-inch jaw crusher driven by a 20-horsepower motor; a Kennedy Van Saun 3- by 6-foot ball mill driven by a 30-horsepower motor; a Denver duplex jig, a Denver Dillon screen, a Wemco spiral classifier, a Wemco hydro-classifier, three Denver vertical sand-pumps; four Wilfley tables; and six Denver flotation cells. Each of these machines is driven by either a 2- or a 3-horsepower motor.

Very good workmanship was done in installing the above equipment.

North Kootenay Lake

Riondel (49° 116° N.W.)

Bluebell (The Consolidated Mining and Smelting Company of Canada, Limited)

A 1,500-kva. 66,000–6,900-volt 3-phase transformer, together with primary and secondary switchgear, was installed in a substation near No. 1 shaft collar to supply power to underground electrical equipment. A 6,900-volt cable transmits the power to a bank of three 500-kva. 6,900–575-volt single-phase transformers in a substation on the 525 level. This substation also houses high-voltage switchgear and a low-voltage distribution centre from which 575-volt power is supplied to the pumps on the 525 level and to electrical equipment on the upper and lower levels.

An additional 150-horsepower 500-imperial-gallons-per-minute pumping unit was installed in the 525 level pump-room. On the 675 level two 40-horsepower 300-imperial-gallons-per-minute pumping units were installed.

A "man-on safety-light" system was installed on all levels serviced by No. 1 shaft hoist.

Ainsworth (49° 116° N.W.)

Highlander (Yale Lead & Zinc Mines Limited)

A new crushing plant was built and the old one was dismantled. Most of the equipment in the new plant was taken from the old plant (*see* 1951 Annual Report). The power on the 15- by 25-inch crusher was increased to 40 horsepower, and the power on the large conveyor to the mill was increased to 10 horsepower. The other equipment in the crushing plant consists of two conveyor-belts, a Dillon screen, and two dust fans. The connected load for the crushing plant is 81 horsepower. A new 440-volt service supplies this plant.

In the concentrator a new ball mill driven by a 100-horsepower 440-volt motor and two flotation cells driven by a 10-horsepower 440-volt motor were installed. A new 440-volt panel was installed for these motors because the main mill panel was overloaded. A classifier and one thickener have been removed from the mill.

At the Banker mine an air compressor, driven by a 75-horsepower 2,200-volt motor, was installed.

Two 50-kva. 23,000–2,300-volt transformers were added to the transformers in the main substation.

Three 50-kva. 2,300–480-volt single-phase transformers were installed at the Highlander mine.

A fan driven by a 5-horsepower motor was installed for mine ventilation, while two fans formerly used for ventilation were removed. One of these fans was driven by a 30-horsepower motor and the other was driven by a 7½-horsepower motor.

At the time of inspection it was found that the electric blasting-switch was broken, and in its place a standard isolating-switch was in use. The use of a standard switch is contrary to the "Metalliferous Mines Regulation Act" rules, and it was required that the blasting-switch be repaired or replaced.

A cord containing a grounding conductor was required on the electric drill, and grounding-type polarized outlets were required where portable electric tools were used.

Woodbury Creek (49° 116° N.W.)

Can-Amer Mining & Milling Company Ltd.—Details of the electrical equipment installed in the mill were given in the 1953 Annual Report. Only a small amount of ore was milled in 1955.

SANDON

Silversmith (Carnegie Mines of British Columbia, Ltd.).—(49° 117° N.E.) In May, at the time of inspection, the mill was not in operation. The power plant was in use to supply power for charging locomotive batteries and for lighting the town of Sandon.

Cody-Reco Mines Limited.—(49° 117° N.E.) Starting on May 24th the mill was operated for about one month. Early in May an improvement was made in the generator switchboards to bring them within the required Electrical Code standards.

Victor (Violamac Mines Limited).—(49° 117° N.E.) Electrical work consisted mainly of maintenance and the addition of a few lights and outlets.

SLOCAN LAKE

Western Exploration Company Limited.—(49° 117° N.E.) No major alterations were made to the electrical equipment. At the time of inspection it was found that several portable electric tools were not provided with cords containing a grounding conductor and polarized grounding-type plug caps, as is required by the code. It was also found that two of the poles supporting the elevated transformer platform required restubbing.

Van Roi (Slocan Van Roi Mines Limited).—(49° 117° N.E.) The Van Roi and Hewitt mines, closed except for leasing operations since 1952, were reopened in 1955. The mine buildings were rehabilitated and a 7-kva. lighting plant was installed to supply power through the original distribution system to the buildings. At the mill all the diesel generating units have been returned and replaced in their former positions.

NORTH LARDEAU

Spider (Sunshine Lardeau Mines Limited).—(50° 117° N.W.) At the time of inspection, operations at the property had been temporarily suspended because the spring break-up prevented the hauling of ore to the mill. All the equipment in the mill was undergoing a general overhaul. It was observed that the electrical equipment was in good condition generally.

KIMBERLEY

Sullivan (The Consolidated Mining and Smelting Company of Canada, Limited) (49° 115° N.W.) Electrical equipment installed at the mine consisted mainly of fan units as follows: Two 280,000-cubic-feet-per-minute Jeffery fans were installed on the surface at No. 29 shaft; one 203,000-cubic-feet-per-minute Jeffery fan was installed on the surface at No. 24 shaft; one 175,000-cubic-feet-per-minute Jeffery fan was installed on the surface at No. 33 shaft. Each of the above fans are driven by a 150-horsepower motor. Two 25,000-cubic-feet-per-minute fans driven by 25-horsepower motors were installed in the mine for general ventilation. A fan driven by a 25-horsepower motor was removed from service at No. 9 shaft.

Five trolley telephones were installed on the main-haulage locomotives.

In the concentrator the No. 27 and No. 28 M.S. cells were replaced with No. 30 Denver cells, requiring motors totalling 300 horsepower. The cells removed had been driven by motors totalling 120 horsepower.

An 800-ampere air circuit-breaker and a 1,000,000-c.m. paper-insulated lead-sheathed cable were installed in the substation switchroom.

In the sink-float plant a 6,500-cubic-feet-per-minute fan driven by a 10-horsepower motor was installed to improve ventilation at conveyor-belt transfer points.

A 7,500-cubic-feet-per-minute fan driven by a 10-horsepower motor was installed in the reagent mixing shed.

WINDERMERE

Mineral King (Sheep Creek Gold Mines Limited)

(50° 116° S.E.) Electrical equipment installed in 1955 consisted of a 17- by 10½- by 10-inch XVHE-2 air compressor driven by a 150-horsepower motor, a new slusher driven by a 50-horsepower 440-volt electric motor installed underground, and two 20-horsepower 440-volt motors installed on hoists to replace the air motors formerly used. At the time of inspection it was found that considerable temporary wiring had been installed which required replacing with permanent wiring; two 2,000-volt disconnecting-switches required locking; and an improvement in the underground power-cable system and grounding system was required.

Paradise (Sheep Creek Gold Mines Limited).—(50° 116° S.E.) To carry on mining operations a small camp lighting plant, a Mancha locomotive with battery-charging unit, and two 300-cubic-feet-per-minute portable air compressors driven by diesel engines were installed.

SPILLIMACHEEN

Silver Giant (Giant Mascot Mines Limited)

(50° 116° N.E.) A transfer from company-produced power to British Columbia Power Commission power was made in 1955. Power is received from the British Columbia Power Commission plant on the Spillimacheen River at 12,000 volts and is stepped down to 2,300 volts by a bank of 12,000–2,300-volt transformers, and to 440 volts by a bank of 12,000–440-volt transformers. With the exception of adequate stand-by capacity, the company generating equipment will be sold.

Electrical equipment installed in 1955 was as follows: Two centrifugal pumps at No. 9 level sump, one driven by a 25-horsepower motor and the other by a 40-horsepower motor; on No. 9 level a double-drum slusher driven by a 60-horsepower motor, a triple-drum slusher driven by a 25-horsepower motor, and a fan driven by a 15-horsepower motor; a signalling device on the hoist to indicate within three turns of the drum when the shaft conveyance is approaching the collar or the sump; a photo-electric eye limit-switch device to cut off the power if the shaft conveyance enters the dump limit. To comply with the rules on electric blasting in the code, isolating-transformers have been installed in the blasting-circuits.

At the time of inspection it was found that a fire-door was necessary to seal off the hoistroom transformer-station from the mine workings in event of a fire in the transformer-station, a ground fault indicator was required on the secondary system in the mine, and the controllers on the battery locomotives required repairing. On the surface it was found that exposed 440-volt conductors at a height of less than 7 feet in the transformer-station required guarding, and the equipment in the river pumping-station required rearranging to provide ease of access to the switchgear.

HOWE SOUND

Britannia (Britannia Mining and Smelting Co. Limited)

(49° 123° N.E.) Electrical work done in the mine consisted of the following: Sixteen slusher hoists, driven by motors ranging from 7½ to 50 horsepower, were moved to new locations; at No. 9 shaft on the 1400 level a fan driven by a 40-horsepower motor was installed; on the 1050 level a fan driven by an 11-horsepower motor was installed; a new switching centre was built at the entrance to No. 1 transformer-station to replace the badly deteriorated switchgear in the station; a 40-horsepower 25-kw. 250-volt M.G. set was installed at the 2900 level No. 7 shaft to supply trolley power in that area; power cables were installed to supply the slusher motors in the Empress mine and to connect the 4300 and 4600 level systems. Two 2-kw. battery chargers were installed—one on the 1225 level and the other on the 1125 level No. 9 shaft stations.

Electrical work in the mill consisted of the following: Two 1,000-kva. 6,900–460-volt power transformers were installed in the new upper mill substation. The new 10-panel air break switching centre was connected to these transformers and armoured power cables were installed to connect all load on the primary mill and upper secondary mill floors. A third 1,000-kva. transformer will be moved from the old upper mill substation to the new upper mill substation in the future; the old substation will then be dismantled. The relocation of the 1,250-kva. synchronous condenser in a room adjoining the new substation is in progress.

At the mill-site a new copper precipitation plant has been built and a roots blower driven by a 52-horsepower motor has been installed. A new engineering office and a new plumbing and tin shop were built and wired.

Deterioration by corrosion is severe on mine and mill electrical equipment. At the time of inspection much wiring had deteriorated and required attention. Approved lighting fixtures were required in a fuse cabinet and a powder magazine. Trolley wiring on the 1050 level in the Empress mine required guarding.

Texada Island

Texada Mines Ltd.—(49° 124° N.W.) For details of electrical equipment *see* the 1952 Annual Report.

Vancouver Island

Upper Quinsam Lake (49° 125° N.W.)

Iron Hill (The Argonaut Co. Ltd.)

Operations commenced on March 21st, 1955, after the winter shutdown, and continued until December 21st, 1955. A new portable compressor driven by a 4-horsepower 440-volt motor was installed in the tire-shop. A 15-kva. 440–230/115-volt dry-type transformer was installed for mine-pit flood-lighting. Ground fault indicators were installed on the secondary systems. Use of the old waste-disposal system was discontinued, and a new disposal system, located where the middlings stockpile had been, was put in service. With this change, five conveyors requiring 55 horsepower were replaced with one requiring 10 horsepower.

In the mine pit a pump driven by a 60-horsepower motor was installed.

PLACER MINES

Atlin

Spruce Creek (59° 133° N.W.)

Noland Mines Limited.—This property was operated until November 30th, 1955, when operations were suspended for an indefinite period. No electrical equipment was installed during the period of operation in 1955.

NON-METALLIC MINES AND QUARRIES

McDame

Cassiar Asbestos Corporation Limited

(59° 129° S.W.) An aerial tram was built between the mine and the mill. The tram is in three sections, with transfer equipment for the buckets at the No. 2 middle station and the No. 3 lower station. The No. 1 upper section is driven by a 65-horsepower 550-volt motor, the middle by a 125-horsepower 550-volt motor, and the lower by a 25-horsepower 550-volt motor. In the upper station there are two 3-horsepower 550-volt motors driving measuring-box mechanisms.

A 13,800-volt transmission-line was built from the mill-site to the mine. A 600-kva. 2,300–13,800-volt 3-phase transformer steps up the potential for transmission. At the mine a 600-kva. 12,800–2,300-volt 3-phase transformer steps the power down for distribution to the No. 1 tram station and to the future mine equipment. A 75-kva. 2,300–550-volt 3-phase transformer supplies the motors in No. 1 tram station. At No. 2 tram station a 150-kva. 13,800–550-volt 3-phase transformer supplies the 125-horsepower motor. At No. 3 station a 45-kva. 2,300–550-volt 3-phase transformer supplies power for the 25-horsepower motor. Three 5-kva. 550–115/230-volt single-phase transformers were installed, one at each station, for lighting. A 150-kva. 2,300–550-volt 3-phase transformer was installed at the mill for motors at the mill-site.

At the mine a new diesel-driven 75-kva. 440-volt generator was installed to operate the chute. The two 30-kva. generating units formerly used have been kept as stand-by units.

In the mill additional equipment was installed which increased the connected load for various operations as follows: The crushing-plant load was increased from 290 to 318 horsepower by the installation of crushing equipment requiring 28 horsepower, the conveyor load was increased from 173 to 186 horsepower by conveyors requiring 13 horsepower, the secondary screening load was increased from 111 to 142 horsepower by screens requiring 31 horsepower, and the bagging-plant load was increased from 69 to 105 horsepower by bagging equipment requiring 36 horsepower. The drying load is 2.05 horsepower, and the collecting load is 396 horsepower.

At the time of inspection several equipment and neutral conductor grounds were required, automatic discharge devices were required for the capacitators in the mill, and ground fault detectors were required on the secondary circuits supplying the tram motors.

Blubber Bay

Pacific Lime Company Limited.—(49° 124° N.W.) Only electric blasting equipment and flood-lighting is used in the quarry.

British Columbia Cement Company Limited

Electric blasting and electric welding equipment is used in the Blubber Bay Quarry (49° 124° N.W.). Electrically powered shovels and electric blasting equipment are used at Bamberton Quarry (48° 123° N.W.). At the time of inspection it was noted that the barrier of insulating material had been removed from the blasting-switch and required replacing. It was also noted that electrical equipment in the distribution centre for the upper quarry required equipment grounds.

Kilgard

Clayburn Company Limited.—(49° 122° S.W.) No major changes were made to the electrical installation in 1955. At the time of inspection the power-circuits were in satisfactory condition, but some maintenance work was required on the lighting-circuits.

Coquitlam

Deeks-McBride Ltd.—(49° 122° S.W.) A new 2,200-volt shielded-type cable was installed on the shovel used in the gravel pit. This cable is more suitable for shovel trailing cable than the old one, which was unshielded.

Windermere

Columbia Gypsum Co. Ltd.—(50° 115° S.W.) *See* the 1953 Annual Report for details of equipment on this property.

Kootenay Granite Products Limited

(49° 116° S.W.) A crushing and screening plant was built in 1955. A jaw crusher, rolls crusher, screens, and elevators were installed. The electrical installation consists of a 440-volt 400-ampere service, one 50-horsepower motor, one 30-horsepower

motor, two 15-horsepower motors, one 5-horsepower motor, one 3-horsepower motor, and one 1-horsepower motor.

At the time of inspection a ground fault indicating device was required on the system, a service entrance condulet was required on the power service, and some open wiring required enclosing.

COAL MINES

NANAIMO (49° 123° S.W.)

Blue Flame (Timberlands) Mine.—Electrical equipment installed in the past four years consists of an air compressor driven by a 25-horsepower motor, a hoist driven by a 20-horsepower motor, a screen driven by a 5-horsepower motor, and a pump driven by a 10-horsepower motor.

NORTH WELLINGTON (49° 124° N.W.)

Carruthers and Wakelam Mine.—A pump driven by a 3-horsepower motor and cap-lamp-battery charging equipment are in use.

COMOX (49° 124° S.E.)

Tsable River Mine (Canadian Collieries (Dunsmuir) Limited)

A third air-compressor driven by a 500-horsepower synchronous motor was installed in the compressor building and was put in service on January 12th, 1955. Two banks of 20-kva. 2,200–440-volt transformers connected in closed delta were installed to supply 440-volt power to the secondary equipment in the compressor-room, main hoistroom, and tipple. At the time of inspection several portable tools required cords containing a grounding conductor, and also 3-wire plug caps.

Union Bay Washery (Canadian Collieries (Dunsmuir) Limited)

At Union Bay an air compressor driven by a 150-horsepower 2,200-volt motor was installed for supplying air to the dock. A crusher driven by a 50-horsepower 440-volt motor was installed in the washery. A 40-horsepower motor was relocated to make room for the crusher and motor. At the time of inspection it was found that several portable tools required 3-conductor cords and 3-wire plug caps; some temporary wiring was in use in the washery while the change-over to the new crusher was in progress.

EAST KOOTENAY (49° 114° S.W.)

Michel Colliery (The Crow's Nest Pass Coal Company Limited)

Additional equipment was installed in "A" North mine, the electrification of which was commenced in 1954. Two 200-kva. 6,600–550-volt transformers were placed in service underground to supply the increased load. The 100-horsepower compressor used on the surface was moved underground. Other equipment installed underground was as follows: A fan driven by a 15-horsepower 550-volt motor for auxiliary ventilation, a loading-conveyor driven by a 15-horsepower 550-volt motor, and three battery locomotives for haulage on the various levels. Four battery locomotives are now in service in this mine.

In "A" West mine three 15-horsepower motors and 300 feet of cable were installed for conveyors. One of these motors replaced a 20-horsepower motor formerly in use.

All electrical equipment in the mines is flame-proof equipment and was in good condition when inspected.

Surface installations were as follows: An air compressor driven by a 50-horsepower 550-volt motor was installed at the "A" North bridge; a pump driven by a 15-horsepower 550-volt 3,600-r.p.m. motor was installed in the power-house; a hoist driven by a 40-

horsepower 550-volt motor was installed on the yard tracks for a car haul, a car shaker operated by a 20-horsepower motor and a 5-horsepower motor was installed for Elk River coal shipped to the plant, a new distribution centre and service entrance were installed in the machine-shop, and the distribution centre formerly in the slurry-screen room was moved into a new switchroom adjacent to the slurry-screen room. The last two improvements mentioned were made to bring these installations within Electrical Code standards.

Elk River Colliery (The Crow's Nest Pass Coal Company Limited).—The 100-horsepower 2,200-volt No. 9 fan motor was replaced by a 100-horsepower 550-volt motor. To supply this motor with 550-volt power, three 37½-kva. 2,200–550-volt transformers were installed. At the time of inspection several temporary installations required replacing.

TELKWA (54° 127° N.E.)

Bulkley Valley Collieries Limited

A new troughed-belt conveyor 500 feet long, driven by a Louis Allis 7½-horsepower 440-volt permissible motor with permissible switchgear, was installed underground. At the time of inspection the trailing cables to the portable and transportable equipment required hanging up to protect them from injury, and the main cables required supporting with readily breakable material.

BRITISH COLUMBIA DEPARTMENT OF MINES
LIST OF PUBLICATIONS

The publications listed are available for distribution except as noted. Recent publications for which no charge is made may be obtained from the Department's offices at Victoria and Nelson, and from the office of the Geological Survey of Canada, 739 West Hastings Street, Vancouver.

PAYMENT FOR PUBLICATIONS

If payment is required, application for a publication should be made to the Department of Mines, Victoria, B.C., and should be accompanied by the proper sum. Sales tax of 5 per cent is payable on charge items sent to British Columbia addresses. This sales tax is not applied on items sent outside British Columbia, but an extra charge of 10 cents is made.

Annual Reports and Bulletins

Bulletins and Annual Reports are distributed free of charge, with a limit of one copy to an applicant until the free stock has been exhausted. Thereafter distribution is from reserve stock on payment of the charge listed. Under special circumstances duplicate copies may be supplied from the free stock. If so a charge of $1.25 per copy will be made for a paper-bound copy, and the charge for a cloth-bound copy will be increased by $1.25.

If more than two nominally free publications are requested, the applicant should remit 50 cents for each publication in excess of two.

Indexes

No. 1.—Index to Annual Reports of the Minister of Mines of British Columbia for the years 1874 to 1936, inclusive. (By H. T. Nation.) Paper bound, $1; cloth bound, $2.

No. 2.—Index to Annual Reports of the Minister of Mines, 1937–43, and Bulletins Nos. 1–17. (By H. T. Nation.) Cloth-bound copies, $1 each.

No. 3.—Index to Publications of the British Columbia Department of Mines, Annual Reports of the Minister of Mines, 1937 to 1953, and Bulletins Nos. 1 to 35. (Tables listing the recorded production of lode-metal mines and the occurrences of metals in lode deposits are appended.) Paper bound, $2; cloth bound, $4.50; tables separately, 50 cents.

Index No. 3 incorporates corrections to the 1874–1936 index and replaces the 1937–1943 index.

ANNUAL REPORTS

For each year the entry " free " or the price charged appears in the following table if the report is available. If neither " free " nor a price is entered, the report for that year is not available for distribution.

Year	Paper Bound	Cloth Bound	Year	Paper Bound	Cloth Bound	Year	Paper Bound	Cloth Bound
1874–1917			1930			1943	Free	
1918	75¢		1931			1944	Free	$1.00
1919			1932			1945	Free	1.00
1920	75¢		1933	Free	$1.00	1946	Free	1.00
1921	75¢		1934	Free	1.00	1947	Free	1.00
1922			1935	Free		1948	Free	1.00
1923	75¢		1936	(1)	1.00	1949	Free	1.00
1924			1937	(1)		1950	Free	1.00
1925			1938	(1)	1.00	1951	Free	1.00
1926			1939	Free	1.00	1952[2]	1.00	3.50
1927	Free		1940	Free	1.00	1953[2]	1.00	3.50
1928	Free		1941	Free	1.00	1954[2]	Free	2.50
1929	Free		1942	Free	1.00	1955[2]	Free	2.50

[1] Parts A to F, bound separately in paper, are available (free) for the years 1936, 1937, and 1938. Part G, " Inspection of Mines," is not available for these years.

[2] The Lode Metals section of the report for the year noted is available as a pamphlet free. Other parts of the report are available as unbound separates.

BULLETINS, OLD SERIES

Bulletin No. 2, 1918: Bumps and Outbursts of Gas. (By George S. Rice.)

Bulletin No. 2, 1919: The Commercial Feasibility of Electric Smelting of Iron Ores in British Columbia. (By Alfred Stansfield.)

Bulletin No. 2, 1932: Report on McConnell Creek Placer Area. (By Douglas Lay.)

MISCELLANEOUS

Special Reports on Coal-mine Explosions. (By George Wilkinson, Thomas Graham, and James Ashworth.) 1918. Out of print.

Report on Snowflake and Waverley-Tangier Mineral Properties. (By J. D. Galloway.) 1928.

Report on Mineral Properties of the Goldside Mining Company. (By B. T. O'Grady.) 1935. Out of print.

Elementary Geology Applied to Prospecting. (By John F. Walker.) Revised, 1955. 65 cents; outside British Columbia, 75 cents.

Possibilities for Manufacture of Mineral Wool in British Columbia. (By J. M. Cummings.) 1937.

Lode-gold Deposits of the Zeballos Area. (By J. S. Stevenson.) 1938. Out of print.

Preliminary Investigations into Possibilities for Producing Silica Sand from British Columbia Sand Deposits. (By J. M. Cummings.) 1941.

Iron Ores of Canada: Vol. I, British Columbia and Yukon. (By G. A. Young and W. L. Uglow, Geological Survey, Canada, Department of Mines.) 1926.

Mining in British Columbia—an outline of the development of the industry, 1953.

Synopses of Mining Laws.

BULLETINS, NEW SERIES, STARTING IN 1940

(Free, except as noted.*)

Bulletin No. 1: Aiken Lake Area, North-Central B.C. (By Douglas Lay.) Out of print.

Bulletin No. 2: Placer-gold Deposits, Wheaton (Boulder) Creek, Cassiar District. (By Stuart S. Holland.) Out of print.

Bulletin No. 3: Fraser River Tertiary Drainage-history in Relation to Placer-gold Deposits. I. (By Douglas Lay.) 75 cents.

Bulletin No. 4: Saline and Hydromagnesite Deposits of British Columbia. (By J. M. Cummings.) Out of print.

Bulletin No. 5: Mercury Deposits of British Columbia. (By John S. Stevenson.) Out of print.

Bulletin No. 6: Geology of Camp McKinney and the Cariboo Amelia Mine. (By M. S. Hedley.) Out of print.

Bulletin No. 7: Lode-gold Deposits of the Upper Lemon Creek area and Lyle Creek-Whitewater Creek area, Kootenay District. (By R. J. Maconachie.) Out of print.

Bulletin No. 8: Preliminary Report on the Bedwell River Area. (By H. Sargent.) Out of print.

Bulletin No. 9: Molybdenite in British Columbia. (By John S. Stevenson.) Out of print.

Bulletin No. 10: Tungsten Deposits of British Columbia. (By John S. Stevenson and staff of the Department of Mines.) Revised. Out of print.

Bulletin No. 11: Fraser River Tertiary Drainage-history in Relation to Placer-gold Deposits. II. (By Douglas Lay.)

Bulletin No. 12: Reconnaissance in the Area of Turnagain and Upper Kechika Rivers. (By M. S. Hedley and Stuart S. Holland.)

Bulletin No. 13: Supplementary Report on Bedwell River Area. (By H. Sargent.)

Bulletin No. 14: Coal Analyses of British Columbia. (By James Dickson.)

Bulletin No. 15: Hydraulic Mining Methods. (By Stuart S. Holland.) Out of print.

Bulletin No. 16: Dragline Dredging Methods. (By Stuart S. Holland.) Out of print.

Bulletin No. 17: An Introduction to Metal-mining in British Columbia. (By Officers of the Department.) Out of print.

Bulletin No. 18: Specimens and Samples—Their Treatment and Use. (By Officers of the Department.)

Bulletin No. 19: The Tuya-Teslin Area, Northern British Columbia. (By K. DeP. Watson and W. H. Mathews.)

Bulletin No. 20: Lode-gold Deposits—

- Part II: South-eastern British Columbia. (By W. H. Mathews.) Revised, 1948.
- Part III: Central Southern British Columbia. (By M. S. Hedley and K. DeP. Watson.) 75 cents.
- Part IV: South-western British Columbia—exclusive of Vancouver Island. (By J. S. Stevenson.) Revised, 1946.
- Part V: Vancouver Island. (By J. S. Stevenson.) Revised, 1946.
- Part VI: North-eastern British Columbia and Cariboo and Hobson Creek Areas. (By S. S. Holland.) Revised, 1946.

Bulletin No. 21: Notes on Placer-mining in British Columbia. (By Officers of the Department.)

Bulletin No. 22: Geology of the Whitewater and Lucky Jim Mine Areas. (By M. S. Hedley.)

Bulletin No. 23: Calcareous Deposits of the Georgia Strait Area. (By W. H. Mathews.) Out of print.

* *See* page 183, Payment for Publications.

Bulletin No. 24: Geology and Coal Resources of the Carbon Creek-Mount Bickford Map-area. (By W. H. Mathews.)
Bulletin No. 25: The Squaw Creek-Rainy Hollow Area. (By K. DeP. Watson.)
Bulletin No. 26: Report on the Stanley Area, Cariboo Mining Division. (By Stuart S. Holland.)
Bulletin No. 27: Geology and Mineral Deposits of the Zeballos Mining Camp, British Columbia. (By John S. Stevenson.)
Bulletin No. 28: Placer Gold Production of British Columbia. (By S. S. Holland.)
Bulletin No. 29: Geology and Ore Deposits of the Sandon Area, Slocan Camp, British Columbia. (By M. S. Hedley.)
Bulletin No. 30: Clay and Shale Deposits in British Columbia. (By J. W. McCammon and J. M. Cummings.)
Bulletin No. 31: Geology of the Sheep Creek Camp. (By W. H. Mathews.)
Bulletin No. 32: Geology and Mineral Deposits of the Shulaps Range, Southwestern British Columbia. (By G. B. Leech.)
Bulletin No. 33: Geology of the Crowsnest Coal Basin with Special Reference to the Fernie Area. (By C. B. Newmarch.)
Bulletin No. 34: Geology of the Yanks Peak-Roundtop Mountain Area, Cariboo District, British Columbia. (By Stuart S. Holland.)
Bulletin No. 35: Geology of the Stanford Range of the Rocky Mountains, East Kootenay District, British Columbia. (By G. G. L. Henderson.)
Bulletin No. 36: Coal Reserves of the Hasler Creek-Pine River Area, British Columbia. (By N. D. McKechnie.)
Bulletin No. 37: Geology of the Cowichan Lake Area, Vancouver Island, British Columbia. (By James T. Fyles.)

WELL SCHEDULES

Schedule of Wells Drilled for Oil and Natural Gas in British Columbia to January 1st, 1956. $1.25.

NOTICES *RE* PUBLICATIONS

Applications are invited from those who wish to receive notices when new publications become available.

MAPS SHOWING MINERAL CLAIMS AND PLACER LEASES

Maps showing the approximate locations of placer-mining leases and mineral claims held by record may be seen at the Central Records Offices at Victoria and Vancouver. Prints are obtainable on request made to the Chief Gold Commissioner at Victoria, and accompanied by the proper sum. The charges* are: Full sheet, $1; half-sheet, 50 cents; quarter-sheet, 25 cents. The maps conform to the reference and mineral-reference maps issued by the Lands Department in size and geographical detail and correspond as to numbers.

PERMITS AND LEASES UNDER "PETROLEUM AND NATURAL GAS ACT, 1954"

Maps showing the locations of permits and leases under the "Petroleum and Natural Gas Act, 1954," may be obtained upon application to the office of the Chief Commissioner, Petroleum and Natural Gas, Department of Mines, Victoria, B.C., accompanied by payment of $3* per sheet.

Monthly reports giving information on changes in permits and leases held, changes in title to permits and leases, additions and revisions to permit-location

* Charges for sales within British Columbia are subject to the 5-per-cent sales tax, which must accompany the remittance.

maps, and related matters are available from the office of the Chief Commissioner, Petroleum and Natural Gas, upon application and payment of a fee of $1 per annum.

ROCK AND MINERAL SPECIMENS

Identified specimens, about an inch square, of rocks and minerals may be purchased by prospectors and by schools in British Columbia.

A collection of rock specimens including twenty items is sold for $1. A collection of economic minerals including twenty-five items is sold for $3.50. A combined collection of rock and mineral specimens is available for schools in British Columbia only at $3.50, on official application from the school. Specimens of scheelite, wolframite, cinnabar, stibnite, and tetrahedrite are sold at 25 cents each. All sales in British Columbia are subject to the Provincial 5-per-cent sales tax. If specimens are to be mailed to an address outside British Columbia, the applicant should remit 25 cents for mailing charges on either collection provided the package is to go by surface mail to an address in North America. Otherwise the applicant should remit the actual carrying charge, which may be calculated on 1½ pounds of weight for either collection.

A request for specimens should be addressed to the Chief of the Mineralogical Branch, Department of Mines, Victoria, B.C., and should be accompanied by the proper sum, including 5 per cent tax for deliveries within British Columbia, or the proper mailing allowance to an address outside British Columbia.

LIST OF LIBRARIES

Department publications are being sent to the following Government departments and legislative, university, and public libraries:—

CANADA

Government departments—

Department of Mines and Technical Surveys, Ottawa.
Department of Resources and Development, Ottawa.
Department of Mines and Resources, St. John's, Newfoundland.
Department of Mines, Halifax, Nova Scotia.
Department of Lands and Mines, Fredericton, New Brunswick.
Department of Mines, Quebec, Quebec.
Department of Mines, Toronto, Ontario.
Department of Mines and Natural Resources, Winnipeg, Manitoba.
Department of Natural Resources and Industrial Development, Regina, Saskatchewan.
Department of Mines and Minerals, Edmonton, Alberta.

Legislative libraries—

Library of Parliament, Ottawa.
Legislative Library, Halifax, Nova Scotia.
Legislative Library, Fredericton, New Brunswick.
Legislative Library, Quebec, Quebec.
Legislative Library, Toronto, Ontario.
Legislative Library, Winnipeg, Manitoba.
Legislative Library, Regina, Saskatchewan.
Legislative Library, Edmonton, Alberta.
Provincial Library, Victoria, British Columbia.

University libraries and museums—

Dalhousie University, Halifax, Nova Scotia.
Acadia University, Wolfville, Nova Scotia.
Laval University, Quebec, Quebec.
McGill University, Montreal, Quebec.
Queen's University, Kingston, Ontario.
Royal Ontario Museum of Geology and Mineralogy, Toronto, Ontario.
University of Toronto, Toronto, Ontario.
University of Manitoba, Winnipeg, Manitoba.
University of Montreal, Montreal, Quebec.
University of Saskatchewan, Saskatoon, Saskatchewan.
University of Alberta, Edmonton, Alberta.
University of British Columbia, Vancouver, British Columbia.

Public libraries—

Public Library, Halifax, Nova Scotia.
Public Library, Montreal, Quebec.
Public Library, Toronto, Ontario (Reference Division).
Public Library, Edmonton, Alberta.
Public Library, Calgary, Alberta.
Public Library, New Westminster, British Columbia.
Nelson Municipal Library, Nelson, British Columbia.
Public Library, Prince Rupert, British Columbia.
Public Library, Prince George, British Columbia.
Public Library, Vancouver, British Columbia (Acquisitions Division).
Public Library, Victoria, British Columbia.

ENGLAND

British Columbia House, Regent Street, London, England.
Canada House, London, England.
Institution of Mining and Metallurgy, 44 Portland Place, London, England.

SOUTH AFRICA

Public Library, Johannesburg, South Africa.

AUSTRALIA

Public Library, Sydney, Australia.

UNITED STATES

Government departments and legislative libraries—
- Library of Congress, Washington 25, D.C.
- The Interior Department Library, Washington 25, D.C.
- United States Geological Survey, Washington 25, D.C.
- California State Division of Mines, Ferry Building, San Francisco, California.
- Oregon State Department of Geology and Mineral Industries, 702 Woodlark Building, Portland, Oregon.
- Washington State Division of Mines and Geology, Olympia, Washington.
- Idaho State Bureau of Mines, Boise, Idaho.

University and society libraries—
- Columbia University, New York 27, New York (Document Division).
- University of California, Berkeley, California (Document Division).
- Engineering Societies Library, 29 West Thirty-ninth Street, New York, New York.
- State University of Iowa, Iowa City, Iowa.
- Montana School of Mines, Butte, Montana.
- Oregon State College, Corvallis, Oregon.
- University of Washington, Seattle, Washington.
- University of Nevada, Reno, Nevada.

Public libraries—
- New York Public Library, New York, New York.
- Free Library, Philadelphia Zone 3, Pennsylvania.
- Public Library, Boston, Massachusetts.
- Public Library, Los Angeles, California.
- Public Library, San Francisco, California.
- Library Association of Portland, Portland, Oregon.
- Public Library, Seattle, Washington.
- Public Library, Spokane, Washington.

Lode-metal Deposits Referred to in the 1955 Annual Report

The names of the properties are arranged alphabetically within five areas. Each area consists of the mining divisions listed below. The table shows the principal metals produced or indicated in the deposits in 1955:—

Northern British Columbia.—Atlin, Liard.

Central British Columbia.—Cariboo, Clinton, Omineca.

Coast and Islands.—Alberni, Nanaimo, New Westminster, Skeena, Vancouver, Victoria.

South Central British Columbia.—Greenwood, Kamloops, Lillooet, Nicola, Osoyoos, Similkameen, Vernon.

Southeastern British Columbia.—Fort Steele, Golden, Nelson, Revelstoke, Slocan, Trail Creek.

Property	Mining Division	Latitude and Longitude	Gold	Silver	Copper	Lead	Zinc	Tungsten	Cadmium	Iron	*Manganese*	Uranium	Mercury	Tin	Beryllium	Niobium	Page
Northern British Columbia																	
Big Bull	Atlin	58° 133° N.W.	1	1	1	1	1		2								11
Callison Copper	Liard	58° 131° S.W.			3												13
Cassiar Beryl	Liard	59° 128° S.W.													3		9
Contact	Liard	59° 129° S.W.		3		3											10
Fisher	Atlin	59° 133° N.E.										3					7
Graham	Liard	59° 129° S.W.		3		3											10
Low Grade	Liard	59° 129° S.W.													3		11
Maid of Erin	Atlin	59° 136° N.W.		3	3												7
Purple Rose	Atlin	59° 133° N.E.										3					7
Silver Queen	Liard	59° 129° S.W.		3		3											10
Tulsequah Chief	Atlin	58° 133° N.W.	1	1	1	1	1		2								11
Central British Columbia																	
Abe	Omineca	53° 124° N.W.										3					28
American Boy, Hazelton	*Omineca*	*55° 127° S.W.*	*2*	*1*		*1*	*1*										A46
Babs	Omineca	53° 124° N.W.										3					28
Cariboo Gold Quartz	Cariboo	53° 121° S.W.	1	2													31
Chikamin	Omineca	53° 127° S.E.		3		3											27
Empire Valley	Clinton	51° 122° S.E.	3														31
Harrison	Omineca	53° 127° S.E.	3	3				3									25
Ike	Omineca	53° 124° N.W.										3					28
Jim	*Cariboo*	*52° 121° N.E.*	*3*														31
Kerr Copper	Omineca	54° 125° S.W.			3												25
Lonnie	Omineca	55° 124° N.E.														3	29
McDonald Island	Omineca	54° 126° N.E.			3												29
Nazko	Cariboo	53° 123° S.W.										3					30
Nicholson Creek	Omineca	54° 128° N.W.		3	3												21
Pat	Omineca	53° 124° N.W.										3					28
Silver Standard	*Omineca*	*55° 127° S.W.*	*2*	*1*	*2*	*1*	*1*		*2*								22
Three Hills	Omineca	55° 127° S.W.			3												24
Topley Richfield	Omineca	54° 126° N.E.	3	3													25
Zeke	Omineca	53° 124° N.W.										3					28
Coast and Islands																	
A.B.	Skeena	56° 129° S.W.	3	3		3	3										17
A.M.	New Westminster	49° 121° S.E.			3												73
American Belle	Skeena	56° 129° S.W.	3	3		3	3										17
Anyox	Skeena	55° 129° S.W.			3												21
B.B.	New Westminster	49° 121° S.E.			3												74
Ben Bolt	Skeena	55° 129° N.W.	3	3		3	3										17
Boulder, Kitsault River	Skeena	55° 129° N.W.			3												20
Blue Grouse	Victoria	48° 124° N.E.		2	1												79
Britannia	Vancouver	49° 123° S.E.	2	2	1	2	1		2								74
Defiance	New Westminster	49° 121° S.E.			3												74
Fil	Alberni	50° 127° S.E.	3														78
Foremost Copper	Alberni	49° 125° S.W.			3												78
Gabbro	Victoria	48° 124° S.E.			3												79

Shipping Mines.—(1) Metal contributed at least 10 per cent of gross value of the shipment. (2) Metal contributed less than 10 per cent of gross value of the shipment. Production for 1955 is listed in Table XV.

Non-shipping Mines.—(3) Metal present, indicated by assay or mineralogical determination

LODE-METAL DEPOSITS REFERRED TO IN THE 1955 ANNUAL REPORT—*Continued*

Property	Mining Division	Latitude and Longitude	Gold	Silver	Copper	Lead	Zinc	Tungsten	Cadmium	Iron	Manganese	Uranium	Mercury	Tin	Beryllium	Niobium	Page
Coast and Islands—Continued																	
Granduc	Skeena	56° 130° S.E.			3												14
Iron Crown	Nanaimo	50° 126° S.W.								3							76
Iron Hill	Nanaimo	49° 125° N.W.								1							78
Jumbo	Skeena	55° 129° N.W.	3	3		3	3										17
Kinskuch	Skeena	55° 129° N.W.			3												20
Lake	Nanaimo	49° 124° N.W.								1							75
Lorry	Victoria	48° 124° N.E.			3												79
Lucky Four	New Westminster	49° 121° S.W.			3												74
Mammoth	New Westminster	49° 121° S.E.			3												74
Maple Bay	Skeena	55° 130° S.E.			3												18
Paxton	Nanaimo	49° 124° N.W.								1							75
Porter Idaho	Skeena	55° 129° N.W.	3	3		3	3										17
Prescott	Nanaimo	49° 124° N.W.								1							75
Prosperity	Skeena	55° 129° N.W.	3	3		3	3										17
R.J.	Skeena	56° 129° S.W.	3	3		3	3										17
Reina Blanca	Skeena	55° 129° N.W.			3												20
Rhoda	Nanaimo	50° 126° S.W.								3							76
Ricadonna	Skeena	56° 129° S.W.	3	3		3	3										17
Silbak Premier	Skeena	56° 130° S.E.	3	3		3	3										17
Silverado	Skeena	55° 129° N.W.	3	3		3	3										17
Skeena	Skeena	56° 129° S.W.	3	3		3	3										17
Star, Porcher Island	Skeena	54° 130° S.E.								3							21
Star of the West	Alberni	49° 126° N.W.			3												78
Toric	Skeena	55° 129° N.W.	3	1		2	3										19
Yreka	Nanaimo	50° 127° S.W.			3												76
South Central British Columbia																	
Anuwon	Kamloops	50° 121° N.E.										3					37
Bethlehem Copper	Kamloops	50° 120° S.W.			3												34
Black Diamond	Nicola	50° 121° S.W.			3												37
Bralorne	Lillooet	50° 122° N.W.	1	2													32
Chalco	Lillooet	50° 122° N.W.			3			3									33
Commercial Minerals Limited	Kamloops	50° 120° N.E.			3												38
Copper Mountain	Similkameen	49° 120° S.W.	2	2	1												40
Copper Queen	Greenwood	49° 118° S.W.	2	2	1												46
Dunmore Mines Limited	Kamloops	50° 120° S.W.			3												37
Dynamo	Greenwood	49° 118° S.W.		2		1	1										A47
Ex No. 1	Kamloops	51° 119° S.W.		1		1	1										A47
Fairview	Osoyoos	49° 119° S.W.	3														44
French	Osoyoos	49° 120° S.E.	1	2													41
Highland Bell	Greenwood	49° 119° S.W.	2	1		1	1		2								44
Krain	Kamloops	50° 120° N.W.			3												37
Lodge	Kamloops	50° 120° N.W.			3												37
Lone Pine	Osoyoos	49° 119° S.W.	3			3	3										44
Mother Lode	Greenwood	49° 118° S.W.	3	3	3												45
Nickel Plate	Osoyoos	49° 120° S.E.	1	2													41
Olalla Nos. 1 to 8	Osoyoos	49° 119° S.W.									3						42
Orlean	Kamloops	50° 121° S.W.										3					33
Phoenix	Greenwood	49° 118° S.W.	3	3	3												46
Pioneer	Lillooet	50° 122° N.W.	1	2													32
Plateau Metals Limited	Kamloops	51° 119° S.W.		3		3	3										39
Providence	Greenwood	49° 118° S.W.	3	3		3	3										45
Python	Kamloops	50° 120° N.E.			3												38
Red Star	Similkameen	49° 120° S.W.	3	3	3		3										39
Rexspar	Kamloops	51° 119° N.W.										3					38
Rosyd	Kamloops	50° 121° S.W.										3					34
Salmo Prince	Greenwood	49° 118° S.W.	3	3	3												46
Silver Hill	Similkameen	49° 121° S.E.		3		3	3										39
Silver Quick	Lillooet	51° 122° S.W.											3				33
Transvaal Copper	Kamloops	50° 121° N.E.			3												36
Trojan	Kamloops	50° 121° N.E.			3												36
Victor, Highland Valley	Kamloops	50° 121° S.E.			3												37
Waterloo	Greenwood	49° 118° N.W.		3		3	3										45
Southeastern British Columbia																	
American Boy	Slocan	49° 117° N.E.		3		3	3										61
Annie Fraction	Trail Creek	49° 117° S.W.	3		3												48
Bannockburn	Slocan	50° 117° N.E.		3		3	3										67
Beatrice	Revelstoke	50° 117° N.W.		3		3	3										67
Bluebell	Slocan	49° 116° N.W.		2	2	1	1		2								55
Bosun	Slocan	49° 117° N.E.		3		3	3										64

LODE-METAL DEPOSITS REFERRED TO IN THE 1955 ANNUAL REPORT—*Continued*

Property	Mining Division	Latitude and Longitude	Gold	Silver	Copper	Lead	Zinc	Tungsten	Cadmium	Iron	Manganese	Uranium	Mercury	Tin	*Beryllium*	Niobium	Page
Southeastern British Columbia—Continued																	
Boy Scout	Fort Steele	49° 116° N.E.		3	..	3	3										68
Broadview	Revelstoke	50° 117° N.E.		3	..	3	3										67
Caledonia	Slocan	50° 117° S.E.	2	1	..	1	1	..	2								61
Canada Belle	Nelson	49° 117° S.E.	..	3	..	3	3	..									54
Cariboo	Fort Steele	49° 116° S.E.	..	..	..	3	3	3	..			3					68
Chieftain	Slocan	50° 117° S.W.	1	1	..	2	2										65
Comstock	Trail Creek	49° 117° S.W.	..	3		3	3										48
Creston Hill	*Nelson*	49° 116° S.E.			3												68
Deadman	Slocan	49° 117° N.E.	..	3	..	3	3										61
Deer Horn	Nelson	49° 117° S.E.	..	3	..	3	3										50
Dixie Fraction	Slocan	49° 116° N.W.	..	1		1	2										59
Dodger	Nelson	49° 117° S.E.						1									51
Eclipse	Revelstoke	50° 117° N.W.	3	3	..	3	3										66
Emerald	Nelson	49° 117° S.E.						1									51
Enterprise	Slocan	49° 117° N.E.	2	1	..	1	1		2								63
Estella	Fort Steele	49° 115° N.W.	..	3	..	3	3										70
Feeney	Nelson	49° 117° S.E.						1									51
Galena Farm	Slocan	49° 117° N.E.		3	..	3	3										64
Gibson Creek Gold Mine Nos. 1 to 7	Trail Creek	49° 117° S.W.	3		..			3				3					50
Goodenough	Nelson	49° 117° S.E.	1	2		1	1										A48
H.B.	Nelson	49° 117° S.E.		2		1	1		1								52
Hercules	Slocan	49° 116° N.W.		3		3	3										58
Hewitt	Slocan	49° 117° N.E.		1		1	1										64
Highlander	Slocan	49° 116° N.W.		1		1	1										56
Hinckley	Slocan	49° 117° N.E.	2	1	..	1	1										63
J.G.	Slocan	50° 116° S.W.		3	..	3	3										68
Jackson	Slocan	50° 117° S.E.	..	1		1	1										60
Jersey	*Nelson*	49° 117° S.E.		2		1	1		2								51
Keystone Charleston	Slocan	50° 117° S.E.		1	..	1	1	..	2								61
Kootenay Florence	Slocan	49° 116° N.W.	..	3	..	3	3										58
Last Chance	Slocan	49° 117° N.E.		3	..	3	3										61
Lead Mountain	Golden	50° 116° N.E.	..	..		3	3										73
Lone Bachelor	Slocan	49° 117° N.E.		3		3	3										63
Mammoth	Slocan	49° 117° N.E.	2	1	..	1	1	..	2								63
Mineral King	Golden	50° 116° S.E.	..	2	2	1	1	..	2								70
Molly Mac	Revelstoke	50° 117° N.E.		3		3	3										67
Monarch	Slocan	49° 117° N.E.	2	1		1	1	..	2								63
Mountain Chief	Trail Creek	49° 118° S.E.			3												66
Noble Five	Slocan	49° 117° N.E.		2	..	2	1	..	2								61
Noonday	Slocan	49° 117° N.E.	..	1		1	1										64
Paradise	Golden	50° 116° S.E.		2	2	1	1	..	2								70
Ptarmigan	Golden	50° 116° S.E.		3	3												71
Queen Victoria	Nelson	49° 117° S.E.			3												50
Reeves MacDonald	Nelson	49° 117° S.E.	..	2		1	1		2								53
Renata	Trail Creek	49° 118° S.E.		3	..	3	3	3									65
Shady Fraction	Slocan	49° 117° N.E.	..	1		1	2										62
Silver Bear	Slocan	49° 117° N.E.		3		3	3										59
Silver Giant	Golden	50° 116° N.E.		2	2	1	2	..	2								72
Silversmith	Slocan	49° 117° N.E.		3	..	3	3										61
Slocan Sovereign	Slocan	49° 117° N.E.		2		2	1		2								61
Snowdrop	Trail Creek	49° 117° S.W.	1	2	3												47
Spider	Revelstoke	50° 117° N.W.	2	1		1	1		2								66
Standard	Slocan	49° 117° N.E.	2	1	..	1	1		2								63
Star, Ainsworth	Slocan	49° 116° N.W.		3		3	3										59
Sullivan	Fort Steele	49° 115° N.W.	2	1	2	1	1	..	..	..	..	..	..	2	..	..	68
Sunny	Nelson	49° 117° S.E.			..	3	3	..	..	..	..	..	..	..	..	..	51
True Fissure	Revelstoke	50° 117° N.E.	..	3	..	3	3										67
Try Again	Slocan	49° 117° N.E.										3					65
Tungsten King	Nelson	49° 117° S.E.						3									53
Utica	Slocan	49° 117° N.E.		1		1	1										60
V & M	Slocan	49° 117° N.E.	1	1		2	2										65
Valparaiso	Nelson	49° 116° S.W.	3	3	..	3		3									54
Van Roi	Slocan	49° 117° N.E.	2	1		1	1		2								64
Velvet	Trail Creek	49° 117° S.W.	1	2	1												47
Victor, Sandon	Slocan	49° 117° N.E.	2	1		1	1		2								62
Wagner	Slocan	50° 117° N.E.	..	3	..	3	3										67
Wonderful	Slocan	49° 117° N.E.		3		3	3										63
Woodbury—*see* Dixie Fraction.																	

Shipping Mines.—(1) Metal contributed at least 10 per cent of gross value of the shipment. (2) Metal contributed less than 10 per cent of gross value of the shipment. Production for 1955 is listed in Table XV.

Non-shipping Mines.—(3) Metal present, indicated by assay or mineralogical determination.

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ILLUSTRATIONS

PHOTOGRAPHS

DRAWINGS

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