Minister of Mines

PROVINCE OF BRITISH COLUMBIA

ANNUAL REPORT

For the year ended 31st December

1945

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1946.

BRITISH COLUMBIA DEPARTMENT OF MINES.

VICTORIA, B.C.

Hon. R. C. MACDONALD, *Minister.*
JOHN F. WALKER, *Deputy Minister.*
JAMES DICKSON, *Chief Inspector of Mines.*
G. CAVE-BROWNE-CAVE, *Chief Analyst and Assayer.*
HARTLEY SARGENT, *Chief Mining Engineer.*
P. J. MULCAHY, *Chief Gold Commissioner.*

To His Honour Lieut.-Colonel WILLIAM CULHAM WOODWARD,
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 1945 is herewith respectfully submitted.

R. C. MACDONALD,
Minister of Mines.

Minister of Mines' Office,
June, 1946.

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PLANS.

Annual Report of the Minister of Mines, 1945.

THE MINING INDUSTRY.

BY

HARTLEY SARGENT, CHIEF MINING ENGINEER.

The gross value of mineral production for 1945 exceeded $63,300,000, an increase of $8,400,000 or more than 15 per cent. compared with the value of production in 1944.

Of the metals, lode gold decreased 6 per cent. from the 1944 figure; copper decreased 28.8 per cent. in quantity and 25.5 per cent. in value, while silver, lead, and zinc increased from 7.6 to 20 per cent. in quantity and 18 to 61 per cent. in value. The metals group increased nearly 23 per cent. compared with the value of production in 1944.

Coal production decreased by 415,000 tons, or 21.5 per cent. in quantity and value. The decrease resulted in part from a strike which fortunately was settled in a comparatively short time.

The value of non-metallics increased by 9.3 per cent., increases in gypsum and sulphur more than offsetting reduced production of fluxes.

The group "Clay Products" increased by a third, all the major items recording increases in value. The greatest increases were in "common brick" and in "structural tile—hollow blocks."

Of the group "Other Structural Materials," sand and gravel decreased but the other items increased, giving an increase of 15 per cent. for the group.

Part of the increase in value is attributed to increases in average prices for metals, the prices of all the principal metals except gold having increased materially as compared with 1944. This statement needs to be amplified by stating that the price for each metal is the average price received for all of the particular metal produced in Canada. Although the average price received by Canadian producers of zinc improved markedly in 1945, some producers may have received lower prices at the end of the year because they had lost the advantage of exporting to the United States market under favourable war contracts.

The value of production in 1944 was the lowest for any year since 1936 and is almost $4,000,000 lower than the average value for the twenty-year period 1926 to 1945. Comparison with the average for the twenty-year period may be of interest; accordingly, the arithmetic averages for the twenty-year period and the production for the years 1944 and 1945, in round figures, are set forth in the following table, which includes metal prices with the production figures:—

AVERAGE, 1926–45.*

	Price.	Quantity.	Value.
Gold, placer.....crude, oz.	$25.42	26,600	$730,000
Gold, lode.....fine, oz.	$30.85	314,000	10,505,000
Silver.....fine, oz.	45.26c.	9,440,000	4,310,000
Copper.....lb.	10.94c.	60,790,000	7,030,000
Lead.....lb.	3.86c.	351,000,000	13,440,000
Zinc.....lb.	4.07c.	255,000,000	10,070,000
Total value of principal metals			$46,085,000
Coal.....long ton	$4.45	1,740,000	7,835,000
Structural materials			2,595,000
Miscellaneous metals, minerals, etc.			2,310,000
Grand total, value			$58,825,000

1944.

Gold, placer.....crude, oz.	$31.66	11,500	$360,000
Gold, lode.....fine, oz.	$38.50	186,500	7,185,000
Silver.....fine, oz.	43.00c.	5,705,000	2,455,000
Copper.....lb.	12.00c.	36,300,000	4,355,000
Lead.....lb.	4.50c.	294,800,000	13,265,000
Zinc.....lb.	4.30c.	280,400,000	12,055,000
Total value of principal metals			$39,675,000
Coal.....long ton	$4.25	1,935,000	8,220,000
Structural materials			3,025,000
Miscellaneous metals, minerals, etc.			4,005,000
Grand total, value			$54,925,000

1945.

Gold, placer.....crude, oz.	$31.66	12,500	$400,000
Gold, lode.....fine, oz.	$38.50	175,500	6,750,000
Silver.....fine, oz.	47.00c.	6,157,000	2,895,000
Copper.....lb.	12.55c.	25,850,000	3,245,000
Lead.....lb.	5.00c.	353,500,000	17,675,000
Zinc.....lb.	6.44c.	301,700,000	19,430,000
Total value of principal metals			$50,395,000
Coal.....long ton	$4.25	1,520,000	6,455,000
Structural materials			3,400,000
Miscellaneous metals, minerals, etc.			3,095,000
Grand total, value			$63,345,000

* Prices and production figures for the period 1926–45 are arithmetic averages.

The quantities of the principal metals produced in 1944 and 1945 were well below the twenty-year averages, except for zinc in both years and lead in 1945. The metal prices for the two years were higher and in some cases materially higher than the twenty-year average. It is interesting to note that production of zinc has increased greatly in quantity and in relative importance, while copper production has declined materially in the twenty-year period. The twenty-year period includes substantially all our production of sulphur, mercury, tungsten, antimony, bismuth, cadmium, and tin. These products make up a large part of the miscellaneous group which is now of considerable importance but was relatively unimportant before 1925.

In the early part of 1945 most mining operations were acutely short of labour. Returns from the operators show that the average numbers of men employed for the year, in all departments of the mining industry except underground in lode mines and in the production of structural materials, were less than the averages for 1944. However, by the end of 1945 many more men were employed in metal mines than had been employed at the beginning of the year. Skilled miners were still short in supply, but it is expected that the increasing experience of new employees and the efforts being made to train new employees will increase the supply of skilled labour. The situation at the coal mines has not improved materially, and improvement is apt to take more time than for the metal-mining industry as the time required to train miners is longer for coal-mining than for metal-mining.

Dividends credited to 1945 amounted to $10,487,395, compared with $11,367,732 credited to 1944. The 1945 figure includes $70,504 made up of capital distribution and two amounts omitted from the amount credited to 1944.

Prospecting, development, and rehabilitation of mines and plants were pursued actively during 1945 and are continuing in 1946. Exploratory work was undertaken in the Portland Canal, Cariboo, Bridge River, Hedley, Boundary, Nelson, Slocan, Texada Island, Taseko Lake, and Whitesail Lake areas. This work was directed principally toward the search for gold ore, but base-metal ores also received attention. A note on the grub-staking of prospectors by the Provincial Government will be found on page 54.

Work has been resumed at several gold mines which were shut down during the war. Production from some of these properties will probably make a considerable contribution to the 1946 total. It is also expected that production will be increased at other properties where war conditions necessitated reductions. Expansion of copper production to make up some of the war-time reduction is also expected. The price now being obtained for silver is materially higher than for many years, and the prices for copper, lead, and zinc are higher than during much of the time in recent years. These conditions point to increases in quantity and value of metal production for 1946. Industrial disputes have caused shut-downs in other industries, and should shut-downs occur in the mining industry, production would obviously be affected adversely.

War requirements occasioned the beginning of production, or of substantially increasing production, of several items included under "Miscellaneous Metals, Minerals, and Materials." The production of several of these items has been greatly reduced; however, production of by-product metals and sulphur will probably continue to make the miscellaneous group important in total value of production; there are also prospects that some new production will be undertaken in this group. Production of clay products and of other structural materials is expected to be above average because of the activity in building and other construction.

STATISTICS.

The collection and compilation of mining statistics and the preparation of statistical tables for this report is in charge of the Bureau of Economics and Statistics, Department of Trade and Industry.

Since 1939 several mining divisions have been amalgamated with others. These changes may be of interest to those studying the tables and therefore have been set forth under the heading "Amalgamation of Mining Divisions," page 46.

METHOD OF COMPUTING PRODUCTION.

The total value of mine output of the Province, consisting of metalliferous minerals, coal, structural materials, and miscellaneous metals, minerals, and materials, is calculated at standard prices in Canadian funds.

In the Annual Report for 1925 some changes were made in the methods used in previous years in computing and valuing the products of the industry, but in order to facilitate comparisons with former years the same general style of tables was adhered to. The methods used in the 1925 Annual Report have been followed in subsequent Annual Reports, with the addition of new tables.

METALS.

The following notes explain the methods used:—

(1.) From the certified returns of lode mines of ore and concentrate shipments made during the full calendar year by the producers, the net recovered metal contents have been determined by deducting from the "assay value content" necessary corrections for smelting and refining losses.

In making comparisons of production figures with previous years, it should be remembered that prior to 1925 in the Annual Reports the total metal production, with the exception of copper, was determined by taking the assay value content of all ores shipped; deductions for slag losses were made by taking varying percentages of the metal prices.

(2.) 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. Beginning with 1932 the average value per crude ounce has been based on the same fineness but has recognized the varying price of gold. Since 1940 the price per fine ounce has been $38.50 in Canadian funds, and the equivalent average value per crude ounce has been $31.66.

(3.) In the interests of uniformity the Statistical Bureaus of the Provinces and the Dominion Bureau of Statistics use the same average metal prices in valuing mineral production.

Suspension of trading on the London Metal Exchange in September, 1939, and the controls of metals during the war years have necessitated changes from the procedures which had been followed previously. A foot-note under Table II. outlines the procedures which have been followed in recent years. The prices used formerly in evaluating metal and mineral production were:—

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

Copper, Lead, and Zinc.—The average London Metal Market prices for the year converted into Canadian funds at the average exchange rate.

British Columbia lead and zinc were sold largely on the basis of the London prices. The New York, St. Louis, and Montreal lead- and zinc-market prices differed materially from the London prices and were not properly applicable in valuing British Columbia production.

Until 1932 the New York price for copper was used. British Columbia copper production was sold largely in the United States, and the New York export price for copper rather than the London price was the basis for settlement. Any difference between the two prices introduced a variation in the gross value of copper production as calculated. (*See* foot-note, Table II.)

FUEL.

(4.) In 1926 a change was made in computing coal and coke statistics. The practice in former years had been to list coal and coke production (in part) as primary mineral production. Only the coke made in bee-hive ovens was so credited; that 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 the coke-production figures were incomplete. Starting with the 1926 Annual Report, the standard practice of the Bureau of Statistics, Ottawa, has been 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 it is, however, of interest to the mining industry, a table included in the report shows the total coke produced in the Province, together with by-products, and the values given by the producers. This valuation of coke is not, of course, included in the total gross mine production of the Province.

From 1918 to 1930 coal production was valued at $5 per long ton. In 1931 the price used was $4.50, and from 1932 on the price used has been $4.25 per long ton. The different prices should be kept in mind when comparing the dollar value of production for different years.

TABLE I.—British Columbia Mine Production, 1944 and 1945.

	Quantity, 1944.	Quantity, 1945.	Value, 1944.	Value, 1945.	Per Cent. Increase (+) or Decrease (−). Quantity.	Value.
Metallics.			$	$		
Antimony	.....	.....	281,000	292,635	.....	+ 4.1
Bismuth	.....	.....	154,844	260,047	.....	+ 67.9
Cadmium	.....	.....	401,623	505,328	.....	+ 25.8
Copper*	lb. 36,300,589	25,852,366	4,356,070	3,244,472	− 28.8	− 25.5
Gold, lode†	fine, oz. 186,632	175,373	7,185,332	6,751,860	− 6.0	− 6.0
Gold, placer†	crude, oz. 11,433	12,589	361,977	398,591	+ 10.0	+ 10.0
Lead*	lb. 294,797,469	353,497,689	13,265,886	17,674,884	+ 20.0	+ 33.2
Mercury	lb. 755,908	.....	1,210,375	.....	−100.0	−100.0
Silver*	oz. 5,705,334	6,157,307	2,453,293	2,893,934	+ 7.9	+ 18.0
Tin	lb.	.....	299,643	484,490	.....	+ 61.7
Tungsten concentrates	.....	.....	236,788	331	−100.0	−100.0
Zinc*	lb. 280,356,477	301,737,902	12,055,328	19,431,921	+ 7.6	+ 61.2
Totals	.....	.....	42,262,159	51,938,493	.....	+ 22.9
Fuel.						
Coal	tons (2,240 lb.) 1,933,639	1,518,673	8,217,966	6,454,360	− 21.5	− 21.5
Non-metallics.						
Barites, diatomite, and mica	.....	.....	63,579	63,414	.....	.....
Fluxes—limestone, quartz	*tons 63,443*	45,221	100,283	79,266	− 28.7	− 29.9
Granules—slate and rock, talc	tons 949	969	17,903	16,272	+ 2.1	− 9.1
Gypsum products, gypsite	.....	.....	103,927	127,434	.....	+ 22.6
Iron oxides	.....	.....	8,200	1,985	.....	− 75.8
Sodium carbonate	tons 43	286	473	3,146	+565.1	+565.1
Sulphur‡	tons 113,374	127,653	1,123,868	1,267,350	+ 12.6	+ 12.8
Totals	.....	.....	1,418,233	1,549,867	.....	+ 9.3
Clay Products and Other Structural Materials.						
Clay Products.						
Brick—						
Common	No. 2,038,193	3,092,000	40,936	80,556	+ 51.7	+ 96.8
Face, paving, sewer brick	No. 1,182,784	1,319,743	41,495	49,814	+ 11.6	+ 20.0
Firebricks, blocks	.....	.....	181,199	217,275	.....	+ 20.0
Fireclay	tons 3,706	510	17,283	7,899	− 86.2	− 54.3
Structural tile—hollow blocks	.....	.....	26,527	70,376	.....	+165.3
Drain-tile, sewer-pipe	No. 1,733,114	1,603,969	165,905	205,883	− 7.5	+ 24.1
Pottery—glazed or unglazed	.....	.....	.....	3,245	.....	+100.0
Other clay products; bentonite	.....	.....	3,444	2,632	.....	− 23.6
Totals	.....	.....	476,789	637,680	.....	+ 33.7
Other Structural Materials.						
Cement	.....	.....	1,085,918	1,182,297	.....	+ 8.9
Lime	tons 147,444	162,334	421,648	522,692	+ 10.0	+ 24.0
Sand and gravel	.....	.....	935,370	865,557	.....	− 7.5
Stone	tons 1,075	4,284	64,794	127,809	+298.5	+ 97.3
Rubble, riprap, crushed rock	tons 44,423	71,949	40,926	65,194	+ 62.0	+ 59.3
Totals	.....	.....	2,548,656	2,763,549	.....	+ 8.4
Total value in Canadian funds	.....	.....	54,923,803	63,343,949	.....	+ 15.3

* For information on evaluation of silver, copper, lead, and zinc in 1945, refer to foot-note on Table II.

† Canadian funds.

‡ Sulphur content of pyrites shipped, estimated sulphur contained in sulphuric acid made from waste smelter-gases, and elemental sulphur.

TABLE II.—AVERAGE METAL PRICES* USED IN COMPILING VALUE OF PROVINCIAL PRODUCTION OF GOLD, SILVER, COPPER, LEAD, AND ZINC.

Year.	Gold, Fine Ounce.	Silver, Fine Ounce.	Copper, Lb.	Lead, Lb.	Zinc, Lb.
	$	Cents.	Cents.	Cents.	Cents.
1901	20.67	56.002 N.Y.	16.11 N.Y.	2.577 N.Y.	.....
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 ,,	.....
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 ,,
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 ,,
1932	23.47	31.671 ,,	6.380 Lond.	2.113 ,,	2.405 ,,
1933	28.60	37.832 ,,	7.454 ,,	2.391 ,,	3.210 ,,
1934	34.50	47.461 ,,	7.419 ,,	2.436 ,,	3.044 ,,
1935	35.19	64.790 ,,	7.795 ,,	3.133 ,,	3.099 ,,
1936	35.03	45.127 ,,	9.477 ,,	3.913 ,,	3.315 ,,
1937	34.99	44.881 ,,	13.078 ,,	5.110 ,,	4.902 ,,
1938	35.18	43.477 ,,	9.972 ,,	3.344 ,,	3.073 ,,
1939	36.14	40.488 ,,	10.092 ,,	3.169 ,,	3.069 ,,
1940	38.50	38.249 ,,	10.086 ,,	3.362 ,,	3.411 ,,
1941	38.50	38.261 ,,	10.086 ,,	3.362 ,,	3.411 ,,
1942	38.50	41.166 ,,	10.086 ,,	3.362 ,,	3.411 ,,
1943	38.50	45.254 ,,	11.75 ,,	3.754 ,,	4.00 ,,
1944	38.50	43.000 ,,	12.000 ,,	4.500 ,,	4.300 ,,
1945	**38.50**	***47.000** ,,	***12.550** ,,	***5.000** ,,	***6.440** ,,
Average, 1941–45 (inc.)	38.50	42.936 ,,	11.294 ,,	3.996 ,,	4.312 ,,

* Until price control was initiated in the recent war, the average metal prices used in evaluating British Columbia metal production were those used by the Dominion Bureau of Statistics and by all Provinces co-operating with that Bureau. The average United States prices, as quoted in the Engineering and Mining Journal, converted to Canadian funds were used for the precious metals. London prices were used similarly for the principal base metals (*see also* note headed "Metals," page 17). The method of arriving at the price for gold continued unchanged, but while controls were in effect during the war, the prices for the metals controlled were supplied by the Canadian Metals Controller. In 1945 the controls were largely removed and the Dominion Bureau of Statistics again computed average prices, using information supplied by the principal Canadian refiners of silver and the base metals.

In recent years the prices received for silver, lead, and zinc used in Canada have been substantially less than the prices received for these metals exported to the United States. Further, in 1945 the prices for foreign silver imported into the United States increased from 49.5 cents to 78.2 cents per ounce, in Canadian funds. The 1945 average price, 47 cents per ounce of fine silver, is a somewhat arbitrary figure, reconciling the markedly different prices received for silver used in Canada and silver exported.

In addition to metal sold in Canada, British Columbia silver, lead, and zinc are exported to the United States, Great Britain, and other markets abroad, and for some years all British Columbia copper has been sold in the United States. If the United States prices were used instead of the Dominion Bureau of Statistics average price, additional amounts could be credited to the copper production values; namely, for 1945, $82,728; for 1944, $315,815; and for 1943, $473,845.

NOTE.—In making comparisons with average prices used prior to 1925, it should be remembered that deductions were made from the average prices as a means of adjustment between the "assay value content" of ores shipped instead of allowing percentage losses in smelting operations. The price of copper prior to 1925 was taken at "net"; silver, at 95 per cent.; lead, at 90 per cent.; and zinc, at 85 per cent. Subsequent to 1925 (inclusive) prices are true averages, and adjustments are made on the metal content of ores for loss in smelting and refining.

TABLE III.—TOTAL PRODUCTION FOR ALL YEARS UP TO AND INCLUDING 1945.

Gold, placer	$92,297,951*
Gold, lode	332,908,138*
Silver	160,347,708
Copper	338,245,361
Lead	358,037,657
Zinc	241,263,375
Coal and coke	429,758,895
Structural materials	96,762,878
Miscellaneous metals, minerals, and materials	47,842,681
Total	$2,097,464,644

* Canadian funds.

TABLE IV.—PRODUCTION FOR EACH YEAR FROM 1852 TO 1945 (INCLUSIVE).

1852 to 1895 (inclusive)	$94,547,370	1921	$28,066,641
1896	7,507,956	1922	35,162,843
1897	10,455,268	1923	41,304,320
1898	10,906,861	1924	48,704,604
1899	12,393,131	1925	61,492,242
1900	16,344,751	1926	67,188,842
1901	19,671,572	1927	60,729,358
1902	17,486,550	1928	65,372,583
1903	17,495,954	1929	68,245,443
1904	18,977,359	1930	55,391,993
1905	22,461,325	1931	34,883,181
1906	24,980,546	1932	28,798,406*
1907	25,882,560	1933	32,602,672*
1908	23,851,277	1934	42,305,297*
1909	24,443,025	1935	48,821,239*
1910	26,377,066	1936	54,081,967*
1911	23,499,072	1937	74,475,902*
1912	32,440,800	1938	64,485,551*
1913	30,296,398	1939	65,681,547*
1914	26,388,825	1940	75,701,155*
1915	29,447,508	1941	78,479,719*
1916	42,290,462	1942	75,551,093*
1917	37,010,392	1943	65,892,395*
1918	41,782,474	1944	54,923,803*
1919	33,296,313	1945	63,343,949*
1920	35,543,084	Total	$2,097,464,644

* Canadian funds.

TABLE V.—QUANTITIES AND VALUE OF MINE PRODUCTS FOR 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, AND 1945.

Description.	1936.		1937.		1938.		1939.		1940.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer*.....oz.	43,389	$1,249,940	54,153	$1,558,245	57,759	$1,671,015	49,746	$1,478,492	39,067	$1,236,928
Gold, lode*.....oz.	404,472	14,168,654	460,781	16,122,727	557,522	19,613,624	587,180	21,221,272	583,416	22,461,516
Silver.....oz.	9,521,015	4,296,548	11,308,685	5,075,451	10,861,578	4,722,288	10,771,585	4,361,199	12,327,944	4,715,315
Copper.....lb.	20,806,672	1,971,848	46,057,584	6,023,411	65,769,906	6,558,575	73,254,679	7,392,862	77,980,223	7,865,085
Lead.....lb.	377,971,618	14,790,029	419,118,371	21,416,949	412,979,182	13,810,024	378,743,763	12,002,390	485,364,420	16,317,952
Zinc.....lb.	254,581,393	8,439,373	291,192,278	14,274,245	298,497,295	9,172,822	278,409,102	8,544,375	310,767,251	10,600,271
Coal.....tons, 2,240 lb.	1,346,471	5,722,502	1,444,687	6,139,920	1,309,428	5,565,069	1,477,872	6,280,956	1,667,827	7,088,265
Structural materials.....	.....	1,796,677	.....	2,098,337	.....	1,975,249	.....	1,832,434	.....	2,534,840
Miscellaneous metals, minerals, and materials....	.....	1,646,396	.....	1,766,617	.....	1,396,885	.....	2,567,567	.....	2,880,983
Totals.....	.....	$54,081,967	.....	$74,475,902	.....	$64,485,551	.....	$65,681,547	.....	$75,701,155

Description.	1941.		1942.		1943.		1944.		1945.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold, placer*.....oz.	43,775	$1,385,962	32,904	$1,041,772	14,600	$462,270	11,433	$361,977	12,589	$398,591
Gold, lode*.....oz.	571,026	21,984,501	444,518	17,113,943	224,403	8,639,516	186,632	7,185,332	175,373	6,751,860
Silver.....oz.	12,175,700	4,658,545	9,677,881	4,080,775	8,526,310	3,858,496	5,705,334	2,453,293	6,157,307	2,893,934
Copper.....lb.	66,435,583	6,700,693	50,097,716	5,052,856	42,307,510	4,971,132	36,300,589	4,356,070	25,852,366	3,244,472
Lead.....lb.	490,185,657	16,480,042	463,269,005	15,575,104	405,285,476	15,214,417	294,797,469	13,265,886	353,497,689	17,674,884
Zinc.....lb.	363,302,195	12,392,238	396,857,260	13,536,801	335,137,014	13,405,481	280,356,477	12,055,328	301,737,902	19,431,921
Coal.....tons, 2,240 lb.	1,802,353	7,660,000	1,938,158	8,237,172	1,821,654	7,742,030	1,933,639	8,217,966	1,518,673	6,454,360
Structural materials.....	.....	2,845,262	.....	3,143,382	.....	3,039,148	.....	3,025,445	.....	3,401,229
Miscellaneous metals, minerals, and materials....	.....	4,372,476	.....	7,769,288	.....	8,559,905	.....	4,002,506	.....	3,092,698
Totals.....	.....	$78,479,719	.....	$75,551,093	.....	$65,892,395	.....	$54,923,803	.....	$63,343,949

* Canadian funds.

TABLE VI.—Production of Lode Gold, Silver, Copper, Lead, and Zinc.

Year.	Gold.		Silver.		Copper.		Lead.		Zinc.		Total Value.
	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
		$		$		$		$		$	$
1887			17,690	17,331			204,800	9,216			26,547
1888			79,780	75,000			674,500	29,813			104,813
1889			53,192	47,873			165,100	6,498			54,371
1890			70,427	73,948							73,948
1891			4,500	4,000							4,000
1892			77,160	66,935			808,420	33,064			99,999
1893	1,170	23,404	227,000	195,000			2,135,023	78,996			297,400
1894	6,252	125,014	746,379	470,219	324,680	16,234	5,662,523	169,875			781,342
1895	39,270	785,400	1,496,522	977,229	952,840	47,642	16,475,464	532,255			2,342,526
1896	62,259	1,244,180	3,135,343	2,100,689	3,818,556	190,926	24,199,977	721,384			4,257,179
1897	106,141	2,122,820	5,472,971	3,272,836	5,325,180	266,258	38,841,135	1,390,517			7,052,431
1898	110,061	2,201,217	4,292,401	2,375,841	7,271,678	874,781	31,693,559	1,077,581			6,529,420
1899	138,315	2,857,573	2,939,413	1,663,708	7,722,591	1,351,453	21,862,436	878,870			6,751,604
1900	167,153	3,453,381	3,958,175	2,309,200	9,997,080	1,615,289	63,358,621	2 691,887			10,069,757
1901	210,384	4,348,605	4,396,447	2,462,008	27,603,746	4,446,963	51,582,906	2,010,260			13,267,836
1902	236,491	4,888,269	3,917,917	1,941,328	29,636,057	3,446,673	22,536,381	824,832			11,101,102
1903	232,831	4,812,616	2,996,204	1,521,472	34,359,921	4,547,535	18,089,283	689,744			11,571,367
1904	222,042	4,589,608	3,222,481	1,719,516	35,710,128	4,578,037	36,646,244	1,421,874			12,309,035
1905	238,660	4,933,102	3,439,417	1,971,818	37,692,251	5,876,222	56,580,703	2,399,022			15,180,164
1906	224,027	4,630,639	2,990,262	1,897,320	42,990,488	8,288,565	52,408,217	2,667,578			17,484,102
1907	196,179	4,055,020	2,745,448	1,703,825	40,832,720	8,166,544	47,738,703	2,291,458			16,216,847
1908	255,582	5,282,880	2,631,389	1,321,483	47,274,614	6,240,249	43,195,733	1,632,799			14,477,411
1909	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	14,191,141
1910	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	13,228,731
1911	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	11,454,063
1912	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	17,662,766
1913	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	17,190,838
1914	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	15,225,061
1915	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	19,992,149
1916	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	31,483,014
1917	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	26,788,474
1918	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	27,590,278
1919	152,426	3,150,645	3,403,119	3,592,673	42,459,339	7,939,896	29,475,968	1,526,855	56,787,651	3,540,429	19,750,498
1920	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	19,444,365
1921	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	12,920,398
1922	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	19,231,857
1923	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	25,347,062

TABLE VI.—PRODUCTION OF LODE GOLD, SILVER, COPPER, LEAD, AND ZINC—*Continued.*

Year.	Gold.		Silver.		Copper.		Lead.		Zinc.		Total Value.
	Oz.	Value.	Oz.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
		$		$		$		$		$	$
1924	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	35,538,247
1925	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	46,200,135
1926	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	51,508,031
1927	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	44,977,082
1928	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	48,281,825
1929	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	51,174,859
1930	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	40,915,395
1931	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	22,535,573
1932	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	19,700,235
1933	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	25,007,137
1934	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	33,895,930
1935	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	40,597,569
1936	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	43,666,452
1937	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	62,912,783
1938	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	53,877,333
1939	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	53,522,098
1940	583,416	22,461,516*	12,327,944	4,715,315	77,980,223	7,865,085	485,364,420	16,317,952	310,767,251	10,600,271	61,960,139
1941	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	62,216,019
1942	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	55,359,479
1943	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	46,089,042
1944	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	39,315,909
1945	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	49,997,071
Totals	12,234,563	332,908,138	307,240,334	160,347,708	2,407,350,293	338,245,361	8,671,138,684	358,037,657	5,715,727,700	241,263,375	1,430,802,239

* Canadian funds.

TABLE VII.—VALUE OF GOLD PRODUCTION TO DATE.

Year.	Placer Gold.		Lode Gold.		Total.
	Crude (Ounces).	Value.	Fine (Ounces).	Value.	
1858–1862	580,650	$9,871,634	.....	.....	$9,871,634
1863–1867	954,920	16,283,592	.....	.....	16,283,592
1868–1872	582,080	9,895,318	.....	.....	9,895,318
1873–1877	530,540	9,019,201	.....	.....	9,019,201
1878–1882	328,230	5,579,911	.....	.....	5,579,911
1883–1887	225,970	3,841,515	.....	.....	3,841,515
1888–1892	148,560	2,525,426	.....	.....	2,525,426
1893	20,950	356,131	1,170	$23,404	379,535
1894	23,260	405,516	6,252	125,014	530,530
1895	28,330	481,683	39,270	785,400	1,267,083
1896	32,000	544,026	62,259	1,244,180	1,788,206
1897	30,210	513,570	106,141	2,122,820	2,636,340
1898	37,840	643,346	110,061	2,201,217	2,844,563
1899	79,100	1,344,900	138,315	2,857,573	4,202,473
1900	75,210	1,278,724	167,153	3,453,381	4,732,105
1901	57,060	970,100	210,384	4,348,605	5,318,703
1902	63,120	1,073,140	236,491	4,888,269	5,961,409
1903	62,380	1,060,420	232,831	4,812,616	5,873,036
1904	65,600	1,115,200	222,042	4,589,608	5,704,808
1905	57,020	969,300	238,660	4,933,102	5,902,402
1906	55,790	948,400	224,027	4,630,639	5,579,039
1907	48,700	828,000	196,179	4,055,020	4,883,020
1908	38,060	647,000	255,582	5,282,880	5,929,880
1909	28,060	477,000	238,224	4,924,090	5,401,090
1910	31,760	540,000	267,701	5,533,380	6,073,380
1911	25,060	426,000	228,617	4,725,513	5,151,513
1912	32,680	555,500	257,496	5,322,442	5,877,942
1913	30,000	510,000	272,254	5,627,490	6,137,490
1914	33,230	565,000	247,170	5,109,004	5,674,004
1915	45,290	770,000	250,021	5,167,934	5,937,934
1916	34,150	580,500	221,932	4,587,334	5,167,834
1917	29,180	496,000	114,523	2,367,190	2,863,190
1918	18,820	320,000	164,674	3,403 812	3,723,812
1919	16,850	286,500	152,426	3,150,645	3,437,145
1920	13,030	221,600	120,048	2,481,392	2,702,992
1921	13,720	233,200	135,663	2,804,154	3,037,354
1922	21,690	368,800	197,856	4,089 684	4,458,484
1923	24,710	420,000	179,245	3,704,994	4,124,994
1924	24,750	420,750	247,716	5,120,535	5,541,285
1925	16,476	280,092	209,719	4,335,269	4,615,361
1926	20,912	355,503	201,427	4,163,859	4,519,362
1927	9,191	156,247	178,001	3,679,601	3,835,848
1928	8,424	143,208	188,087	3,888,097	4,031,305
1929	6,983	118,711	145,339	3,004,419	3,123,130
1930	8,955	152,235	160,778	3,323 576	3,475,811
1931	17,176	291,992	146,039	3,018,894	3,310,886
1932	20,400	395,542	181,564	4,261,307	4,656,849*
1933	23,928	562,787	223,529	6,392,929	6,955,716*
1934	25,181	714,431	297,130	10,250,985	10,965,416*
1935	30,929	895,058	365,244	12,852,936	13,747,994*
1936	43,389	1,249,940	494,472	14,168,654	15,418,594*
1937	54,153	1,558,245	460,781	16,122,727	17,680,972*
1938	57,759	1,671,015	557,522	19,613,624	21,284 639*
1939	49,746	1,478,492	587,180	21,221,272	22,699,764*
1940	39,067	1,236,928	583,416	22,461,516	23,698,444*
1941	43,775	1,385,962	571,026	21,984,501	23,370,463*
1942	32,994	1,041,772	444,518	17,113,943	18,155,715*
1943	14,600	462,270	224,403	8,639,516	9,101,786*
1944	11,433	361,977	186,632	7,185,332	7,547,309*
1945	12,589	398,591	175,373	6,751,860	7,150,451*
Totals	5,100,169	$92,297,951	12,234,563	$332,908,138	$425,206,089

* Canadian funds.

TABLE VIII.—Value of Mine Production by Divisions, 1941, 1942, 1943, 1944, and 1945.

Mining Division.	1941.	1942.	1943.	1944.	1945.
Atlin	$1,449,341	$1,401,357	$314,005	$255,539	$321,227
Portland Canal	2,262,577	1,796,684	1,100,439	732,087	736,125
Skeena	640,785	430,090	58,309	32,211	37,443
Stikine	32,991	16,211	2,311	1,520	348
Cariboo	3,157,927	2,465,413	1,161,053	979,399	1,033,181
Omineca	1,547,379	3,273,590	5,357,775	1,409,984	142,315
Peace River	2,459	13,910	59,354	58,251	32,342
Quesnel	170,457	77,082	20,360	13,804	14,533
Kamloops	183,054	183,406	161,820	124,130	135,791
Nicola	107,525	122,930	155,606	83,032	27,099
Vernon	34,657	10,409	2,177	3,225	1,338
Greenwood	740,814	511,553	361,396	275,571	191,767
Osoyoos	2,223,666	2,429,785	1,490,888	1,837,959	2,069,351
Similkameen	4,786,602	4,111,591	3,497,570	3,242,076	2,205,091
Ainsworth	44,408	25,270	49,405	277,435	254,429
Fort Steele	35,417,691	35,427,802	34,397,668	30,532,861	41,367,966
Golden	721,250	528,800	438,726	324,525	825,803
Lardeau	11,823	1,031	95	1,288	.....
Nelson	3,748,001	2,682,612	892,159	544,663	516,283
Revelstoke	19,443	30,997	29,031	19,664	35,904
Slocan	626,106	884,623	1,089,433	1,193,092	954,479
Trail Creek	3,095,444	4,154,407	3,282,427	2,246,794	2,790,460
Alberni	2,473,860	1,647,140	527,401	9,725	6,194
Ashcroft	9,963	59,598	9,964	14,809	1,393
Clinton	13,688	8,602	5,679	1,803	3,368
Lillooet	5,991,503	5,093,991	3,312,574	3,072,599	2,412,843
Nanaimo	3,051,178	3,418,984	3,435,235	3,353,930	2,981,253
New Westminster	679,169	654,719	607,133	597,569	677,220
Vancouver	4,024,175	2,596,739	2,607,391	2,233,911	2,124,478
Victoria	1,211,793	1,491,767	1,465,011	1,450,347	1,443,925
Totals	$78,479,719	$75,551,093	$65,892,395	$54,923,803	$63,343,949

TABLE IX.A (1944 AND 1945).—PRODUCTION IN DETAIL OF PLACER GOLD, LODE GOLD, SILVER, COPPER, LEAD, AND ZINC.

Divisions.	Year.	Tons.	Gold—Placer.		Gold—Lode.		Silver.		Copper.		Lead.		Zinc.	
			Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
				$		$		$		$		$		$
Atlin	1944	50	7,826	247,777	141	5,428	87	37						
	1945		**10,014**	**317,062**	**28**	**1,078**	**16**	**7**						
Portland Canal	1944	68,496			15,289	588,627	109,630	47,141	120,061	14,407	1,820,265	81,912		
	1945	**65,801**			**14,464**	**556,864**	**83,598**	**39,291**	**94,149**	**11,816**	**2,563,078**	**128,154**		
Skeena	1944		19	601										
	1945		**12**	**380**										
Stikine	1944		48	1,520										
	1945		**11**	**348**										
Cariboo	1944	54,227	1,895	59,997	23,030	886,655	2,189	941						
	1945	**57,291**	**1,344**	**42,554**	**23,547**	**906,560**	**2,507**	**1,178**						
Omineca	1944		952	30,141										
	1945		**608**	**19,250**										
Peace River	1944													
	1945		**17**	**538**										
Quesnel	1944		430	13,614										
	1945		**416**	**13,171**										
Kamloops	1944	1	16	507	13	500								
	1945		**6**	**190**										
Nicola	1944	6			10	385	370	159			4,221	190	597	26
	1945													
Vernon	1944	32			10	385	31	13						
	1945		**9**	**285**										
Greenwood	1944	2,056			575	22,138	337,555	145,149			174,010	7,830	201,076	8,646
	1945	**1,817**			**299**	**11,512**	**248,248**	**116,677**			**113,300**	**5,665**	**134,082**	**8,635**
Osoyoos	1944	130,776			45,960	1,769,460	5,831	2,507	182,594	21,911				
	1945	**155,995**	**2**	**63**	**51,475**	**1,981,788**	**5,368**	**2,523**	**137,882**	**17,304**				
Similkameen	1944	1,383,296	4	127	5,603	215,716	147,695	63,509	22,348,642	2,669,837				
	1945	**785,629**	**24**	**760**	**4,309**	**165,897**	**88,717**	**41,697**	**14,013,705**	**1,758,720**				
Ainsworth	1944	49,971			10	385	28,603	12,299			1,327,067	59,718	4,657,568	200,276
	1945	**39,461**			**10**	**381**	**24,266**	**11,405**			**948,092**	**47,404**	**2,939,273**	**189,289**
Fort Steele	1944	2,141,397	40	1,266			4,535,800	1,950,394			287,831,000	12,952,395	247,563,000	10,645,209
	1945	**2,435,877**	**11**	**348**			**5,400,400**	**2,538,188**			**346,743,000**	**17,337,150**	**276,094,000**	**17,780,454**
Golden	1944	24,995					10,408	4,476			880,720	39,632	5,184,654	222,940
	1945	**47,777**					**72,598**	**34,121**			**2,152,007**	**107,600**	**9,660,898**	**622,162**
Lardeau	1944	27			3	115	547	235			12,578	566	8,661	372
	1945													
Nelson	1944	16,267	6	190	6,979	268,692	5,374	2,311			60,438	2,720	62,863	2,703
	1945	**26,258**	**3**	**95**	**10,934**	**420,959**	**4,376**	**2,057**			**19,096**	**955**	**19,228**	**1,238**
Revelstoke	1944		43	1,361										
	1945		**26**	**823**										
Slocan	1944	140,886			88	3,388	427,358	183,764			2,550,361	114,766	20,724,981	891,174
	1945	**80,826**			**21**	**809**	**166,915**	**78,450**			**901,541**	**45,077**	**12,890,421**	**830,143**
Trail Creek	1944	121			356	13,706	153	66						
	1945	**168**			**146**	**5,621**	**200**	**94**						
Alberni	1944	54			145	5,582	114	49						
	1945		**2**	**63**										
Ashcroft	1944		38	1,203										
	1945		**37**	**1,172**										
Clinton	1944		42	1,330										
	1945		**7**	**222**										
Lillooet	1944	126,616	45	1,425	79,462	3,059,287	18,281	7,861						
	1945	**114,322**	**30**	**950**	**62,308**	**2,398,859**	**16,511**	**7,760**						
Nanaimo	1944		6	190										
	1945													
New Westminster	1944		23	728										
	1945		**10**	**317**										
Vancouver	1944	606,717			8,287	319,049	59,370	25,529	13,435,660	1,612,279	52,656	2,370		
	1945	**566,500**			**7,832**	**301,532**	**43,587**	**20,486**	**11,606,630**	**1,456,632**	**57,575**	**2,879**		
Victoria	1944	17,341			671	25,834	15,038	6,853	313,632	37,636	84,153	3,787	1,953,077	83,982
	1945													
Totals	1944	4,763,332	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
	1945	**4,377,722**	**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**

TABLE IX.B.—Production Value of Placer Gold, Lode Gold, Silver, Copper, Lead, and Zinc in 1940, 1941, 1942, 1943, 1944, and 1945.

Divisions.	1940.	1941.	1942.	1943	1944.	1945.
	$	$	$	$	$	$
Atlin	1,245,709	1,445,031	1,393,567	310,734	253,242	318,147
Portland Canal	2,211,087	2,253,299	1,796,684	1,089,525	732,087	736,125
Skeena	591,021	547,908	354,257	982	601	380
Stikine	67,154	32,991	16,211	2,311	1,520	348
Cariboo	2,774,971	3,077,675	2,415,991	1,104,703	947,593	950,292
Omineca	201,473	170,039	62,397	31,789	30,141	19,250
Peace River	5,984	2,438	760	.....	.....	538
Quesnel	223,183	167,297	74,625	20,232	13,614	13,171
Kamloops	36,809	8,073	5,713	1,551	1,007	190
Nicola	30,424	9,436	.....	.....	760	.....
Vernon	17,536	30,122	7,473	831	398	285
Greenwood	727,331	711,981	458,573	224,385	183,763	142,489
Osoyoos	2,030,408	2,173,069	2,122,417	1,414,337	1,793,878	2,001,678
Similkameen	4,564,452	4,351,322	3,621,198	3,010,155	2,949,189	1,967,074
Ainsworth	24,862	34,308	3,870	45,455	272,678	248,479
Fort Steele	29,147,985	31,013,289	30,921,250	30,328,407	25,549,264	37,656,140
Golden	1,021,364	700,911	497,178	402,738	267,048	763,883
Lardeau	13,433	11,823	.....	95	1,288	.....
Nelson	4,057,804	3,686,326	2,633,021	837,919	276,616	425,304
Revelstoke	2,976	2,596	1,108	253	1,361	823
Slocan	138,730	626,106	884,623	1,089,433	1,193,092	954,479
Trail Creek	564,603	322,106	193,658	348,821	13,772	5,715
Alberni	2,905,014	2,450,639	1,610,534	521,595	5,631	63
Ashcroft	17,382	1,362	7,535	855	1,203	1,172
Clinton	69,996	11,420	6,554	982	1,330	222
Lillooet	5,607,347	5,982,811	5,075,552	3,286,891	3,068,573	2,407,569
Nanaimo	39,258	1,379	1,102	.....	190	.....
New Westminster	20,598	32,095	3,758	380	728	317
Vancouver	4,833,476	3,742,673	2,245,915	2,387,899	1,959,227	1,781,529
Victoria	4,180	1,456	380	73,354	158,092	.....
Totals	63,196,550	63,601,981	56,415,904	46,536,612	39,677,886	50,395,662

TABLE IX.C.—PRODUCTION AND VALUE OF PLACER GOLD, LODE GOLD, SILVER, COPPER, LEAD, AND ZINC, 1900–1945.

Divisions.	Gold—Placer.		Gold—Lode.		Silver.		Copper.		Lead.		Zinc.		Division Total.
	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Pounds.	Value	Pounds.	Value	Pounds.	Value	
		$		$		$		$		$		$	$
Atlin*	629,951	14,865,979	107,273	3,732,600	56,955	34,069	83,161	11,949	109,945	7,036	.....	.....	18,651,633
Portland Canal	201	4,260	1,910,691	47,813,914	49,068,614	27,273,345	649,677,707	96,796,399	32,481,563	1,382,303	1,867,664	110,254	173,380,475
Skeena	3,903	86,448	414,794	9,979,046	265,198	182,759	7,671,642	1,215,720	39,539	1,287	15,277	490	11,465,750
Stikine	32,716	765,106	114	4,120	20	8	.....	.....	.....	.....	.....	.....	769,234
Cariboo†	1,911,948	39,013,879	538,129	19,824,266	59,199	25,907	.....	.....	656	30	492	16	58,864,098
Omineca	46,844	1,233,952	8,638	197,545	2,350,470	1,454,199	6,126,209	1,345,688	6,239,613	345,809	3,960,018	248,654	4,825,847
Peace River	4,074	93,755	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	93,755
Quesnel‡	621,418	12,919,922	198	7,156	271	110	.....	.....	.....	.....	.....	.....	12,927,188
Kamloops	3,306	82,643	39,376	1,318,141	281,229	167,209	5,767,133	1,021,694	368,662	20,737	409,170	26,063	2,636,487
Nicola	230	4,652	8,520	234,737	266,826	126,121	536,304	103,443	2,223,285	88,851	319,990	10,511	568,315
Vernon	2,091	54,935	5,212	175,639	7,674	3,798	614	89	6,374	293	2,820	149	234,898
Greenwood	4,038	94,634	1,085,041	23,376,038	22,762,014	11,368,708	441,171,575	70,493,191	9,379,804	373,612	9,386,717	318,808	106,024,991
Osoyoos	190	4,142	1,150,573	32,665,106	513,742	325,544	2,100,285	235,794	252,418	7,475	5,209	163	33,238,224
Similkameen	7,073	160,237	100,299	3,370,787	2,403,023	1,095,295	335,949,516	39,790,121	238,577	9,006	64,377	2,616	44,428,062
Ainsworth	212	5,690	3,875	113,210	6,556,869	3,945,892	10,175	1,201	123,821,425	6,089,594	42,139,389	1,429,763	11,585,350
Fort Steele	17,090	395,431	2,532	56,964	146,707,856	69,469,384	28,592	6,193	7,868,261,404	323,166,978	5,084,965,816	211,645,551	604,740,501
Golden	467	11,213	70	1,447	1,392,507	824,128	57,378	10,590	97,668,378	3,604,683	115,420,908	4,254,716	8,706,777
Lardeau	1,769	38,136	24,889	652,366	2,805,116	1,119,860	5,594	785	9,569,431	382,498	447,139	20,393	2,214,038
Nelson	3,176	79,689	1,238,462	38,663,727	4,165,495	2,242,697	5,685,261	889,008	53,551,663	2,341,502	24,714,916	1,465,634	45,682,257
Revelstoke	4,066	88,343	12	335	50,097	31,309	683	124	939,741	55,882	8,093	469	176,462
Slocan	150	3,596	6,382	156,543	40,492,654	24,435,389	219,318	42,287	298,300,301	14,258,312	253,663,553	14,769,458	53,665,585
Trail Creek§	848	24,176	2,604,400	55,575,212	3,306,325	1,843,712	116,845,719	17,374,402	16,980,309	689,523	157,917,364	5,292,401	80,799,426
Alberni	1,581	32,157	271,732	10,235,406	147,158	67,003	2,225,948	333,373	108,322	3,679	.....	.....	10,671,618
Ashcroft	11,017	253,995	8,476	289,680	16,804	9,513	633,775	155,721	99	4	.....	.....	708,913
Clinton	9,984	237,744	23,388	827,260	31,564	14,214	57,548	5,905	193	7	.....	.....	1,085,130
Lillooet¶	90,523	1,854,420	1,798,491	62,686,076	477,023	213,174	400	41	62,463	2,542	.....	.....	64,756,253
Nanaimo	596	13,711	67,890	1,426,275	518,645	298,523	20,223,405	3,201,703	.....	.....	.....	.....	4,940,212
New Westminster	11,313	235,217	4,311	110,307	13,373	5,960	26,489	6,379	28,144	1,081	12,163	415	359,359
Vancouver	182	5,306	305,042	9,255,757	3,655,668	1,960,359	734,291,474	99,381,642	7,941,652	278,051	17,981,772	563,988	111,445,103
Victoria	612	15,223	36,574	777,845	765,054	412,656	21,034,675	3,112,698	129,288	5,481	2,424,853	102,853	4,426,756
Provincial totals	3,421,569	72,678,591	11,765,384	323,527,505	289,137,443	148,950,840	2,350,430,580	335,536,140	8,528,703,249	353,116,256	5,715,727,700	240,263,365	1,474,072,697

* Atlin totals include estimated placer-gold production from and including 1898.

† Cariboo totals include estimated placer-gold production from and including 1858.

‡ Quesnel totals include estimated placer-gold production from and including 1858.

§ Includes zinc and lead recovered at the Trail smelter, from current and reclaimed slags, derived from mines in several mining divisions.

¶ Lillooet totals include estimated placer-gold production from and including 1874.

TABLE X.—Production in Detail of Structural Materials, 1944 and 1945.

Divisions.	Year.	Cement.	Lime and Limestone.	Building-stone.	Rubble, Riprap, and Crushed Rock.	Sand and Gravel.	Brick (Common).	Face, Paving, and Sewer Brick.	Firebrick, Blocks.	Fireclay.	Structural Tile (Hollow Blocks), Roof-tile, Floor-tile.	Drain-tile and Sewer-pipe.	Pottery, Glazed or Unglazed.	Other Clay Products.	Division Totals.
		$	$	$	$	$	$	$	$	$	$	$	$	$	$
Atlin and Stikine	1944				430	1,867									2,297
	1945				310	2,770									3,080
Portland Canal and Skeena	1944		18,724		118	12,768									31,610
	1945		22,281		10,278	4,173									36,732
Cariboo and Quesnel	1944				74	31,536									31,610
	1945				554	66,063									66,617
Omineca and Peace River	1944					67,838									67,838
	1945					14,657									14,657
Nicola, Vernon, and Kamloops	1944			1,500	640	19,785			1,011		316				23,252
	1945			579		11,427									12,006
Greenwood, Osoyoos, and Similkameen	1944				8,049	37,907								1,504	47,460
	1945				19,383	86,427									105,810
Fort Steele and Golden	1944				3,010	227,231									230,241
	1945				775	28,892									29,667
Ainsworth, Slocan, and Nelson	1944			7,394	1,459	25,256									34,109
	1945			61,630	817	34,482									96,929
Trail Creek and Revelstoke	1944			400	9,748	21,594									31,742
	1945				4,632	42,064									46,696
Alberni, Nanaimo, and Victoria	1944	1,085,918	398,552		1,296	172,220	13,115				8,891	6,239			1,686,231
	1945	1,182,297	495,931		1,245	178,917	80,556				21,976	15,461	3,245		1,979,628
Ashcroft, Lillooet, and Clinton	1944				332	14,886									15,218
	1945				414	4,860									5,274
Vancouver and New Westminster	1944		4,372	55,500	15,770	302,482	27,821	41,495	180,188	17,283	17,320	159,666		1,940	823,837
	1945		4,480	65,600	26,786	390,825		49,815	217,275	7,899	48,400	190,422		2,632	1,004,134
Totals	1944	1,085,918	421,648	64,794	40,926	935,370	40,936	41,495	181,199	17,283	26,527	165,905		3,444	3,025,445
	1945	1,182,297	522,692	127,809	65,194	865,557	80,556	49,814	217,275	7,899	70,376	205,883	3,245	2,632	3,401,229

TABLE XI.—PRODUCTION IN DETAIL OF MISCELLANEOUS METALS, MINERALS, AND MATERIALS, 1944 AND 1945.

Division.	Year.	Antimony.	Barite.	Bismuth.	Cadmium.	Diatomite, Mica.	Flux (Limestone and Quartz).	Gypsum Products.	Iron Oxides.	Mercury.	Slate and Rock Granules.	Sodium Carbonate.	Sulphur.	Tin.	Tungsten Concentrates.*	Division Totals.
		$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Skeena	1944															
	1945														331	331
Cariboo and Omineca	1944									1,210,375						1,210,375
	1945					17,136										17,136
Peace River and Quesnel	1944					190										190
	1945					498										498
Kamloops and Greenwood	1944						84,173	103,927								188,100
	1945						28,400	125,134								153,534
Osoyoos and Similkameen	1944					15,382	1,440									16,822
	1945															
Fort Steele, Golden, and Lardeau	1944		48,007													48,007
	1945		45,780					2,300								48,080
Ainsworth, Nelson, and Revelstoke	1944				1,907										236,788	238,695
	1945															
Trail Creek	1944	281,000		154,844	399,716								1,084,380	299,643		2,219,583
	1945	292,635		260,047	505,328								1,230,630	484,490		2,773,130
Ashcroft and Clinton	1944											473				473
	1945											3,146				3,146
Lillooet and Nanaimo	1944						14,340									14,340
	1945						41,866									41,866
Vancouver and Victoria	1944						330		8,200		17,903		39,488			65,921
	1945								1,985		16,272		36,720			54,977
Totals	1944	281,000	48,007	154,844	401,623	15,572	100,283	103,927	8,200	1,210,375	17,903	473	1,123,868	299,643	236,788	4,002,506
	1945	292,635	45,780	260,047	505,328	17,634	70,266	127,434	1,985		16,272	3,146	1,267,350	484,490	331	3,092,698

* The item of $331 noted for 1945 represents the balance of British Columbia tungsten concentrates held in Ottawa, as originally shipped from the Department of Mines' sampling plant, Prince Rupert, and for ready reference has been assigned to the Skeena Mining Division owing to the difficulty of crediting this amount to the correct point of origin.

TABLE XII.—British Columbia Mine Production, 1895–1945.

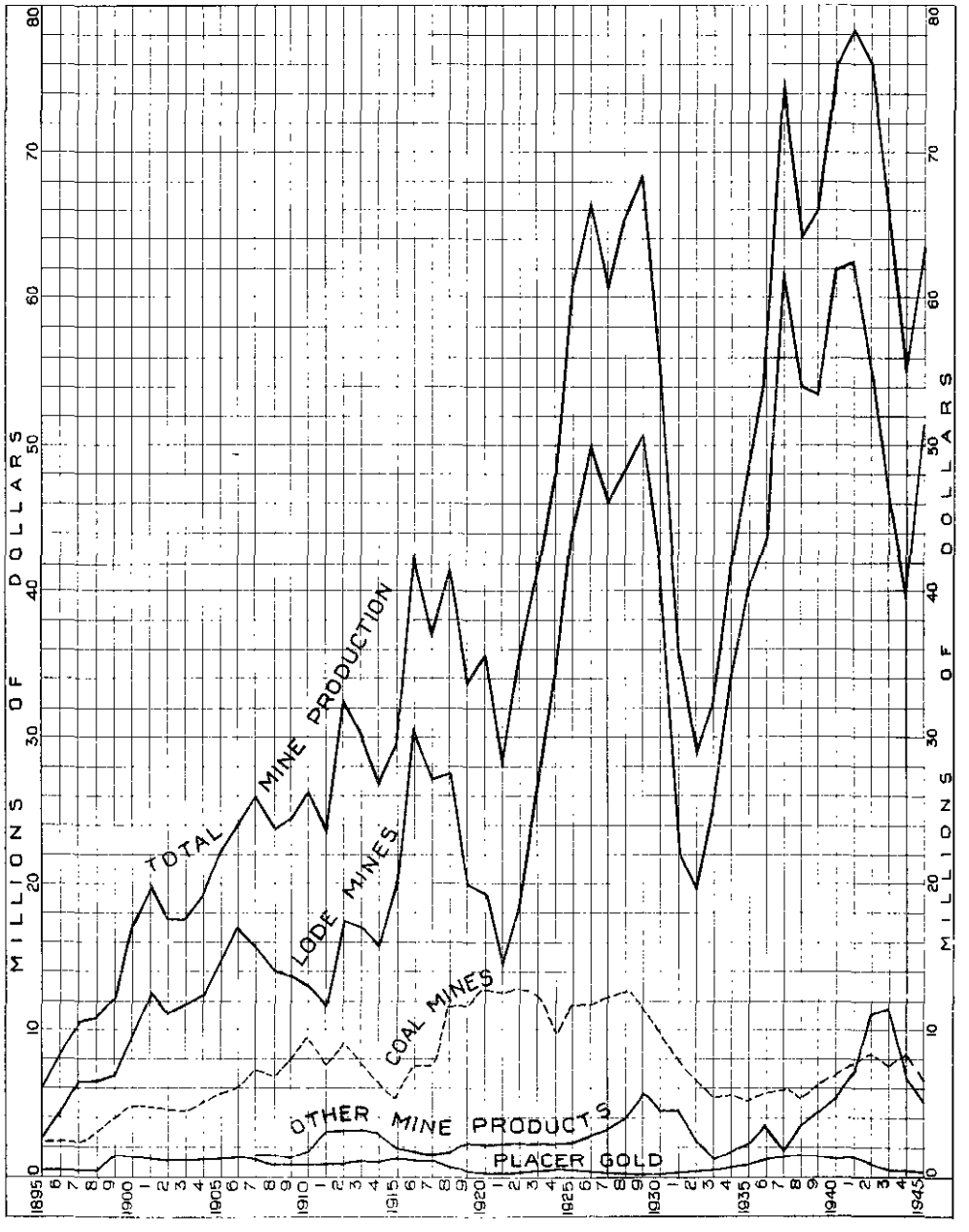


TABLE XIII.—PRODUCTION OF LODE MINES IN BRITISH COLUMBIA, 1913–1945.

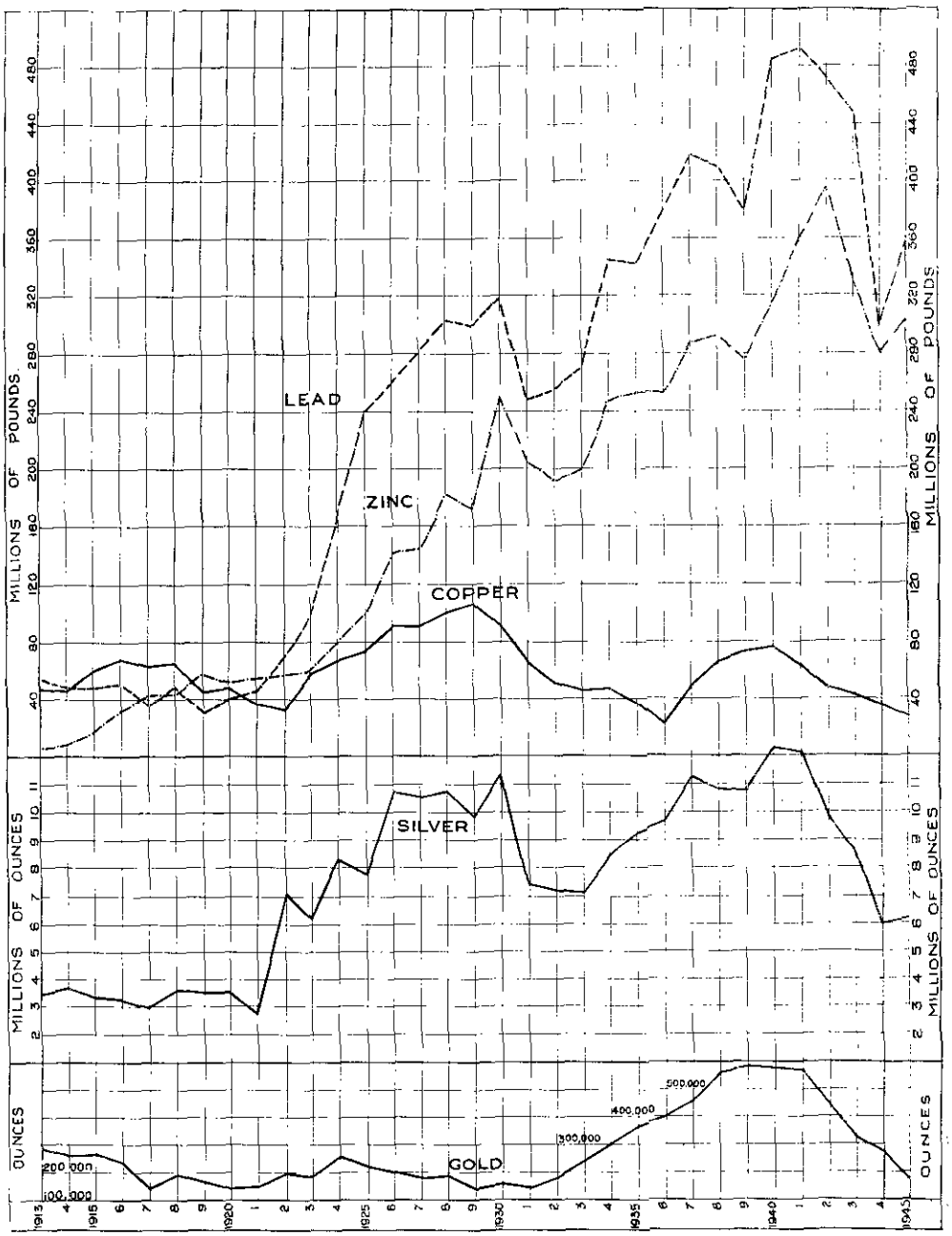


TABLE XIV.—Coal Production per Year to Date.*

	Tons. (2,240 lb.)	Value.		Tons. (2,240 lb.)	Value.
1836–1885	3,029,011	$9,468,567	1917	2,149,975	$7,524,913
1886	326,636	979,908	1918	2,302,245	11,511,225
1887	413,360	1,240,080	1919	2,267,541	11,337,705
1888	489,301	1,467,903	1920	2,595,125	12,975,625
1889	579,830	1,739,490	1921	2,483,995	12,419,975
1890	678,140	2,034,420	1922	2,511,843	12,559,215
1891	1,029,097	3,087,291	1923	2,453,223	12,266,115
1892	826,335	2,479,005	1924	1,939,526	9,697,630
1893	978,294	2,934,882	1925	2,328,522	11,642,610
1894	1,012,953	3,038,859	1926	2,330,036	11,650,180
1895	939,654	2,818,962	1927	2,453,827	12,269,135
1896	896,222	2,688,666	1928	2,526,702	12,633,510
1897	882,854	2,648,562	1929	2,251,252	11,256,260
1898	1,135,865	3,407,595	1930	1,887,130	9,435,650
1899	1,306,324	3,918,972	1931	1,707,590	7,684,155
1900	1,439,595	4,318,785	1932	1,534,975	6,523,644
1901	1,460,331	4,380,993	1933	1,264,746	5,375,171
1902	1,397,394	4,192,182	1934	1,347,090	5,725,133
1903	1,168,194	3,504,582	1935	1,187,968	5,048,864
1904	1,253,628	3,760,884	1936	1,346,471	5,722,502
1905	1,384,312	4,152,936	1937	1,444,687	6,139,920
1906	1,517,303	4,551,909	1938	1,309,428	5,565,069
1907	1,800,067	6,300,235	1939	1,477,872	6,280,956
1908	1,677,849	5,872,472	1940	1,667,827	7,088,265
1909	2,006,476	7,022,666	1941	1,802,353	7,660,000
1910	2,800,046	9,800,161	1942	1,938,158	8,237,172
1911	2,193,062	7,675,717	1943	1,821,654	7,742,030
1912	2,628,804	9,200,814	1944	1,933,639	8,217,966
1913	2,137,483	7,481,190	1945	1,518,673	6,454,360
1914	1,810,967	6,338,385			
1915	1,611,129	5,638,952	Totals	100,678,682	$404,085,295
1916	2,084,093	7,294,325			

* For all years to 1925 (inclusive) figures are net coal production and do not include coal made into coke; subsequent figures are entire coal production, including coal made into coke.

TABLE XV.—Coke Production from Bee-hive Ovens in British Columbia from 1895 to 1925.

	Tons. (2,240 lb.)	Value.		Tons. (2,240 lb.)	Value.
1895–97	19,396	$96,980	1913	286,045	$1,716,270
1898 *(estimated)*	*35,000*	*175,000*	1914	234,577	1,407,462
1899	34,251	171,255	1915	245,871	1,475,226
1900	85,149	425,745	1916	267,725	1,606,350
1901	127,081	635,405	1917	159,905	959,430
1902	128,015	640,075	1918	188,967	1,322,769
1903	165,543	827,715	1919	91,138	637,966
1904	238,428	1,192,140	1920	67,792	474,544
1905	271,785	1,358,925	1921	59,434	416,038
1906	199,227	996,135	1922	45,835	320,845
1907	222,913	1,337,478	1923	58,919	412,433
1908	247,399	1,484,394	1924	30,615	214,305
1909	258,703	1,552,218	1925	75,185	526,295
1910	218,029	1,308,174			
1911	66,005	396,030	Totals	4,393,265	$25,673,600
1912	264,333	1,585,998			

TABLE XVI.—Coke and By-products Production of British Columbia, 1944 and 1945.

Description.	1944.		1945.	
	Quantity.	Value.	Quantity.	Value.
Coal used in making coke, long tons	190,074	$1,439,891	206,132	$1,211,584
Coke made in bee-hive ovens, long tons	33,005	$301,201	12,021	$117,369
Coke made in by-product ovens, long tons	42,322	347,245	52,766	434,876
Coke made in gas plants, long tons	78,955	565,393	81,859	577,479
Total coke made, long tons	154,282	$1,213,839	146,646	$1,129,724
Gas sold and used	.....	2,562,610	.....	2,721,690
Tar produced	.....	56,476	.....	83,828
Other by-products	.....	19,046	.....	20,756
Total production value of coke industry	.....	$3,851,971	.....	$3,955,998

TABLE XVII.—Dividends paid by Mining Companies, 1897–1945.

*Lode-gold Mines.**

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	14,205,550
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	†868,595
Goodenough (leasers)	Ymir	Gold	13,731
Hedley Mascot Gold Mines, Ltd.	Hedley	Gold	1,290,553
Island Mountain Mines, Ltd.	Wells	Gold	1,108,495
I.X.L.	Rossland	Gold	134,025
Jewel-Denero	Greenwood	Gold	11,751
Kelowna Exploration, Ltd. (Nickel Plate)	*Hedley*	*Gold*	*1,560,000*
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	9,299,393
Poorman	Nelson	Gold	25,000
Premier Gold Mining Co., Ltd.	Premier	Gold	‡18,858,075
Privateer Mine, Ltd.	Zeballos	Gold	1,914,183
Queen	Sheep Creek	Gold	85,000
Relief Arlington Mines, Ltd. (Second Relief)	Erie	Gold	†308,000
Reno Gold Mines, Ltd.	Sheep Creek	Gold	†1,433,640
Sheep Creek Gold Mines, Ltd.	Sheep Creek	Gold	2,587,500
Silbak Premier Mines, Ltd.	Premier	Gold	‡2,350,000
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
Miscellaneous mines		Gold	108,623
Total, lode-gold mines			$69,857,609

* The gold-copper properties of Rossland are included in this table.

† Includes "Return of Capital" distributions.

‡ 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.

TABLE XVII.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1945—*Continued.*

Silver-lead-zinc Mines.

Company or Mine.	Locality.	Class.	Amount paid.
Antoine	Rambler	Silver-lead-zinc	$10,000
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
Capella	New Denver	Silver-lead-zinc	5,500
Consolidated Mining and Smelting Co. of Canada, Ltd.	Trail	Silver-lead-zinc	*134,645,136
Couverapee	Field	Silver-lead-zinc	5,203
Duthie Mines, Ltd.	Smithers	Silver-lead-zinc	50,000
Florence Silver	Ainsworth	Silver-lead-zinc	35,398
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	646,415
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
Queen Bess	Alamo	Silver-lead-zinc	25,000
Rambler-Cariboo	Rambler	Silver-lead-zinc	467,250
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‡	Sandon	Silver-lead-zinc	1,267,600
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
Utica	Kaslo	Silver-lead zinc	64,000
Wallace Mines, Ltd. (Sally)	Beaverdell	Silver-lead-zinc	135,000
Washington	Rambler Station	Silver-lead-zinc	20,000
Whitewater	Retallack	Silver-lead-zinc	592,515
Miscellaneous mines		Silver-lead-zinc	70,237
Total, silver-lead-zinc mines			$145,904,823

* Earnings of several company mines, and customs smelter at Trail.

† Includes $10,504 paid in 1944 but not included in the yearly figure.

‡ These two properties were amalgamated as Silversmith Mines, Limited, in August, 1939.

TABLE XVII.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1945—*Continued.*

Copper Mines.

Company or Mine.	*Locality.*	*Class.*	Amount paid.
Britannia M. & S. Co.*	Britannia Beach	Copper	$11,511,449
Canada Copper Corporation	Greenwood	Copper	615,399
Cornell	Texada Island	Copper	8,500
Granby Cons. M.S. & P. Co.†	Copper Mountain	Copper	26,643,227
Marble Bay	Texada Island	Copper	175,000
Hall Mines	Nelson	Copper	233,280
Miscellaneous mines		Copper	261,470
Total, copper mines			$39,448,325

* Britannia Mining and Smelting Company, Limited, is a subsidiary of the Howe Sound Company, which is the holding company for *Britannia* and other mines in Mexico and the State of Washington. Dividends paid by the Howe Sound Company, therefore, can not 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.

† The Granby Consolidated Mining, Smelting and Power Company dividends as set out in the above table in the Minister of Mines Annual Report for 1942 were incorrect, and 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 prior to reorganization. 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 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.

Coal.

Wellington Collieries, Ltd., Nanaimo	$16,000,000
Crow's Nest Pass Coal Co., Ltd., Fernie	13,427,080
Total	$29,427,080

Miscellaneous, Structural, and Placer Gold.

Various	$2,897,313

Aggregate of all Classes.

Lode-gold mining	$69,857,609
Silver-lead-zinc mining and smelting	145,904,823
Copper-mining	39,448,325
Coal-mining	29,427,080
Miscellaneous, structural, and placer gold	2,897,313
Total	$287,535,150

TABLE XVII.—DIVIDENDS PAID BY MINING COMPANIES, 1897–1945—*Continued.*

Dividends paid Yearly, 1917–1945, inclusive.

Year.	Amount paid.	Year.	Amount paid.
1917	$3,269,494	1933	$2,471,735
1918	2,704,469	1934	4,745,905
1919	2,494,283	1935	7,386,070
1920	1,870,296	1936	10,513,705
1921	736,629	1937	15,085,293
1922	3,174,756	1938	12,068,875
1923	2,983,570	1939	11,865,698
1924	2,977,276	1940	14,595,530
1925	5,853,419	1941	16,598,110
1926	8,011,137	1942	13,627,104
1927	8,816,681	1943	11,860,159
1928	9,572,536	1944	11,367,732
1929	11,263,118	1945	10,487,395
1930	10,543,500		
1931	4,650,857	Total	$224,382,290
1932	2,786,958		

Dividends paid during 1944 and 1945.

	1944.	1945.
Bralorne Mines, Ltd.	$1,496,400	$1,247,000
Britannia Mining and Smelting Co., Ltd.	183,932	
The Consolidated Mining and Smelting Co. of Canada, Ltd.	8,189,604	8,189,653
The Crow's Nest Pass Coal Co., Ltd.	186,354	186,354
Gold Belt Mining Co., Ltd.	*413,595	
Granby Consolidated Mining, Smelting and Power Co., Ltd.	135,070	74,966
Highland Bell, Ltd.	13,159	13,159
Island Mountain Mines, Ltd.	52,536	73,550
Kelowna Exploration, Ltd. (Nickel Plate)	150,000	210,000
Privateer Mine, Ltd.	49,082	
Providence		†10,504
Relief Arlington Mines, Ltd.		*18,000
Sheep Creek Gold Mines, Ltd.	225,000	225,000
Silbak Premier Mines, Ltd.	125,000	‡100,000
Others	148,000	139,209
Totals	$11,367,732	$10,487,395

* Distribution of capital. † Omitted from 1944. ‡ Includes $50,000 omitted from 1944.

TABLE XVIII.—SALARIES AND WAGES, FUEL AND ELECTRICITY, AND PROCESS SUPPLIES, 1945.

Class.	Salaries and Wages.	Fuel and Electricity.	Process Supplies.
Lode-mining	$15,295,945	$6,257,139	$3,113,273
Placer-mining	121,314	7,838	8,350
Coal-mining	4,892,356	209,099	817,282
Miscellaneous metals, minerals, and materials	1,315,095	447,876	1,756,876
Structural materials industry	996,265	317,774	60,847
Totals, 1945	**$22,620,975**	**$7,239,726**	**$5,756,628**
Grand totals, 1944	$23,131,874	$5,788,671	$6,138,084
Grand totals, 1943	26,051,467	7,432,585	6,572,317
Grand totals, 1942	26,913,160	7,066,109	6,863,398
Grand totals, 1941	26,050,491	3,776,747	7,260,441
Grand totals, 1940	23,391,330	3,474,721	6,962,162
Grand totals, 1939	22,357,035	*3,266,000	6,714,347
Grand totals, 1938	22,765,711	3,396,106	6,544,500
Grand totals, 1937	21,349,690	3,066,311	6,845,330
Grand totals, 1936	17,887,619	2,724,144	4,434,501
Grand totals, 1935	16,753,367	2,619,639	4,552,730
Grand totals, 1935–45	249,272,719	*49,850,759	68,644,438

* Estimated.

NOTE.—The above figures, compiled from returns on the subject made by companies and individuals, illustrate the amount of money distributed in salaries and wages, fuel and electricity, and process supplies (explosives, chemicals, drill-steel, lubricants, etc.).

TABLE XIX.—Tonnage, Number of Mines, Net and Gross Value of Lode Minerals, 1901–1945.

Year.	Tonnage.*	No. of Shipping-mines.	No. of Mines shipping over 100 Tons.	Gross Value of Lode Minerals as reported by Shipper.†	Net Value to Shipper of Lode Minerals. produced.‡	Gross Value of Lode Minerals produced.§
1901	920,416	119	78	.....	.....	$14,100,282
1902	998,999	124	75	.....	.....	11,581,153
1903	1,286,176	125	74	.....	.....	12,103,237
1904	1,461,609	142	76	.....	.....	12,909,035
1905	1,706,679	146	79	.....	.....	15,980,104
1906	1,963,872	154	77	.....	.....	18,484,102
1907	1,804,114	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	2,690,110	132	59	.....	.....	19,992,149
1916	3,188,865	169	81	.....	.....	31,483,014
1917	2,761,579	193	87	.....	.....	26,788,474
1918	2,892,849	175	80	.....	.....	27,590,278
1919	2,112,975	144	74	.....	.....	19,750,498
1920	2,178,187	121	60	.....	.....	19,444,305
1921	1,562,645	80	35	.....	.....	12,920,398
1922	1,573,186	98	33	.....	.....	19,227,857
1923	2,421,839	77	28	.....	.....	25,347,092
1924	3,397,105	86	37	.....	.....	35,538,247
1925	3,849,269	102	40	.....	.....	46,200,135
1926	4,775,073	138	55	.....	$38,558,613	51,508,031
1927	5,416,021	132	52	.....	27,750,364	44,977,082
1928	6,241,310	110	49	.....	29,070,075	48,281,825
1929	6,977,681	106	48	.....	34,713,887	51,174,859
1930	6,803,846	68	32	.....	21,977,688	40,915,395
1931	5,549,103	44	22	.....	10,513,931	22,535,573
1932	4,340,158	75	29	.....	7,075,393	19,700,235
1933	4,030,978	109	47	.....	13,976,358	25,007,137
1934	5,116,897	145	69	.....	20,243,278	33,895,930
1935	4,916,148	177	72	.....	25,407,914	40,597,569
1936	4,381,027	168	70	.....	30,051,207	43,666,452
1937	6,145,144	185	113	$48,616,505	43,952,521	62,912,783
1938	7,377,021	211	92	40,222,237	35,278,633	53,877,333
1939	7,211,223	217	99	45,125,341	40,709,385	53,522,098
1940	7,937,358	216	92	49,945,270	43,610,846	62,848,642
1941	7,938,803	200	96	52,354,870	46,681,802	62,216,019
1942	6,708,277	126	76	50,494,041	45,199,604	55,359,479
1943	5,429,557	48	32	37,234,070	33,293,917	46,089,042
1944	4,763,332	51	31	29,327,114	26,449,408	39,315,910
1945	**4,377,722**	**36**	**27**	**34,156,405**	**31,026,149**	**49,997,071**

Notes.—* Does not include mercury ore, which in 1944 amounted to 106,427 tons.

† Data not collected before 1937.

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

§ Gross value as represented by valuing lode metals at yearly average prices.

TABLE XX.—Men employed in the Mining Industry of British Columbia, 1901–1945.

Year.	Placer-mining.	Lode-mining.			Concentrators.	Smelters.	Coal-mining.			Structural Materials.		Miscellaneous.	Total.
		Under.	Above.	Total.	In	In	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	14,830
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	12,314
1945	**209**	**1,933**	**1,750**	**3,683**	**822**	**2,834**	**1,927**	**503**	**2,430**	**921**	**335**	**586**	**11,820***

* The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry is the sum of these individual averages.

TABLE XXI.—METALLIFEROUS MINES SHIPPING IN 1945.*

Mine or Group.	Location of Mine.	Mining Division.	Owner or Agent.	Process.	Character of Ore.
Engineer	Tagish Lake	Atlin	Kirkwood, Forbes, and Sweet, Atlin		Gold.
Silbak Premier	Stewart	Portland Canal	Silbak Premier Mines, Ltd., Premier	Flotation	Gold, silver, lead.
Cariboo Gold Quartz	Wells	Cariboo	Cariboo Gold Quartz Mining Co., Ltd., Vancouver	Cyanidation	Gold, silver.
Island Mountain	Wells	Cariboo	Island Mountain Mines, Ltd., Wells	Cyanidation	Gold, silver.
Cariboo Amelia	Camp McKinney	Greenwood	E. A. Wanke and O. Johnson, Greenwood		Gold, silver, lead, zinc.
Highland Bell	Greenwood	Greenwood	Highland Bell, Ltd., Creston		Silver, gold, lead, zinc.
Number Seven	Boundary Falls	Greenwood	S. J. and J. S. Klemans, Boundary Falls		Gold, silver.
Providence	Greenwood	Greenwood	W. E. McArthur, Greenwood		Gold, silver, zinc.
Apex	Hedley	Osoyoos	Hunstone and McLeod, Vancouver		Gold, silver.
Hedley Mascot	Hedley	Osoyoos	Hedley Mascot Mines, Ltd., Vancouver	Flotation	Gold, silver, copper.
Nickel Plate	Hedley	Osoyoos	Kelowna Exploration Co., Hedley	Cyanidation; flotation	Gold, silver, copper.
Copper Mountain	Allenby	Similkameen	Granby Cons. M.S. & P. Co., Ltd., Copper Mountain	Flotation	Copper, silver, gold.
Ainsmore	Ainsworth	Ainsworth	Ainsmore Mines, Ltd., Ainsworth		Silver, lead.
Whitewater	Retallack	Ainsworth	Retallack Mines, Ltd., Vancouver	Flotation	Silver, lead, zinc.
Sullivan	Kimberley	Fort Steele	Cons. Mining and Smelting Co. of Canada, Ltd., Trail	Flotation	Silver, lead, zinc.
Monarch and Kicking Horse	Field	Golden	Base Metals Mining Corporation, Ltd., Toronto	Table concentration; flotation	Silver, lead, zinc.
Arlington	Erie Creek	Nelson	Messrs. Golac and Shrieves, Erie		Gold, silver.
Golden Age	Hall Creek	Nelson	Tri-Metals Mining, Inc., Hall Creek		Gold, silver.
Granite-Poorman	Taghum	Nelson	Leasers—Blewett		Gold, silver.
Nugget	Salmo	Nelson	Messrs. Endersby, Jr. and Sr., Fruitvale		Gold, silver.
Protection	Ymir	Nelson	G. Turk, Ymir		Gold, silver, lead, zinc.
Queen	Sheep Creek	Nelson	O. W. Gowing and H. Moore, Sheep Creek		Gold, silver.
Second Relief	Erie	Nelson	A. Burgess *et al.*, Salmo		Gold, silver.
Sheep Creek	Sheep Creek	Nelson	Sheep Creek Gold Mines, Ltd., Vancouver	Cyanidation	Gold, silver.
Venango	Blewett	Nelson	D. H. and A. G. Norcross, Nelson		Gold, silver.
Ymir Mill lease	Ymir	Nelson	Messrs. Gowing, Moore, and Gibbons, Salmo		Gold, silver, lead, zinc.
Noble Five	Sandon	Slocan	Paul Lincoln, Nelson		Silver, lead, zinc.
Ottawa	Springer Creek	Slocan	W. E. Graham *et al.*, Slocan City		Silver.
Victor	Sandon	Slocan	Leased by E. Doney and Sons, Sandon		Silver, lead, zinc.
Standard and Mammoth	Silverton	Slocan	Western Exploration Co., Ltd., Silverton	Table concentration; flotation	Silver, zinc, lead.
I.X.L.	Rossland	Trail Creek	Leasing Syndicate of I.X.L., Rossland		Gold, silver.
Midnight	Rossland	Trail Creek	B. A. Lins, Rossland	Amalgamation; jig; flotation	Gold, silver.
Bralorne	Bridge River	Lillooet	Bralorne Mines, Ltd., Vancouver	Amalgamation; flotation	Gold, silver.
Pioneer	Bridge River	Lillooet	Pioneer Gold Mines of B.C., Ltd., Vancouver	Cyanidation	Gold, silver.
Britannia	Britannia Beach	Vancouver	Britannia Mining & Smelting Co., Ltd., Britannia Beach	Flotation	Copper, gold, silver.

* Includes producers of lode gold, silver, copper, lead, and zinc, but not producers of miscellaneous metals and minerals.

TABLE XXII.—Lode Metal Mines employing an Average of Ten or more Men during 1945.

Shipping Mines.

Name of Mine or Company.	Days operating.		Tonnage.		Average Number employed.	
	Mine.	Mill.	Mined.	Milled.	Mine.	Mill.
Silbak Premier Mines, Ltd.	306	306	65,801	65,801	180	16
Cariboo Gold Quartz Mining Co., Ltd.	365	365	36,016	34,677	167	14
Island Mountain Mines Co., Ltd.	305	305	22,614	22,614	70	10
Highland Bell, Ltd.	302	.....	1,164	.....	26	.....
Hedley Mascot Gold Mines, Ltd.	293	335	56,481	56,503	113	37
Kelowna Exploration Co., Ltd.	304	362	99,383	99,383	119	64
Copper Mountain (Granby Cons. M.S. & P. Co., Ltd.)	306	304	786,026	785,629	361	157
Ainsmore Consolidated Mines, Ltd.	209	197	9,900	9,900	22	4
Retallack Mines, Ltd. (Whitewater)	184	206	29,561	29,561	32	6
Sullivan (Cons. M. & S. Co. of Canada, Ltd.)	304	288	2,435,877	2,435,877	1,241	308
Base Metals, Ltd. (Monarch and Kicking Horse)	305	305	47,777	47,777	57	11
Sheep Creek Gold Mines, Ltd.	304	219	24,504	24,504	72	7
Western Exploration Co., Ltd. (Standard, Enterprise, Mammoth)	319	131	17,266	17,266	61	17
Zincton Mines, Ltd. (Sheep Creek Gold Mines, Ltd.)	365	182	63,322	63,322	44	13
Bralorne Mines, Ltd.	365	365	110,410	105,283	328	17
Pioneer Gold Mines of B.C., Ltd.	177	177	10,528	9,039	123	6
Britannia Mining and Smelting Co., Ltd.	308	303	566,500	566,500	360	128

Non-shipping Mines.

Gold Belt Mining Co., Ltd.	.....	.....	.....	.....	16	.....
Kenville Gold Mines, Ltd. (Granite-Poorman)	.....	.....	.....	.....	21	.....
Privateer Mine, Ltd.	.....	.....	.....	.....	17	.....

DEPARTMENTAL WORK.

ADMINISTRATIVE BRANCH.

The administrative branch is responsible for the administration of the Provincial mining laws regarding the acquisition of mineral rights, and deals with other Departments of the Provincial Service for the Department or for any Branch.

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, the "Allied Forces Exemption Act," the "Free Miners' Exemption Act," 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 to placer-mining leases. Recording of location and of work upon mineral claims, placer claims, and placer-mining leases as required by the various Acts must be made at the office of the Mining Recorder for the proper mining division. Information concerning claims and leases which are held and concerning the ownership and standing of claims and leases in any division may be obtained from the Mining Recorder for the mining division in which the property is situated and from the Central Records offices. 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 47 and 48.

Copies of the various Acts, upon payment of the prices listed on page 194, can be obtained from the office of the Chief Gold Commissioner, the King's Printer, Victoria, the Central Records office in Vancouver, or from the offices of the Gold Commissioners throughout the Province.

New Type Forms B and E (Mineral Act); Certificate of Work (Placer-mining Act).

Use of the counterfoil type of Forms B and E ("Mineral Act") and the Certificate of Work form ("Placer-mining Act") was discontinued during 1945 and a carbon-copy type of book substituted.

Central Records Offices (Victoria and Vancouver).

A Central Records office, 305 Federal Building, Vancouver, was established in 1942. The office provides information as to the ownership of claims staked, placer-mining leases issued, certificates of work and bills of sale recorded, and leases of reverted Crown-granted mineral claims. The approximate positions of mineral claims and placer-mining leases are shown on a series of reference maps from information supplied by the locators. The information outlined, so far as possible, is brought up to date on receipt of semi-monthly returns from all Mining Recorders. The maps and records may be inspected by any one who calls at the office in business hours.

Provision has been made to establish at Victoria the same services as now provided in Vancouver, and it is anticipated that by August 1st, 1946, complete records will be available at the General Office, Department of Mines, Victoria, B.C. Returns from Gold Commissioners and Mining Recorders will be forwarded semi-monthly to the

Victoria office, and copies of the cards will be forwarded to Vancouver from Victoria. The Vancouver office will continue to provide the same services as in the past.

Amalgamation of Mining Divisions.

(Particulars of Mining Divisions amalgamated since 1939.)

Date.	Mining Divisions amalgamated.	New Name.	Mining Recorder's Office.
July 2, 1939	Yale and New Westminster	New Westminster	New Westminster.
Sept. 18, 1939	Bella Coola and Skeena	Skeena	Prince Rupert.
Nov. 20, 1939	Slocan City and Slocan	Slocan	New Denver.
Aug. 1, 1940	Queen Charlotte and Skeena	Skeena	Prince Rupert.
Aug. 5, 1940	Grand Forks and Greenwood	Greenwood	Greenwood.
Oct. 15, 1942	Arrow Lake and Slocan	Slocan	New Denver.
Oct. 15, 1942	Golden and Windermere	Golden	Golden.
Nov. 30, 1942	Nanaimo and Quatsino	Nanaimo	Nanaimo.
Dec. 1, 1942	Alberni and Clayoquot	Alberni	Alberni.

Gold Purchasing.

Late in 1935 the Department of Finance, co-operating with the Department of Mines, undertook to purchase small lots of placer gold under 2 oz. in weight from the individual placer-miner. The Gold Commissioners throughout the Province are paying a cash price of $29 per ounce for clean placer gold and are purchasing dirty placer gold and amalgam on a deferred-payment basis. Purchases made under this arrangement are as follows:—

Year.	No. of Lots.	Paid.	Paid per Oz.
1936	1,470	$50,000	$28.00
1937	1,657	52,250	28.00
1938	2,397	72,000	28.00
1939	2,322	60,000	29.00
1940	1,336	31,600	29.00
1941	631	16,825	29.00
1942	229	8,068	29.00
1943	93	2,705	29.00
1944	59	1,196	29.00
1945	63	1,604	29.00
Totals	10,257	$296,248	.....

This purchasing scheme was established during the depression years to give the individual miner the best possible price for his gold, and this was realized in that the total price paid has been almost exactly the same as the receipts from the Royal Canadian Mint.

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

Mining Division.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-recorder.
Ainsworth	Kaslo	C. MacDonald	W. M. H. Dunn	
Sub-office	Poplar			A. Robb.
Alberni	Alberni	J. H. Byrne	J. H. Byrne	
Sub-office	Tofino			Mrs. E. M. Burchett.
Sub-office	Zeballos			G. Nicholson.
Sub-office	Nanaimo			W. H. Cochrane.
Ashcroft	Ashcroft	D. Dalgleish (Kamloops)	W. F. Knowlton	
Sub-office	Lytton			J. Blakiston-Gray.
Atlin	Atlin	G. H. Hallett	G. H. Hallett	
Sub-office	Telegraph Creek			A. E. Roddis.
Sub-office	Squaw Creek			Mrs. F. Muncaster.
Sub-office	Lower Post			J. W. Stewart.
Sub-office	Tulsequah			H. K. Richardson.
Sub-office	Pouce Coupe			M. S. Morrell.
Cariboo	Barkerville	W. E. McLean		Mrs. T. B. McLean.
Sub-office	Quesnel			S. Allen.
Sub-office	Prince George			Geo. Milburn.
Sub-office	McBride			J. Blezard.
Sub-office	Fort McLeod			J. E. McIntyre.
Clinton	Clinton	C. G. Sutherland	C. G. Sutherland	
Sub-office	Williams Lake			Miss J. Foster.
Sub-office	Haylmore			W. Haylmore.
Fort Steele	Cranbrook	E. L. Hedley	E. L. Hedley	
Sub-office	Fernie			F. E. P. Hughes.
Golden	Golden	A. W. Anderson	A. W. Anderson	C. J. Dainard.
Sub-office	Windermere			A. M. Chisholm.
Greenwood	Greenwood	L. A. Dodd	L. A. Dodd	
Sub-office	Beaverdell			L. F. Crump.
Sub-office	Oliver			W. H. Laird.
Sub-office	Grand Forks			E. Harrison.
Kamloops	Kamloops	D. Dalgleish	D. Dalgleish	
Sub-office	Chu Chua			G. M. Fennell.
Sub-office	Vavenby			H. Finley.
Sub-office	Salmon Arm			T. G. O'Neill.
Lardeau	Beaton	W. G. Fleming (Revelstoke)	C. A. McElroy	
Lillooet	Lillooet	G. H. Beley	G. H. Beley	
Sub-office	Haylmore			W. Haylmore.
Nanaimo	Nanaimo	W. H. Cochrane	W. H. Cochrane	
Sub-office	Stuart Island			J. B. Willcock.
Sub-office	Alert Bay			W. H. Davidson.
Sub-office	Vananda			Henry Carter.
Sub-office	Granite Bay			H. J. Bull.
Sub-office	Cumberland			A. G. Freeze.
Sub-office	Zeballos			G. Nicholson.
Sub-office	Alberni			J. H. Byrne and H. R. Burdon.
Sub-office	Tofino			Mrs. E. M. Burchett.
Sub-office	Quatsino			E. Evenson.
Nelson	Nelson	S. Hamilton	S. Hamilton	Miss W. M. Palethorpe.
Sub-office	Creston			B. J. H. Ryley.
Sub-office	Salmo			M. C. Donaldson.
New Westminster	New Westminster	A. B. Gray	J. F. Macdonald	
Sub-office	Chilliwack			E. L. Anderson.
Sub-office	Lytton			J. Blakiston-Gray.
Sub-office	Hope			A. J. Sutherland.
Nicola	Merritt	D. Dalgleish (Kamloops)	R. G. Couper	
Omineca	Smithers	K. D. McRae	K. D. McRae	D. H. Bruce.
Sub-office	Bella Coola			E. Bradley.
Sub-office	Finlay Forks			Mrs. M. McDougal.
Sub-office	Fort St. James			Norman Henry.

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

Mining Division.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-recorder.
Omineca (*Continued*)				
Sub-office	Manson Creek			W. B. Steele.
Sub-office	Telkwa			T. J. Thorp.
Sub-office	Prince George			Geo. Milburn.
Sub-office	Kimsquit via Ocean Falls			Percy Gadsden.
Sub-office	Fort St. John			H. O. Callahan.
Sub-office	Terrace			T. C. Brunton.
Sub-office	Fort Fraser			Normal Earl LePoidevin.
Sub-office	Vanderhoof			Geo. Ogsdon.
Sub-office	Hazelton			W. A. A. West.
Sub-office	Burns Lake			John Brown.
Sub-office	Usk			J. L. Bethurem.
Sub-office	Takla Landing			Mrs. G. M. Henry.
Sub-office	Doreen			W. E. Horwill.
Sub-office	Copper River			L. G. Skinner.
Osoyoos	Penticton	W. R. Dewdney	W. R. Dewdney	
Sub-office	Keremeos			L. S. Coleman.
Sub-office	Oliver			W. H. Laird.
Peace River	Pouce Coupe	M. S. Morrell	S. M. Carling (Deputy)	
Sub-office	Fort St. John			H. O. Callahan.
Sub-office	Prince George			G. Milburn.
Sub-office	Finlay Forks			Mrs. M. McDougal.
Portland Canal	Stewart	G. Forbes (at Prince Rupert)	A. Fisher	
Sub-office	Alice Arm			Mrs. M. V. Leake.
Quesnel	Williams Lake	Miss J. Foster (Deputy)	Miss J. Foster (Deputy)	
Sub-office	Quesnel			S. Allen.
Sub-office	Likely			L. R. Speed.
Sub-office	Barkerville			W. E. McLean.
Sub-office	Horsefly			A. B. Campbell.
Sub-office	Keithley Creek			W. Rae.
Revelstoke	Revelstoke	W. G. Fleming	W. G. Fleming	
Similkameen	Princeton	Chas. Nichols	Chas. Nichols	
Sub-office	Hedley			A. J. Dillabough.
Skeena	Prince Rupert	G. Forbes	G. Forbes	
Sub-office	Copper River			L. G. Skinner.
Sub-office	Terrace			T. C. Brunton.
Sub-office	Stewart			A. Fisher.
Sub-office	Rosswood			Oscar Olander.
Sub-office	Kimsquit via Ocean Falls			Percy Gadsden.
Sub-office	Ocean Falls			G. H. Hill.
Sub-office	Bella Coola			E. Bradley.
Sub-office	Queen Charlotte			F. J. Walker.
Sub-office	Burns Lake			John Brown.
Slocan	New Denver	C. MacDonald (Kaslo)	F. Broughton	
Sub-office	Slocan			W. E. Graham.
Stikine	Telegraph Creek	A. E. Roddis	A. E. Roddis	
Sub-office	Burns Lake			John Brown.
Sub-office	Fort St. John			H. O. Callahan.
Sub-office	Lower Post			J. W. Stewart.
Sub-office	Pouce Coupe			M. S. Morrell.
Trail Creek	Rossland	E. B. Offin	E. B. Offin	
Vancouver	Vancouver	J. Egdell	Miss J. Burnett (Deputy)	
Sub-office	Stuart Island			J. B. Willcock.
Sub-office	Alert Bay			W. H. Davidson.
Sub-office	Powell River			J. P. Scarlett.
Vernon	Vernon	E. F. Little	E. F. Little	
Sub-office	Kelowna			C. W. Dickson.
Victoria	Victoria	K. B. Blakey	R. H. McCrimmon (Deputy)	Miss L. Davey.

Gold Commissioners' and Mining Recorders' Office Statistics, 1945.

Districts and Divisions.	Free Miners' Certificates.				Lode-mining.					Placer-mining.				Revenue.		Total.
	Individual.	Company.	Special.	Provisional (Placer).	Mineral Claims recorded.	Certificates of Work.	Bills of Sale, etc.	Certificates of Improvements.	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.	General.	Mining Division and Provincial.
Atlin	250	5	1	.....	42	64	34	6	2	17	48	73	16	$1,484.75	$8,296.00	$9,780.75
Portland Canal	87	2	.....	.....	113	160	25	.....	.....	.....	.....	.....	.....	620.25	1,056.00	1,676.25
Skeena	147	.....	.....	.....	39	26	56	.....	19	1	1	.....	.....	638.75	1,023.75	1,662.50
Stikine	75	.....	1	.....	44	15	33	.....	13	.....	8	.....	27	392.00	1,412.75	1,804.75
Cariboo	466	11	2	2	400	233	38	2	6	12	89	119	79	2,033.25	12,014.58	14,047 83
Omineca	332	5	1	1	587	564	78	.....	8	7	18	20	17	1,805.25	6,441.75	8,247.00
Peace River	44	.....	.....	.....	31	.....	15	.....	.....	.....	.....	.....	.....	383.25	102.75	486.00
Quesnel	500	8	.....	.....	219	39	2	.....	.....	11	79	59	94	1,633.75	9,328.75	10 962.50
Kamloops	152	.....	2	13	81	41	5	.....	3	3	.....	.....	4	712.25	821.00	1,533.25
Nicola	13	1	.....	.....	33	66	2	.....	.....	.....	.....	.....	.....	156.50	344.50	501.00
Vernon	77	1	1	1	17	8	1	.....	.....	2	3	3	3	386.50	526.75	913.25
Greenwood	85	1	.....	.....	47	50	6	2	.....	1	6	1	1	495.00	1,676.00	2,171.00
Osoyoos	104	3	.....	2	179	109	39	.....	8	.....	.....	.....	.....	749.75	1,274.90	2,024.65
Similkameen	160	1	2	10	83	48	22	1	7	1	9	8	23	810.75	1,491.00	2,301.75
Ainsworth	67	3	2	1	83	94	.....	2	27	1	.....	.....	.....	669.00	1,318.75	1,987.75
Fort Steele	120	.....	.....	8	103	36	9	4	.....	3	6	5	3	554.25	1,559.50	2,113.75
Golden	44	1	.....	1	41	19	10	.....	5	.....	.....	1	.....	349.25	378.00	727.25
Lardeau	26	.....	.....	1	45	30	2	.....	.....	1	.....	.....	.....	118.25	337.00	455.25
Nelson	981	12	6	12	245	225	54	2	16	21	4	.....	.....	2,305.25	4,197.00	6,502.25
Revelstoke	42	.....	2	.....	40	27	12	.....	14	.....	2	.....	1	211.50	2,057.75	2,269.25
Slocan	66	1	.....	.....	47	44	7	17	.....	.....	.....	5	.....	407.25	357.75	765.00
Trail Creek	98	1	1	4	30	14	.....	.....	2	.....	.....	.....	.....	577.50	139.35	716.85
Alberni	139	8	.....	.....	194	178	36	.....	30	3	.....	9	.....	1,331.25	4,190.00	5,521.25
Ashcroft	49	.....	.....	.....	24	22	14	.....	.....	1	16	.....	13	213.25	783.75	997.00
Clinton	39	.....	.....	.....	160	157	6	.....	.....	2	4	.....	.....	187.50	1,062.75	1,250.25
Lillooet	304	8	2	5	920	465	93	13	5	1	18	12	15	2,295.50	5,929.60	8,225.10
Nanaimo	119	2	3	.....	355	193	207	16	28	1	.....	2	18	757.00	2,684.25	3,441.25
New Westminster	173	2	.....	15	218	210	6	36	1	4	.....	7	2	961.25	4,898.25	5,859.50
Vancouver	1,257	81	21	47	86	64	3	.....	17	.....	1	.....	.....	11,208.75	1,026.50	12,235.25
Victoria	197	8	.....	10	28	49	.....	.....	1	1	4	4	.....	1,452.50	1,495.50	2,948.00
Totals	6,213	165	47	133	4,534	3,250	815	101	212	94	316	328	316	$35,901.25	$78,226.18	$114,127.43

CHEMICAL LABORATORIES AND SAMPLING PLANT.

The Department has its principal laboratory at Victoria, and also a sampling plant and an assay office at Prince Rupert. The Victoria laboratory has on its permanent staff six analysts and technicians as well as the Chief Analyst and Assayer. The assayer at Prince Rupert is also in charge of the sampling plant there.

During 1945 the chemical laboratory in Victoria issued reports on 1,774 samples and specimens. A laboratory examination of a sample generally consists of the following: (1) A mineralogical determination of visible minerals and a classification of the type of rock; (2) a spectrographic analysis to determine if any base metals are present in interesting percentages; (3) assays for precious metals, and for base metals shown by the spectrographic analysis to be present in interesting percentages. The laboratory reports were distributed in the following manner amongst *bona-fide* prospectors, *bona-fide* prospectors who were grantees under the "Prospectors' Grub-stake Act," departmental engineers, and the Provincial Government Sampling Plant at Prince Rupert:—

	Samples and Specimens.	Mineralogical Determinations.	Spectrographic Analyses.	Assays.
Bona-fide prospectors	771	629	624	1,196
Bona-fide prospectors (grantees)	448	439	428	907
Departmental engineers	532	19	302	818
Sampling plant	23	6	23	.....
Totals	1,774	1,093	1,377	2,921

Serially numbered sample or specimen tags stapled together in booklets of ten continued to be supplied free of charge to *bona-fide* prospectors during 1945. About 75 per cent. of those who submitted samples used these tags, and their availability was drawn to the attention of those who did not. In addition, shipping-tags and sample-sacks were loaned free of charge to those prospectors who requested them for use when submitting samples or specimens to this laboratory.

Proximate analyses and heat value determinations were made on sixty-nine coal samples. Of these, fifty-eight were for the Department of Mines and eleven were for the Department of Public Works.

For the Attorney-General's Department, forty cases of a chemico-legal nature were undertaken, involving in all a study of 289 exhibits. The analyses and examinations were of a very diversified nature. Quantitative spectrographic analyses played a very important part in the investigations.

Seventeen analyses of soils and other raw materials for the Department of Agriculture and one analysis of water submitted by the Provincial Board of Health completed the analytical work of the laboratory for 1945.

Sixty-three lots of placer gold amounting to 55.3 oz., representing purchases from individual placer-miners, were received from Gold Commissioners.

A Provincial Government examination for certificates of competency and licence to practise assaying in British Columbia was held in Victoria in December. Of the two candidates who sat for the examination, one was granted a supplemental examination in wet assaying but the other failed. One application for a licence to practise assaying under subsection (2) of section 11 of the "Department of Mines Act" was received and was granted.

PRINCE RUPERT SAMPLING PLANT.*

In 1937 the Department established a sampling plant at Prince Rupert. Small shipments of ore are accepted at the plant, and payment is made for tonnage lots and

* Letters, tonnage lots, or samples should be addressed to: The Manager, Department of Mines Assay Office and Sampling Plant, Prince Rupert, B.C.

bulk test lots after they have been sampled and the samples have been assayed. Lots of any one class of ore are accumulated until the quantity is sufficient to warrant shipment to a smelter. Samples for assay are also accepted at the plant. An assay office in conjunction with the sampling plant was opened in 1943.

The numbers of tonnage lots and of bulk test lots received annually at the Prince Rupert sampling plant declined following the outbreak of the war. The number, weight, and value of tonnage lots received in 1945 increased materially compared with 1944. High-grade gold ore from Tide Lake Gold Mines in the Stewart area made up a large part of the total value of ore received in 1945.

In 1945 fifty-four samples were received for assay. This is less than the number received in 1944 but greater than for any year preceding 1944. Since September all samples assayed in the Prince Rupert assay office are forwarded to Victoria for spectrographic analysis to detect the rarer metals if present.

Prospectors' identification cards were issued to twelve prospectors during 1945.

The principal statistics for the sampling plant and assay office are set out in the following tables:—

*Summary of Ore Purchases and Sales for Fiscal Years 1937–38 to 1945–46, inclusive.**

Fiscal Year.	Ore Purchases.			Ore Sales received or receivable from Smelters.
	Freight Charges.	Paid to Shipper.	Total Cost of Ore.	
1937–38	$14.25	$609.79	$624.04	$318.15
1938–39	519.05	8,038.07	8,557.12	8,281.70
1939–40	767.85	13,602.09	14,369.94	10,724.35
1940–41	239.11	11,860.11	12,099.22	14,565.66
1941–42	185.18	12,173.06	12,358.24	11,948.21
1942–43	134.99	1,705.04	1,840.03	3,964.53
1943–44	7.09	289.45	296.54	252.21
1944–45	22.48	1,677.99	1,700.47	7.90
1945–46	92.12	12,097.01	12,189.13	14,430.46
Totals	$1,982.12	$62,052.61	$64,034.73	$64,488.17
Estimated value of ore on hand at end of 1945	.....	.....	.....	12.26
Total value of ore sales	.....	.....	.....	$64,500.43
Calendar year 1945	$82.98	$12,938.90	$13,021.88	$14,430.46
Add estimated value of ore on hand December 31st, 1945	.....	.....	.....	12.26
Total	.....	.....	.....	$14,442.72
Subtract estimated value of ore on hand January 1st, 1945	.....	.....	.....	1,381.64
Total	.....	.....	.....	$13,061.08

* Ore purchases and sales have been under the "Department of Mines Act" from the beginning of the fiscal year 1938–39. For the few months of operation in the fiscal year 1937–38, operations were provided for under a special warrant.

Summary of Ore Receipts, 1938 to 1945.

Year.	Tonnage Lots.	No. of Properties.	Bulk Test Lots.	No. of Properties.	Assay Lots.	No. of Properties.	Weights of Shipments.
							Tons.
1938	24	12	90	35	47	24	104.261
1939	43	20	101	40	27	13	217.672
1940	40	16	117	32	27	16	171.345
1941	25	14	81	36	21	10	119.324
1942	3	2	37	13	16	12	30.615
1943	1	1	2	2	17	12	1.666
1944	2	1	4	3	70	19	3.496
1945	12	6	2	2	54	30	22.096

Sampling Plant Payments, 1945.

Lot No.	Date.	Shipper.	Property.	Freight, etc.	Payments to Shippers.	Total Cost of Ore purchased.
770	Jan. 4	Phillips, Julia K.	Tide Lake Gold	.....	$841.89	$841.89
771	Mar. 27	Cameron, Art	B.C. Gold	$20.40	31.09	51.49
772	Apr. 18	Cameron, Art	B.C. Gold	20.03	123.90	143.93
773	June 26	Erickson, Axel	Gold Bar group	5.50	79.06	84.56
774	July 17	Phillips, A. A.	Tide Lake Gold	5.30	1,490.43	1,495.73
775	July 18	Cameron, Art	Mountain Boy	17.00	273.40	290.40
776	Aug. 14	Phillips, A. A.	Tide Lake Gold	7.50	2,340.68	2,348.18
777	Aug. 14	Phillips, A. A.	Tide Lake Gold	.....	6,738.47	6,738.47
778	Aug. 14	Phillips, A. A.	Tide Lake Gold	.....	85.97	85.97
779	Sept. 18	Christie, Neil	Christie	.....	5.07	5.07
780-T	Oct. 12	Nightingale, Henry	Nightingale	.....	0.37	0.37
781	Oct. 12	Phillips, A. A.	Tide Lake Gold	5.00	910.68	915.68
782-T	Oct. 11	Merryth, Frank	Merryth	0.75	7.13	7.88
786	Oct. 31	Nicholson Creek Mining Corp.	Nicholson Creek	1.50	10.76	12.26
		Totals		$82.98	$12,938.90	$13,021.88

Ore received at Sampling Plant, 1945.

TONNAGE LOTS.

Lot No.	Property.	Shipper.	Locality.	Dry Tons.	Au.	Ag.	Cu.	Pb.	Zn.	S.
					Oz. per Ton.	Oz. per Ton.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
770	Tide Lake Gold	Phillips, Julia K.	Stewart	0.02550	894.270	1,225.60	.....	.....	.....	.....
771	B.C. Gold	Cameron, A.	Stewart	3.43600	0.720	0.80	*Nil*	.....	.....	.....
772	B.C. Gold	Cameron, A.	Stewart	4.30800	1.220	0.40	*Nil*	.....	.....	.....
773	Gold Bar group	Erickson, Axel	Kallum Lake	2.88550	1.140	1.66	*Nil*	.....	.....	.....
774	Tide Lake Gold	Phillips, A. A.	Stewart	0.04875	1,092.435	1,466.89	.....	.....	.....	.....
775	Mountain Boy	Cameron, A.	Stewart	3.49850	0.066	196.98	0.50	1.66	3.42	.....
776	Tide Lake Gold	Phillips, A. A.	Stewart	1.12600	55.024	155.35	0.14	2.54	16.60	.....
777	Tide Lake Gold	Phillips, A. A.	Stewart	2.70850	66.094	140.57	.....	.....	.....	.....
778	Tide Lake Gold	Phillips, A. A.	Stewart	1.83500	1.522	19.13	0.09	6.40	22.18	.....
779	Christie	Christie, Neil	Manson Creek	0.40850	0.650	*Nil*	.....	.....	.....	.....
781	Tide Lake Gold	Phillips, A. A.	Stewart	1.07300	29.580	134.06	*Nil*	11.88	11.93	.....
786	Nicholson Creek	Nicholson Creek Mining Corp.	Usk	0.51700	0.400	11.60	8.38	.....	.....	.....
	Total			21.87025	.....	.....	.....	.....	.....	.....

TEST LOTS.

780-T	Nightingale	Nightingale, Henry	Revelstoke	0.02570	0.080	35.80	28.56	4.08	.....	6.00
782-T	Merryth	Merryth, Frank	Carcross	0.20000	0.880	44.80	.....	.....	.....	.....
	Total			0.22570	.....	.....	.....	.....	.....	.....
	Total weight	of ore received		22.09595	.....	.....	.....	.....	.....	.....

The sales to the smelter on account of ore purchased at the sampling plant in 1945 yielded some $200 less than the cost of the ore to the sampling plant. This difference is traceable to four shipments of exceptionally high-grade gold ore. The four shipments were from Tide Lake, one lot having been shipped to the sampling plant by Julia K. Phillips, and the other three by A. A. Phillips.

INSPECTION BRANCH.

In addition to statistics and other information on coal-mining, the section headed "Coal-mining," page 136, contains information about the staff of the Inspection Branch and their activities. Some further information concerning the activities of Inspectors will be found under the subheading "Inspection of Metalliferous Mines" in the section headed "Metal-mining (Lode)." Substantial parts of the information on properties in that section and in the sections headed "Placer-mining" and "Non-metallics" were contributed by officers of the Inspection Branch.

MINERALOGICAL BRANCH.

The activities of the Mineralogical Branch include collecting geological and mineralogical data in the field, compiling and editing the annual report, and dispensing information for the benefit of the mining industry. Field-work is devoted principally to geological mapping and the examination of mineral deposits, the results of which are published partly in the annual report and partly in a series of bulletins.

In 1945 Part III. of Bulletin 20, "Lode-gold Deposits in Central Southern British Columbia," was published, and Bulletin 21, "Notes on Placer-mining," was prepared for publication. A paper entitled "Geology of the Twin 'J' Mine," based on field-work at Mount Sicker, was presented by John S. Stevenson in November, 1944, and was published in the Transactions of the Canadian Institute of Mining and Metallurgy, Volume XLVIII., 1945, pages 294–308. A paper covering part of his study of limestone deposits in South-western British Columbia was presented by W. H. Mathews at the Vancouver meeting of the Canadian Institute of Mining and Metallurgy in October, 1945. Other activities of the branch are referred to in the following notes on the field-work of the several engineers:—

J. M. Cummings continued to be on loan to the British Columbia Industrial and Scientific Research Council where he is acting-head of the Division of Mining and Metallurgy.

M. S. Hedley completed the detailed mapping of some silver-lead-zinc deposits in the Slocan area and made examinations in the Nelson-Sheep Creek district. Assisted by W. J. Lynott, he did some preliminary detailed mapping in the area lying south of the Kootenay River between Cottonwood and Fortynine Creeks. Later a preliminary study was made of the Merritt coal-basin.

S. S. Holland began detailed mapping on Lightning Creek in the Cariboo District and made detailed examinations of some properties in the same district. He also examined prospects in the Whitesail Lake area.

W. J. Lynott joined the staff of the Mineralogical Branch in July on obtaining his discharge from the Royal Canadian Air Force. In addition to assisting Mr. Hedley as outlined above, he made some independent examinations of properties.

J. T. Mandy undertook a reconnaissance trip from Kitwanga, on the Canadian National railway, via Kitwanga Lake and Cranberry River to the Nass River.

W. H. Mathews continued studies of limestone deposits in South-western British Columbia and spent part of the season studying coal deposits in the Peace River area.

B. T. O'Grady was occupied principally in Victoria organizing and directing the grub-stake programme, dealing with applications for assistance in building and repairing mining roads and trails, and assisting the Superintendent of Brokers in administering the "Securities Act." D. H. Rae, N. G. Freshwater, and J. H. Parliament assisted Mr. O'Grady on the grub-stake programme by visiting prospectors in the field.

J. S. Stevenson completed a programme of detailed mapping in the Zeballos Camp. Compilation of both underground and surface geology is in course of preparation. During the season visits were paid to Bridge River and Texada Island properties.

K. DeP. Watson began geological mapping in the territory adjacent to the Haines Cut-off Road, in North-western British Columbia. The work included examination of prospects in the Rainy Hollow section. During the season a visit was paid to placer operations on Spruce and Pine Creeks near Atlin.

Museums.

The Department has a large exhibit of ores and minerals in the museum on Superior Street, Victoria; smaller collections are displayed in the joint office, 305 Federal Building, 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 179.

Grub-staking Prospectors.

The "War-time Prospectors' Grub-stake Act," passed at the 1943 session of the Legislature, authorized the provision of grub-stakes as a means of assisting prospectors in the search for strategic minerals required in the prosecution of the war. Amendments made to the 1943 Act by the Legislature in March, 1944, included striking out the term "war-time" and the definition of "war minerals." Grub-stakes were limited under the 1943 Act to $300 per man; the amended Act provided for an additional allowance of up to $200 per man for travelling expenses if required.

For the 1943 season (fiscal year 1943–44) $25,000 was appropriated by the Legislature, and for each of the 1944 and 1945 seasons appropriations of $50,000 were made. Expenditures for the three seasons have been approximately: 1943, $18,500; 1944, $27,215; 1945, $27,310.

In 1943 ninety prospectors were granted grub-stakes. Search for deposits of strategic minerals was stressed. The prospectors were urged also to be on the lookout for deposits of ores of precious or base metals. Discoveries of scheelite and other strategic minerals were made, but by the end of the season it was apparent that the war demand for such minerals would be met from properties already in production or fully developed. Two gold prospects located in 1943 are of interest. The Good Hope, at Hedley, located by W. R. Wheeler, has been under development by Hedley Mascot Gold Mines, Limited, and in 1945 ore was trucked from this property to the company's mill for treatment. On the Harrison property in Tweedsmuir Park, a gold-bearing vein has been explored by Pioneer Gold Mines of B.C., Limited, and much interest has been attracted to the area.

In 1944, 105 grub-stakes were granted; of these, thirteen were reduced or cancelled. In 1945 eighty-four grub-stakes were granted, of which three were cancelled and seven were reduced. In 1944 and 1945 attention was directed principally to the search for lode-gold deposits. Samples of some promise were received from grub-staked prospectors in several areas.

In 1945 gold properties staked by grantees and taken under lease and bond by mining interests include the following: Paymuck group on Marshall Creek, Bridge River Camp, staked by L. J. Russell; D. C. Ault's Truax Mountain prospect, Bridge River Camp, which was relinquished after shallow diamond-drilling but is to be further explored by a syndicate; Warrior group on Carpenter Creek near Pacific, a divisional point on the Canadian National Railway, staked by John (Paddy) Creagh who has also staked the adjacent Gold Dome group on which he found good showings of gold ore.

Samples and specimens sent to the Department laboratories in the three years were: 1943, 773; 1944, 606; 1945, 448. The samples and specimens were examined by an engineer, following which most of them were given further study involving one or more of: mineralogical determination, spectrographic analysis, assaying.

The prospectors grub-staked have located and recorded the following numbers of claims: 1943, 87; 1944, 135; 1945, 181.

The grub-stake programme has been organized and supervised by B. T. O'Grady. In 1945 he was assisted by D. H. Rae, N. G. Freshwater, and J. H. Parliament, who were employed for the summer months to visit the prospectors in the field.

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

The Provincial Department's engineer, the Gold Commissioner and Mining Recorder for the Vancouver Mining Division, and the officers of the Dominion Geological Survey now occupy one suite of offices. All official information relating to mining is now available to the public in the one suite of offices at 305 Federal Building, Vancouver.

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

PUBLICATIONS.

Annual Reports of the Minister of Mines, bulletins, and other publications of the Department, with prices charged for them, are listed on pages 177 to 179.

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, 305 Federal Building, Vancouver, in the offices of the Inspectors of Mines in Nelson and Prince Rupert, as well as in public libraries listed on pages 180 and 181.

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 were to be carried on by the Geological Survey of Canada; this agreement has been fully adhered to by the Dominion of Canada and has proved of great benefit to the mining industry of the Province. Each year several geological parties are kept in the field; and in the many excellent reports and maps covering British Columbia, issued by the Geological Survey of Canada, a vast amount of information has been made available to prospectors and mining engineers.

For some years a branch office of the Geological Survey has been maintained in Vancouver, where copies of maps and reports on British Columbia can be obtained. The officer in charge of the British Columbia office is W. E. Cockfield, and the address is 305 Federal Building, Vancouver, B.C.

In 1936 a reorganization of several departments in the Federal Government was effected, and the Department of Mines and Resources created. One of the main branches of this Department is that of Mines and Geology, with sub-branches known as the Bureau of Geology and Topography and the Bureau of Mines. The Geological Survey of Canada and the Topographical Survey are now a part of the Bureau of Geology and Topography. During the 1944 season the Bureau of Geology and Topography had the following officers employed on field-work in British Columbia:—

Geological Parties.

C. S. Lord completed geological mapping in the McConnell Creek area; longitude 126°–127°, latitude 56°–57°.

J. E. Armstrong commenced geological mapping in the Aiken Lake area; longitude 125°–126°, latitude 56°–57°.

Stan Duffell and K. C. McTaggart commenced geological mapping in the Ashcroft area; longitude 121°–122°, latitude 50°–51°.

H. M. A. Rice commenced further geological mapping in the Shuswap area; longitude 119°–120°, latitude 50°–51°.

A. F. Buckham continued a study of the coal-bearing rocks in the Nanaimo and Cumberland areas, Vancouver Island; J. L. Usher collected fossils from the coal-bearing strata.

W. E. Cockfield conducted several brief geological investigations in various parts of the Province.

Topographical Parties.

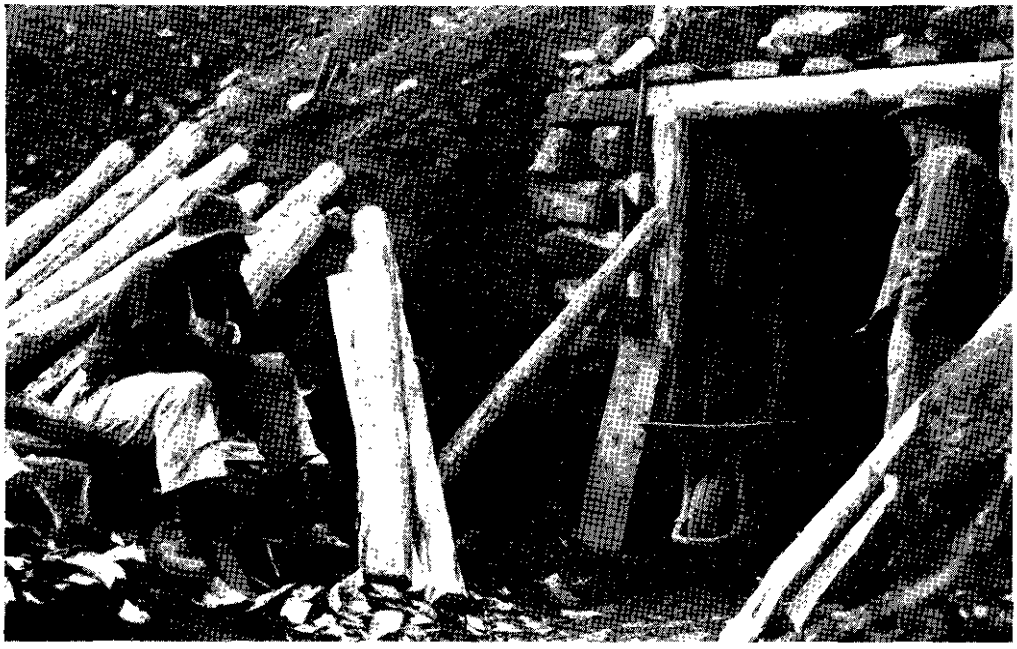
A. C. Tuttle completed the field-work for mapping the Bennett area; longitude 134°–136°, latitude 59°–60°.

METAL-MINING (LODE).

CONTENTS.

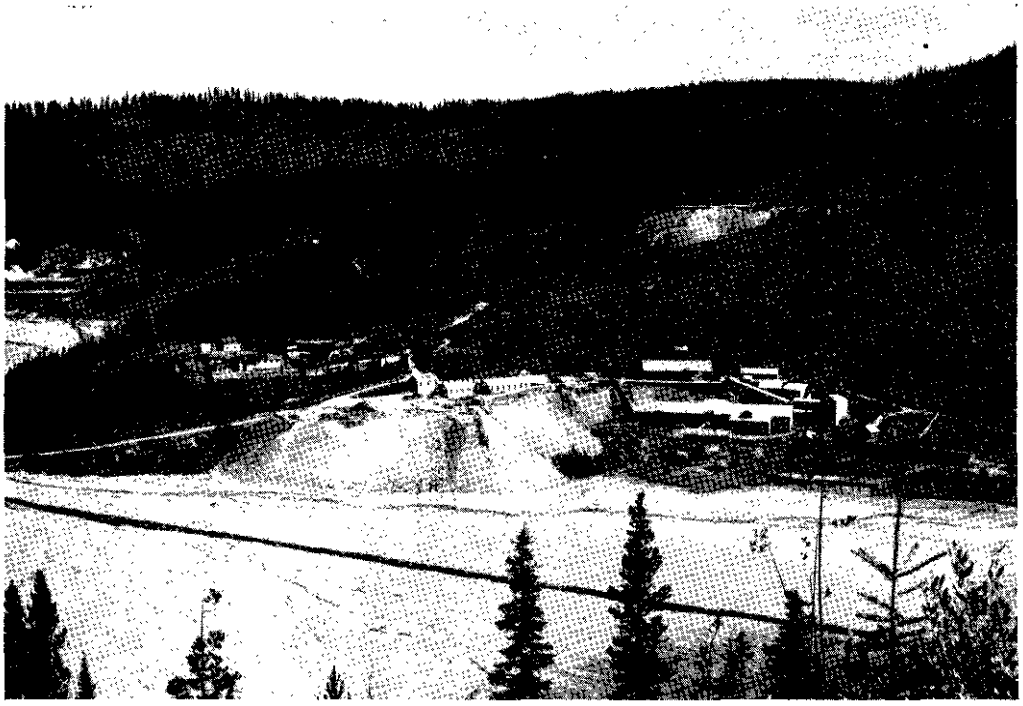
NOTES ON METAL MINES—*Continued.*

PLATE I.



A. Ranger group adit, Mount Truax, Bridge River.

B. Looking north-eastward down Tahtsa Lake from Tahtsa Peak at the west end.



A. View of Cariboo Gold Quartz mine from Island Mountain, showing the camp to the left of the 1500-level dump and the power-house and mill to the right; the 1200-level dump is at the upper right; Lowhee Creek is in the left background; and tailings from the Lowhee hydraulic are in the foreground.

B. Sheep Creek Valley with Gold Belt mill in centre distance and Kootenay Belle mill in foreground.

NOTES ON METAL MINES.

The following section includes short notes on mines and prospects and more detailed reports on some properties and areas. In the main the material in the short notes was supplied by Inspectors of Mines and the more detailed notes are the work of Engineers of the Department's Mineralogical Branch, but several embody the contributions of an Inspector and an Engineer. Authorship is indicated by foot-notes. Information regarding development and production has been obtained from the Bureau of Economics and Statistics through the courtesy of the property-owners. Information has also been obtained from the office of the Registrar of Companies.

The notes are arranged in a geographical order under headings which are place-names suggesting the area in which the properties are found. As a further aid in placing the properties, the approximate geographic positions are indicated by numbers and letters in parentheses following the name of each property. The numbers refer to the latitude and longitude of the south-eastern corner of the 1-degree quadrilateral, and the letters refer to the quarter of the quadrilateral in which the property is situated.

ATLIN.*

Gold.

Engineer Mine.

(59° 134° S.E.) Neil Forbes, T. J. Kirkwood, and Walter Sweet have acquired and are working the Engineer mine. In the winter of 1944–45 the three men sank a shaft for 30 feet and drove a drift for 50 feet along a vein. All work was done by hand and no other men were employed. They report having struck some high-grade ore in the drift.

TAKU RIVER.*

Gold.

Taku River Gold Mines.

(58° 133° N.W.) Frank H. MacPherson, General Manager. The mine is on the Tulsequah River, about 5 miles from its junction with the Taku River. It has been idle since March 31st, 1942. During the summer of 1945 a small crew of men was employed reconditioning the camp and airfield and working on roads and bridges preparatory to commencing operations early in 1946.

Leta Explorations, Limited, employed four men for about a month prospecting on the Stibnite group, on the South Fork of the Taku River.

PORTLAND CANAL.*

Salmon River.

Gold.

Silbak Premier Mines, Ltd.

(56° 130° S.E.) D. L. Coulter, General Manager; J. G. Pearcey, Superintendent. Capital: 3,000,000 shares, $1 par; issued, 2,500,000. The property is in the Salmon River Valley, about 14 miles from Stewart. Because of the severe labour shortage, little development was done during 1945. Mining was confined to the area between the No. 4 and No. 6 levels, adjacent to the Premier Border property, now controlled by Silbak Premier. A monthly inspection was made by a committee appointed by the local union. Several recommendations on minor matters were made by the committee and were attended to by the Company.

The mine was worked 306 days; ore produced amounted to 65,801 tons; development-work included 168 feet of crosscutting, 410 feet of drifting, and 1,009 feet of raising. The average number of men employed was 196.

* By Charles Graham.

Gold.

SUMMIT LAKE.

Salmon Gold Mines, Ltd. (N.P.L.).

(56° 130° S.E.) The property is on the west side of Summit Lake, about 27 miles from Stewart. It was formerly under option to Consolidated Mining and Smelting Company of Canada, Limited, who did some diamond-drilling, drove a crosscut to intersect a vein, and did some drifting on the vein. The company dropped its option in July, 1939. In 1945 the Salmon Gold Mines, Limited, was reorganized and 3,724 feet of diamond-drilling was done on the property. The average number of men employed was five. Most of the equipment for drilling and the supplies were flown in from Stewart. Because of difficulties in transportation, work has been suspended for the winter.

Gold.

TIDE LAKE.

East.—(56° 130° S.E.) A. Phillips and partners continued prospecting on a group of claims about 5 miles north of the Salmon Gold group. Some high-grade ore was shipped to the sampling plant at Prince Rupert.

Prospecting by individuals was done on claims adjoining the Salmon Gold property.

Gold.

MARMOT RIVER.

Gold Drop Mines, Ltd.

(55° 129° N.W.) J. O. Le Francois, Manager. The property is on the Marmot River, about 2½ miles from tidewater, at an elevation of about 1,000 feet. About 2 miles of truck-road and 1 mile of tractor-road have been constructed to the property. A small tractor is used for transportation. A 5- by 7-foot adit was started in September and had been driven 300 feet near the end of 1945. A Sullivan air-compressor, with a capacity of 150 cubic feet per minute, driven by a Buda gasoline-engine provides air for drilling. Near the end of 1945, a fan and pipe-line were being installed for ventilation. The average number of men employed was two.

Silver.

AMERICAN CREEK.

Mountain Boy Mining Co.—(56° 129° S.W.) J. O. Le Francois, Manager. On this property, an additional 69 feet of drifting and crosscutting was done during 1945.

Gold.

WILLOUGHBY CREEK.

Wilby.

(56° 129° S.E.) This group of claims, under option to the St. Eugene Mining Corporation, is about 12 miles from Meziadin Lake. Willoughby Creek is a tributary of the Nelson River, which flows into the White River, which in turn flows into the Nass River. Some change was made in the location of the trail over Bear River Pass. A trail was started from the south-east end of Meziadin Lake and is almost completed to Nelson River. No work was done at the property.

Gold.

ALICE ARM.

Esperanza Mine.—(55° 129° S.E.) Under the supervision of A. G. Langley, some diamond-drilling is being done with an X-ray drill. Three men will be employed for most of the winter.

OMINECA.

USK.*

Gold.

Nicholson Creek Mining Corp., Ltd. (54° 128° N.E.) Bulkley Shannon, Manager. Capital: 5,000,000 shares, 1 cent par; issued, 2,660,452. The property is on Nicholson Creek, about 2 miles east of Usk. For some years little had been done on the property, but in 1945 four men were employed almost continuously. About 3½ miles of trail was built up to the MacShannon group, which is at approximately 1,700 feet elevation, about 1,400 feet above the railroad. During the winter a 6- by 6½-foot adit was driven by hand, and during the summer cleaning out of old cuts and open-cutting were done. Approximately 1 ton of sorted ore was shipped to the sampling plant at Prince Rupert. A good cabin to accommodate four men, a blacksmith shop, and an explosives magazine were built at the MacShannon group. The road to the Phœnix claims, where tunnelling had been done in previous years, was repaired to enable a compressor to be brought down for use in drifting on the MacShannon group.

PACIFIC.†

Gold-silver.

The Warrior and Gold Dome Groups, located by John Creagh, holder of a grub-stake under the "War-time Prospectors' Grub-stake Act," are near the headwaters of a creek locally known as Carpenter Creek, which enters the Skeena River from the north at a point about 4 miles down the valley from Pacific. A lower camp on Carpenter Creek, 1,500 feet higher than the railway, is reached by a trail 7 miles long.

Warrior. (54° 128° N.W.) Three claims, Warrior Nos. 1, 2, and 3, were recorded in 1944, and two claims, Warrior Nos. 4 and 5, were recorded in 1945. The claims are up the south fork of the creek, about 2 miles from the lower camp, and are reached by a steep trail. The altitude ranges from 3,800 feet at the north-eastern end of the property to 5,300 at the south-western end. Most of the ground is steep hillside, flanking a snow-filled basin.

Steeply dipping altered sedimentary rocks, cut by a series of granitic dykes, are exposed on both sides of the basin. As the main granitic contact, about a mile to the south-west, is approached, the dykes become wider and more numerous.

A quartz vein traceable for at least 500 feet on the very steep side-hill cuts across the sedimentary rocks. The vein strikes north 35 degrees east and dips 50 degrees to the south-east into the hill. Widths up to 30 inches were observed and the average of parts which could be examined is about 2 feet. The narrowest exposure is at the north-eastern end, where the vein is 4 inches wide. Parts of the vein are well mineralized with sulphides, including pyrite, chalcopyrite, galena, and arsenopyrite. No gold is visible, but fine gold can be panned readily in a stream flowing from the north-eastern end of a small glacier covering the higher part of the vein outcrop.

Details concerning three samples are as follows:—

Description.	Width.	Assays.	
		Gold.	Silver.
	Inches.	Oz. per Ton.	Oz. per Ton.
At north-east end of exposures	6	0.01	0.2
300 feet to south-west cut showing abundant sulphides	14	5.02	3.56
500 feet from north-east end	20	0.36	5.40

* By Charles Graham.
† By D. H. Rae.

Gold Dome. (54° 128° N.W.) The claims Gold Dome Nos. 1, 2, and 3, recorded in 1945, are about 1½ miles in an easterly direction from the Warrior group and are up the north fork of the creek, about 2½ miles from the lower camp. The lower (south-eastern) end of the group is at an altitude of about 4,000 feet. The claims are in the main mass of the batholith, the centre line of the claims following a steep granite bluff. The several veins exposed are narrow, strike about north 75 degrees west and dip about 45 degrees south-westward into the steep side-hill. It was possible to examine a short section of one vein only. The other veins are seen readily from the other side of the basin. The section examined consisted of quartz fairly well mineralized with galena, pyrite, and chalcopyrite.

Details concerning two samples are as follows:—

Description.	Width.	Assays.	
		Gold.	Silver.
	Inches.	Oz. per Ton.	Oz. per Ton.
Lowest part of vein exposure (sample 1)	6	0.03	1.40
50 feet north-west of sample 1	14	0.51	60.80

SILVER CREEK.*

Gold.

McKee Group, Leta Explorations, Ltd.—(55° 125° N.E.) D. F. Kidd, Geologist. This group of claims adjoins the Bralorne Takla mercury property. An adit, which was to be driven 800 feet, was abandoned at 350 feet. The ground required lagging on both the back and sides. Eight men were employed.

WHITESAIL LAKE AREA (53° 127° S.E.).†

Eutsuk, Whitesail, and Tahtsa Lakes lie on the east side of the Coast Mountains. From the westernmost ends of these three lakes it is possible to reach a stretch of about 50 miles along the eastern contact-zone of the Coast Range batholith. The lakes are part of a water system that is navigable by shallow-draught river-boats. Whitesail and Tahtsa Lakes drain into Ootsa Lake by navigable rivers, and Eutsuk Lake is reached from Portage Bay on Whitesail Lake by a portage-railway 1⅛ miles long.

Burns Lake, on the Prince Rupert branch of the Canadian National Railways, is the nearest railroad point. From there a road runs south 42 miles to Ootsa Landing on Ootsa Lake. The road extends along the north side of the lake a further 13 miles to Wistaria. The west end of Ootsa Lake is 24 miles by boat from Ootsa Landing, thence 4 miles to the junction of the Tahtsa and Whitesail Rivers. From there it is about 38 miles by river to Tahtsa Lake and about 20 miles farther to the west end of Tahtsa Lake.

From the Whitesail and Tahtsa Rivers' junction it is 13 miles to the east end of Whitesail Lake, thence 13 miles to Portage Bay. Whitesail Lake is 28 miles long. The west end of Eutsuk Lake is 15 miles from the south end of the portage-railway.

The area has received attention from prospectors at various times in the past. Sibola Mountain was, in 1914, the scene of a small stampede occasioned by the discovery of a number of small quartz veins. The lead-zinc showings on Sweeney Mountain were staked in 1915, by 1916 the zinc showings at Zinc Bay on Whitesail Lake at the foot of Chikamin Mountain had been found, by 1918 the discovery of silver-lead showings higher up on Chikamin Mountain was made, and by 1927 the silver-lead-zinc showings on Swing Peak were discovered.

* By Charles Graham.

† By Stuart S. Holland.

The Consolidated Mining and Smelting Company of Canada ceased work on the Emerald property on Sweeney Mountain in 1931. From then on there was very little prospecting in the country until 1944, when interest was renewed by the discovery of gold-bearing quartz veins on the Harrison group at the west end of Whitesail Lake. Prospectors and company scouts visited the area in 1944 and most of the previously known showings were re-examined. Numerous claims were staked but no important new discoveries were made.

In 1945 the Consolidated Mining and Smelting Company of Canada had three two-man prospecting parties in various parts of the area, the Freeport Exploration Company had a prospecting party working on the south side of Tahtsa Lake, and about six other prospectors were working in various places. Discoveries of previously unknown showings were made on the south side of Surel Lake at the west end of Eutsuk Lake.

Field-work.—About three and one-half weeks in August, 1945, was spent in making trips into Tahtsa, Eutsuk, and Whitesail Lakes and in examining properties of current interest.

[References: Eutsuk Lake Area—*Geol. Surv., Canada,* Sum. Rept., 1925, Pt. A, pp. 144–154. Whitesail-Tahtsa Lakes Area—*Geol. Surv., Canada.*, Sum. Rept., 1924, Pt. A, pp. 47–58. Eutsuk Lake District—*Geol. Surv., Canada,* Sum. Rept., 1920, Pt. A, pp. 81–93. Tahtsa-Morice Area—*Geol. Surv., Canada,* Map 367A, 1936. *Minister of Mines, B.C.*, Ann. Rept., 1916, 1917, 1926, 1927, 1944.]

Geology.—The eastern contact of the Coast Range batholith as previously mapped extends north-westward from the west end of Pondosy Bay, past the west end of Eutsuk Lake, and between Whitesail and Lindquist Lakes. The contact has also been mapped from the west end of Tahtsa Lake through to a point about 4 miles from the west end of Morice Lake. On the accompanying index map the contact is assumed to run from Little Whitesail to Tahtsa Lake on the basis of prospectors' reports that granitic rocks outcrop near Seel Lake and at the head of Laventie Creek.

Coast Range intrusive rocks vary somewhat in composition. In the main they are massive grey quartz diorite and diorite, and pinkish weathering granodiorite and granite. Near the contacts of intrusives the rocks may be foliated.

The rocks exposed in roof pendants within the main batholith and in the area extending eastward from the eastern contact of the Coast Range batholith belong to the Hazelton group. They consist of a wide variety of fragmental volcanics, mainly andesitic and rhyolitic in composition and ranging from fine, thinly laminated tuffs to coarse breccias, as well as flow-rocks of various types. Black argillites, limestone, and sandy sediments are intercalated with the volcanics.

At places it has been possible to subdivide the Hazelton group into a lower volcanic member, a middle sedimentary member, and an upper volcanic member. Geological work, however, has not been sufficiently detailed to allow the mapping of the three members and, consequently, the regional structure is imperfectly known.

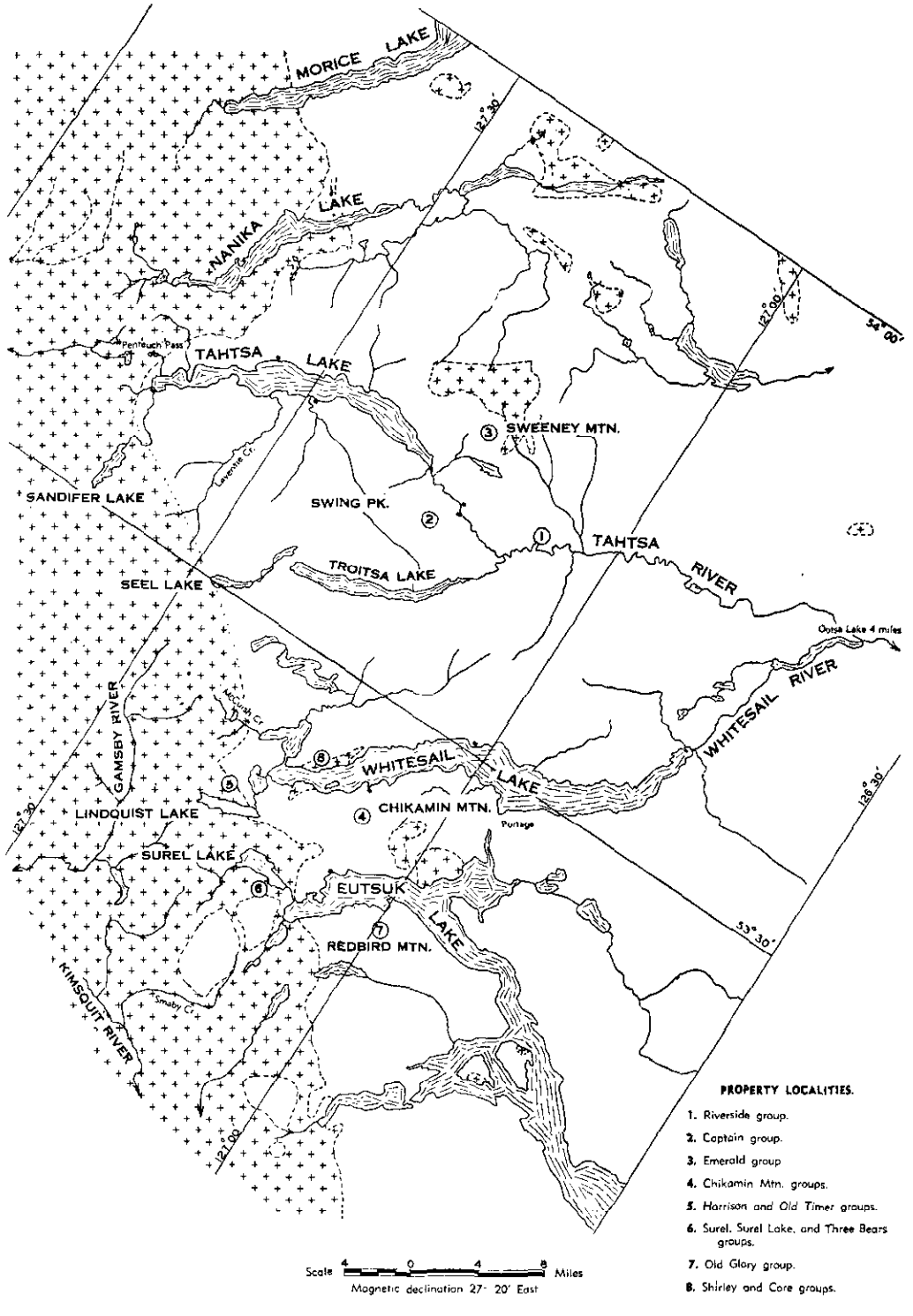
Dioritic and aplitic dykes, as well as post-mineral basaltic dykes, cut the Coast Range intrusives and Hazelton group rocks.

Mineral deposits have been found in the Coast Range batholith and also in the Hazelton group. The middle sedimentary member of the Hazelton group, possibly because of the greater disparity of its rock types, appears to be a somewhat more favourable host-rock than the thick, massive upper and lower volcanic members.

TAHTSA LAKE.

Gold.

Riverside. The Riverside group consists of four claims, located by J. W. McNeill, J. Knox, and George Seel, of Ootsa Landing. The claims are on the north side of Tahtsa River and are reached from a camping-ground that is about 1½ miles down-stream from the junction of Kasalka (Blue) Creek.



INDEX MAP OF WHITESAIL LAKE AREA.

Numbers show the locations of various groups described. Areas of Coast Range intrusives and related rocks are shown in pattern.

The showing is a new discovery made on the east face of a rocky knoll, about 200 feet above the level of Tahtsa River and about 500 feet from the river's edge.

The main showing consists of mineralization along a fracture striking north 85 degrees east and dipping 80 degrees south. The fracture cuts across massive blocky-fracturing dark greenish-black tufts and breccias. The fracture has acted as a locus of silicification, and of mineralization by arsenopyrite and minor amounts of pyrite, sphalerite, and chalcopyrite. The mineralization extends across a width of from 2 to 5 inches and in one place reaches a maximum width of 14 inches. The owners report their highest sample assayed 0.36 oz. of gold per ton. A picked sample containing 25 per cent. arsenopyrite assayed: Gold, 0.13 oz. per ton; silver, 0.2 oz. per ton.

The Freeport Exploration Company, under the direction of Lamont West, did some surface-work on the showing. By means of open-cuts the mineralized fracture was traced for about 100 feet. It was uncovered again across a draw about 250 feet to the east.

Four claims, the Tahtsa Nos. 1 and 2 and the Last Chance Nos. 1 and 2, held by G. A. Young and W. T. Keys, of Vancouver, adjoin the Riverside group on the west.

The showings on this group consist of several sheeted-zones, one of which is about 15 feet wide. Massive tuffs and breccias are cut by zones of parallel fractures from ½ inch to 2 inches apart, striking north 87 degrees east and dipping almost vertically. Some fractures are occupied by narrow quartz veinlets, others are mineralized with almost solid pyrite, and some with arsenopyrite. The pyritic mineralization does not appear to carry gold values. A picked sample from a 1-inch veinlet of arsenopyrite containing 20 per cent. arsenopyrite assayed: Gold, 0.18 oz. per ton.

Silver-lead.

Captain.

The Captain group consists of six located claims on the north-eastern slopes of Swing Peak, covering showings previously held by George Seel and then known as the Swannell group. The claims were located by C. McNeill, of Ootsa Landing, and G. A. Young, of Vancouver. A well-graded trail about 5 miles in length starts from Copp's cabin on a slough on the south side of Tahtsa River, about 2 miles up-stream from the mouth of Kasalka (Blue) Creek, and leads to an old burnt-out camp near timber-line.

The important previous work is an adit, 700 feet above the burnt-out camp, about 400 feet long, driven by Tahtsa Mining Company, Limited, and started in 1929. The surface showing was described in the Minister of Mines' Annual Reports for 1927 and 1929.

This showing is a shear-zone that strikes about north and dips steeply to the east. There is mineralization along the foot-wall of the shear-zone, mainly across narrow widths but reaching a maximum of 10 inches. The mineralization consists of galena, sphalerite, arsenopyrite, pyrite, and tetrahedrite. Picked samples carried high values in silver and lead and little or no gold.

The adit cuts the shear-zone at 84 feet from the portal and follows along it in a southerly direction for 290 feet to the face. The shear is well marked by several inches of gouge. No vein material was seen, except for the last 110 feet to the face, despite the fact that earlier reports noted the presence of a narrow vein. For the last 110 feet the shear-zone is occupied by short lengths of vein from 2 to 4 inches wide. The vein material consists of quartz and rhodochrosite gangue containing galena, sphalerite, pyrite, and tetrahedrite.

Five samples were taken with the following tabulated results:—

Distance from Face of Adit.	Width.	Gold.	Silver.	Lead.	Zinc.
	Inches.	Oz. per Ton.	Oz. per Ton.	Per Cent.	Per Cent.
110 feet	3	Trace	0.9	0.2	Trace
80 feet	4	0.03	138.7	28.0	0.1
65 feet	2	Trace	24.0	26.9	0.9
30 feet	4	Trace	0.2	0.3	0.1
At face	2	Trace	11.7	8.1	2.3

Another shear-zone lying about 500 feet to the west of the one explored by the adit is traced by four open-cuts through the talus. The shear-zone strikes south 15 degrees east and dips almost vertically. The two walls of the zone are parallel and from 3 to 5 feet apart. Mineralization consisting mainly of galena and arsenopyrite appears in narrow widths along the west wall. In the uppermost open-cut 4 inches, mainly of galena, assayed: Gold, 0.05 oz. per ton; silver, 73.8 oz. per ton; and lead, 57.6 per cent. Another picked sample containing about 50 per cent. arsenopyrite assayed: Gold, 0.06 oz. per ton; silver, 1.4 oz. per ton; and lead, 1.9 per cent.

[References: *Minister of Mines, B.C.*, Ann. Repts., 1927, pp. 154–155; 1929, p. 184.]

Emerald. The Emerald group was staked in 1915. The showings are on the south side of Sweeney Mountain and are reached by wagon-road, starting from Emerald Landing, about 3 miles below the outlet of Tahtsa Lake. No work has been done on the property since operations were suspended in 1931. The property was not visited.

The original surface showing was a vein-zone 10 to 20 feet wide, having in one place 10 feet of solid galena along the foot-wall side. The vein-mineralization is chiefly galena with subordinate amounts of sphalerite, pyrite, and chalcopyrite. The ore contains ½ to ⅔ oz. of silver to each per cent. of lead.

The group was taken under option by the Consolidated Mining and Smelting Company of Canada in 1928. Work was suspended in the spring of 1931 after a large amount of underground exploratory work had been done.

[References: *Minister of Mines, B.C.*, Ann. Repts., 1916, pp. 164–165; 1919, pp. 104–105; 1929, pp. 183–184. *Geol. Surv. Canada*, Sum. Rept., 1924, Pt. A, pp. 56–57.]

Prospecting.—The Freeport Exploration Company had a prospecting party in the field during the summer under the direction of Lamont West. Most of the prospecting was done by the geological team of Noel Hendry and Ivan Boyd. Their supplies were back-packed to them from base camps on Tahtsa River and the south shore of Tahtsa Lake. The party prospected along the south side of Tahtsa Lake. Five claims were located within the Laventie Creek drainage-basin.

Whitesail Lake.

Chikamin Mountain.

Several mineral showings on Chikamin Mountain have been held by the Harrison Brothers, of Wistaria, for a number of years. Claims covering these showings are under option to Privateer Mine, Limited, who, in addition, staked a number of other claims on the mountain.

Mentor. This group, the Mentor Nos. 1 and 2 claims, was located by C. V. Harrison, of Wistaria. The claims are along the south shore of Whitesail Lake in Zinc Bay, at the foot of Chikamin Mountain. The showings were not seen. No recent work has been done on the showings, which were described under "Cariboo" in the Minister of Mines, British Columbia, Annual Report, 1916, pages 165–166, and in the Geological Survey, Canada, Summary Report, 1924,

Part A, pages 52–53; also under "Sunset" in Minister of Mines, British Columbia, Annual Report, 1926, page 146, and 1927, page 155.

Dad's Special. This group of four mineral claims was located by A. Ritz, of Wistaria. The showing, 900 feet higher than the lake and about 1 mile up the main trail from the beach, lies 100 yards east of the trail. A small creek exposes an area of rusty weathering, pyritized tuffs about 25 feet wide. In the creek-bottom is a ½-inch stringer of galena and a ¼-inch stringer of sphalerite, both striking north 45 degrees west and standing almost vertical.

Privateer Mine, Limited, in 1945 drilled one diamond-drill hole 134 feet long beneath the surface exposure.

Rainy and Gold Coin. The Rainy No. 1 and Gold Coin mineral claims are on the south slope of Chikamin Mountain. The showing in the California adit is on the Gold Coin claim, about 1,300 feet above the level of the Chikamin Mountain cabins. The California adit, just a few hundred feet below the summit, is reached by climbing a long talus-slope on the south flank of Chikamin Mountain.

The work consists of an open-cut 30 feet long with an adit 25 feet long at the end of it. The adit is along a shear-zone striking north 35 degrees west and dipping 70 degrees to the south-west that cuts fine and coarse tuffs striking north 10 degrees west and dipping 65 degrees to the east. Two open-cuts have exposed the shear-zone 170 feet to the south-east and 90 feet to the north-west from the adit.

Near the face of the open-cut the shear-zone is partly silicified across narrow widths and mineralized with pyrite, galena, sphalerite, and arsenopyrite. On the dump there is about 5 tons of sorted mineralized quartz. A grab sample from this dump assayed: Gold, 0.10 oz. per ton; silver, 6.3 oz. per ton; lead, 1.4 per cent.; and zinc, 5.4 per cent. A sample across 3 inches of quartz mineralized with pyrite, galena, and sphalerite assayed: Gold, 0.09 oz. per ton; silver, 44.9 oz. per ton; lead, 7.2 per cent.; and zinc, 5.3 per cent.

Gold-silver-lead-zinc.

Roosevelt. The Roosevelt group of eight located claims covers old mineral showings partly explored by the Chikamin adit, which is reached by about 2 miles of well-graded trail that climbs about 1,100 feet above Whitesail Lake. The trail starts from a cabin in a protected bay about 3 miles west of Zinc Bay. The original showing was partly exposed in several places along a small creek-bottom. The Chikamin adit extends in a south-easterly direction and cuts a shear-zone at 37 feet from the portal, thence it runs along the shear-zone striking about south 30 degrees east for 40 feet. From that point a crosscut was driven 25 feet to the south-west.

The shear-zone is occupied by a quartz vein mineralized with pyrite, galena, sphalerite, and arsenopyrite. The widest section of vein seen, 8 to 9 inches, is exposed at the face of the drift, where a sample across 8 inches assayed: Gold, 0.29 oz. per ton; silver, 17.9 oz. per ton; lead, 14.3 per cent.; and zinc, 15.8 per cent.

The dump of sorted ore at the portal was estimated to contain 4 or 5 tons. From it a selected piece containing about 50 per cent. arsenopyrite and no galena or sphalerite assayed: Gold, 0.28 oz. per ton, and silver, 0.6 oz. per ton.

At a point about 500 feet south of the Chikamin adit, Privateer Mine, Limited, during the summer of 1945, drilled three diamond-drill holes totalling about 500 feet. The longest hole was 181 feet. These holes were directed toward the southward extension of the shear-zone.

Silver-lead-zinc.

Garner No. 1 and Marie.

The Garner No. 1, located by C. V. Harrison, and the Marie group of three claims, located by W. H. Harrison, Sr., and W. H. Harrison, Jr., are on the north-east slope of Chikamin Mountain. The main cabin on Chikamin Mountain is about 3 miles by trail from the lake-shore and about 1,700 feet above it. The Ruby adit has been driven on a narrow though remarkably persistent vein on the Garner claim.

The vein strikes about south 45 degrees east and dips 85 degrees to the south-west. It has been traced by open-cuts for about 2,000 feet. The vein cuts grey tuffs striking south 55 degrees east and dipping 20 degrees to the south-west.

The Ruby adit, about 2,650 feet above the lake-shore and about 900 feet above the Chikamin Mountain cabins, has been driven for 118 feet in a south-easterly direction along the vein. In the drift the vein has a maximum width of 24 inches. It consists of quartz mineralized with galena, sphalerite, pyrite, chalcopyrite, and possibly tetrahedrite. A sample taken at the face across 12 inches assayed: Gold, 0.08 oz. per ton; silver, 14.5 oz. per ton; copper, 0.9 per cent.; lead, 7.4 per cent.; and zinc, 8.7 per cent.

In 1939 B. T. O'Grady sampled the vein in the Ruby adit with following tabulated results:—

Distance from Portal.	Width of Vein.	Gold.	Silver.
	Inches.	Oz. per Ton.	Oz. per Ton.
0 feet	8½	0.02	38.2
13 feet	15	0.02	14.2
24 feet	15	0.04	12.0
32 feet	10	0.02	12.8
50 feet	9	0.10	12.3
71 feet	6	0.01	5.4
82 feet	6	Trace	7.8
89 feet	9	0.04	6.8
99 feet	24	0.06	11.7
107 feet	23	0.02	17.6
118 feet (face)	16	0.04	16.8

[References: *See* Nickel Plate, *Geol. Surv., Canada*, Sum. Rept., 1924, Pt. A, pp. 54–55. *See* Shamrock, *Minister of Mines, B.C.*, Ann. Rept., 1926, p. 187.]

North Side of Whitesail Lake.

Two groups of claims were located in 1944 along the north side of Whitesail Lake. One, the Shirley group of eight claims, extending north-eastward along the shore of Whitesail Lake from the entrance into Little Whitesail, was located by Molly Nutter, of Wistaria. The other, the Core group of twelve claims, located by Fred Paulig and Orald Harrison, of Wistaria, covers the outcrop of a dioritic stock on the south and south-east flanks of Core Mountain.

The Shirley group was not visited and no one was available to point out the showings on the Core group. The Consolidated Mining and Smelting Company of Canada established a base camping-ground in the protected cove on the Core group and did a small amount of work on the group.

The Core Mountain diorite, where seen along the shore of Whitesail Lake, contains a small amount of disseminated pyrite that shows as rusty weathering areas. Close to the camping-ground a few small open-cuts expose silicified and slightly pyritized diorite. No other mineralization was seen. It is understood that no quartz veins had been found and that the showings were of disseminated pyrite and pyrrhotite mineralization with a very low gold content.

West End of Whitesail Lake.

A large number of claims have been located between the west end of Whitesail Lake and the north side of Lindquist Lake. Only three of the various groups were visited: these are the Harrison group, under exploration by Pioneer Gold Mines of B.C., Limited; the Lam group, on which Privateer Mine, Limited, did some diamond-drilling; and the Old Timer group, located by D. F. Kidd.

Gold.

Harrison.

During 1945 Pioneer Gold Mines of B.C., Limited, continued exploration-work on the Harrison group. The work was under the supervision of A. E. Pike. A tent-camp was established near timber-line, at an elevation of 1,100 feet above the lake and 5 miles by pack-horse trail from the west end of Whitesail Lake. The claims were surveyed by J. T. Underhill, of Vancouver, and a geological examination was made of the ground by F. Joubin.

Exploratory work consisted of 3,728 feet of diamond-drilling and a small amount of surface-trenching. Diamond-drilling was done by a standard machine working two shifts per day and an X-ray machine working one shift per day. Snow conditions are such that drilling was begun about the second week in July and was finished by the second week in October.

The eastern contact of the Coast Range batholith runs almost due west across the Harrison No. 22, No. 13, No. 12, No. 5, No. 1, and No. 2 mineral claims. The contact-zone of the intrusive rock is gneissic and is quartz diorite that has both transitional and intrusive contacts with pink granodiorite lying to the south.

The granitic rocks intrude sediments and volcanics of the middle member of the Hazelton group. These include black slate, tuffaceous argillite, pale green thinly bedded tuff, and some coarse volcanic breccias. Near the intrusive contact the slate is metamorphosed to andalusite schist.

Along the intrusive contact there is a zone of quartz stringers as much as 100 feet wide. The diorite between the stringers is intensely silicified, buff-coloured, and generally retains its granularity. Post-mineral black basaltic dykes outcrop in several places.

Diamond-drilling confirms the surface indication that the intrusive-sedimentary contact dips southward; the indicated dip is about 55 degrees.

The main showing on the Harrison group is a quartz vein in quartz diorite close to the intrusive contact. The vein strikes almost parallel to the contact but dips north at about 45 degrees. At the time of the first examination* it was thought that there were three main veins. Since then surface-stripping and diamond-drilling have led the company engineers to believe that there is just one main east-west vein and that there are several low-dipping north- and north-westerly-striking veins on both foot- and hanging-wall sides of the main vein. The current belief is that there is a western vein-segment at least 500 feet long on the Harrison No. 5 mineral claim, and an eastern segment in the east corner of the Harrison No. 13 claim that surface-stripping indicates as being about 600 feet long. Vein-quartz in surface trenches in the intervening 800 feet is interpreted to mean that the vein has been cut by a series of step-faults between the two segments.

Diamond-drilling during 1945 was chiefly on the western vein-segment and was laid out to explore the downward extension of the vein in the quartz diorite. No change in the behaviour of the vein was discovered at shallow depths. It is thought that the vein will be proved to average more than 5 feet in width.

* *Minister of Mines, B.C.*, Ann. Rept., 1944, p. 176.

No information has been obtained on the behaviour of the north-dipping vein-fracture at its junction with the south-dipping intrusive contact.

[Reference: *Minister of Mines, B.C.*, Ann. Rept., 1945, pp. 175–177.]

Lam. The Lam group of four mineral claims, the Lam Nos. 3 to 6, was located in 1944 by W. A. Lammers, of Vancouver. The group adjoins the south-west side of the Harrison group. The claims are about 1¼ miles west along the side-hill from the Pioneer Gold Mine camp on the Harrison group.

The claims are underlain by grey quartz diorite that is continuous with the dioritic rocks on the Harrison group. There has been no surface-stripping done on the group. In August, 1945, a 200-foot diamond-drill hole had been drilled for Privateer Mine, Limited, below the outcrop of a narrow quartz vein. A sample from the outcrop taken across 3 inches of quartz mineralized with pyrite assayed: Gold, 0.01 oz. per ton. No other showings were seen.

Old Timer. The Old Timer group of six claims, the Old Timer Nos. 1 to 6, was located in 1944 by D. F. Kidd, of Vancouver, The group adjoins the north-west side of the Harrison group and lies on the north-east slope of Lindquist Mountain. The claims may be reached by about 4 miles of trail, built in 1929, from the west end of Little Whitesail Lake. They may also be reached from the Pioneer Gold Mine camp on the Harrison group by climbing 1,600 feet over the ridge to the north-west.

The westerly-striking intrusive contact that crosses the Harrison group extends north-westward over the ridge of Lindquist Mountain and cuts across the Old Timer No. 4 and No. 6 claims. The intrusive rock, chiefly diorite, is in contact with sheared chlorite schists, black slate, and dark grey laminated tuffs.

Two quartz veins outcrop at an elevation of about 5,000 feet close to the toe of a small glacier. One vein, striking about north 45 degrees east and dipping 55 degrees to the south-east, is enclosed by dark green sheared chlorite schist. It is exposed for a length of about 100 feet and ranges in width from 6 to 30 inches. The quartz is moderately well mineralized with pyrite, galena, sphalerite, and pyrrhotite. A sample of selected pieces assayed: Gold, trace; silver, 1.3 oz. per ton. On the foot-wall side of the first vein is a second striking about north 60 degrees east and dipping 45 degrees to the south-east. It may be seen outcropping for about 400 feet along its strike. The quartz is fairly well mineralized with pyrite, galena, sphalerite, and pyrrhotite, and ranges from 6 to 36 inches in width. A sample of selected well-mineralized pieces assayed: Gold, trace.

Other showings, previously described in the Annual Report of the Minister of Mines for 1929, were not examined.

[Reference: *See* Harloworth, *Minister of Mines, B.C.*, Ann. Rept., 1929, pp. 184–185.]

Prospecting.—Two eight-claim groups, the Lena and Lena Nos. 2 to 8 and the Kay and Kay Nos. 2 to 8, were located in September, 1945, near the head of the Gamsby River, south-west of McCuish Pass, by A. Clore, of Copper River, and J. Stadin, of Terrace. It is understood that these men were prospecting for the Consolidated Mining and Smelting Company of Canada. The nature of the showings is not known.

Eutsuk Lake.

Surel Lake.

Interest was aroused in 1945 by the almost simultaneous staking, by three prospectors working independently, of three mineralized showings near Marten Creek, on the south side of Surel Lake. Surel Lake is at the west end of Eutsuk Lake and is reached by a mile of trail that runs along the east side of Surel Creek. Marten Creek flows into the south side of Surel Lake about 2½ miles from the east end.

The three groups of claims are the Three Bears Nos. 1 to 8, located on the lower part of Marten Creek by W. H. Harrison, Jr., of Wistaria; the Surel Nos. 1 to 6, located on the upper part of Marten Creek by Fred Paulig; and the Surel Lake and Surel Lake Nos. 1 to 7, located on the south side of Surel Lake at its east end by J. J. Hepson, of Wells. None of the showings was seen.

A roof-pendant of sediments and volcanics outcrops in the upper part of Marten Creek. Paulig's showings on the Surel group are understood to be quartz veins 10 to 12 inches wide and having a maximum width of 2 feet. The quartz is mineralized with pyrite, galena, sphalerite, and a few flakes of molybdenite. The veins are said to be in the sedimentary rocks.

The showings on the Three Bears group, on the lower part of Marten Creek, are said to be narrow quartz veins mineralized with pyrite, and some galena. The veins are in sedimentary rocks.

The Surel Lake group of J. J. Hepson extends westward from the falls on Surel Creek. The claims are underlain by grey diorite but are close to the eastern margin of batholith. The vein is believed to be from 1 to 2 feet wide, to be exposed for less than 50 feet, and to carry some high values in gold. The ore is thought to contain a telluride mineral.

The Surel Lake group was examined in August, 1945, by J. A. Pike, of Island Mountain Mines, Limited, who also located the adjoining Fly group of four claims.

Red Bird Mountain.

Mineralization on Red Bird Mountain was first discovered in 1929 and was located as the Red Bird group.* These showings were relocated in 1944 by Molly Nutter as the Old Glory group. The claims lie on the north-eastern side of Red Bird Mountain and are reached from the valley of the creek flowing into the south side of Eutsuk Lake just west of Trapp Point.

Red Bird Mountain was climbed from the north-western side, and although a considerable amount of bornite-mineralized float was seen, the original showings were not found.

The varied mineralization reported on Red Bird Mountain includes both copper and arsenopyrite mineralization as well as a galena showing.

CARIBOO.

Gold.

Cariboo Gold Quartz Mining Co., Ltd.†

(53° 121° S.W.) Company office, 1007 Royal Bank Building, Vancouver, B.C.; mine office, Wells, B.C.; W. B. Burnett, President; R. R. Rose, Managing Director and Mine Manager; P. N. Pitcher, Assistant General Superintendent; I. S. Comfort, Mine Superintendent; J. D. Boulding, Mill Superintendent; L. Walker, Mine Foreman. Capital: 2,000,000 shares, $1 par; issued, 1,333,309. The company operates the Cariboo Gold Quartz mine on Cow Mountain outside Wells. The mine is on the south-east side of Jack of Clubs Lake. Wells is 56 miles by road from Quesnel, the northern terminus of the Pacific Great Eastern Railway.

The company was organized in 1927. The Pinkerton claim was acquired first, then the Rainbow group, previously owned by A. W. Sanders, was bought. Subsequently, the company's holdings have been increased to 106 claims and fractions totalling about 3,600 acres. The present holdings extend in a continuous belt for about 6 miles south-eastward from Mosquito Creek on the north-east slope of Island Mountain to the Westport group on the south-east side of Williams Creek.

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* *Minister of Mines, B.C.*, Ann. Rept., 1929, p. 185.

† By S. S. Holland.

The first underground development consisted of an adit started from Lowhee Creek and driven as a crosscut at a depth of about 400 feet below the surface showings on the Rainbow claim. These showings are now known to be the outcrop of the Sanders zone. The crosscut was stopped short of its objective in 1930 when preparations were begun to drive the 1500 adit at an additional depth of 375 feet and about 100 feet above Jack of Clubs Lake. The 1500 adit, begun in 1931, is now the main haulage-level of the mine and from it the mine-development has proceeded. Raises were put up on the Rainbow, Sanders, Pinkerton, and Butts zones, and the 1200 and 1000 levels driven out to the surface. A connection was made through to the old crosscut adit from Lowhee Creek, and the raise on the Butts zone put through to surface.

Three internal shafts have been sunk from the 1500 level to develop the zones at depth. No. 1 shaft gives access to the No. 1 zone down to the 2000 level, and on the 2000 level a crosscut was started in 1940 and driven 1,300 feet towards the company's holdings on Island Mountain. The No. 2 and No. 3 shafts give access to the Rainbow and Sanders zones respectively and have been sunk to the 1900 level.

In 1938 a start was made to advance the 1500 adit-crosscut towards the B.C. vein. This work was completed to the B.C. vein in 1941, and in the same year the B.C. incline shaft was sunk 926 feet from the surface. The connection between the shaft and the 1500 level crosscut was made in 1942. Very little development-work has been done since 1942. In 1945 the development footage amounted to about 300 feet. To date the total footage of workings is: Drifts and crosscuts, about 21 miles; raises, about 15,000 feet; and shafts, 2,731 feet.

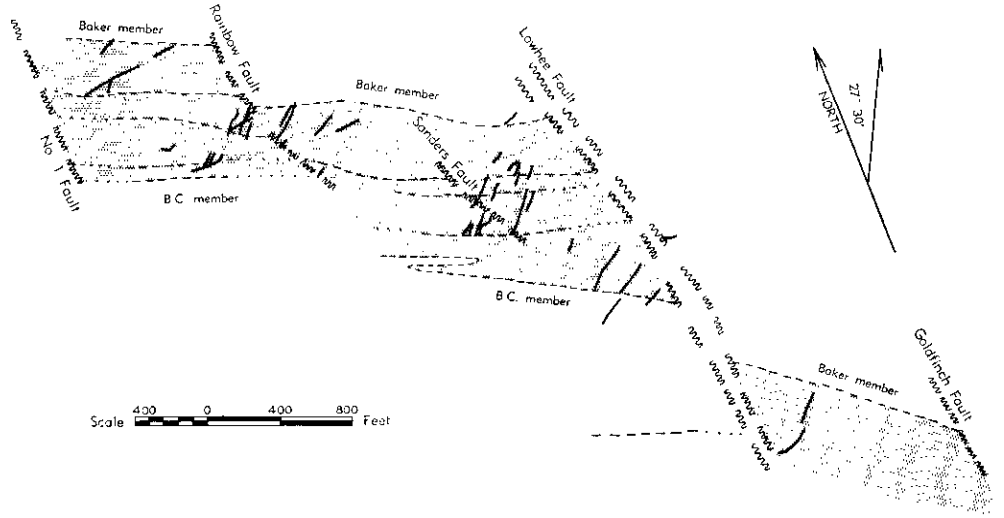
Ventilation, except in long development-headings, none of which have been driven for some time, is still controlled by natural differences between the inside and outside temperatures. Underground temperatures vary between 42 degrees and 51 degrees Fahrenheit.

In January, 1933, the initial mill, with a capacity of 50 tons per day, began operating. The mill capacity was increased to 100 tons daily in 1934; to 150 tons in September, 1935; to 200 tons in July, 1936; to 250 tons in September, 1937; to 300 tons daily by October, 1938; and to the present capacity of 350 tons daily in 1940. Since 1942 the tonnage milled has been limited by labour shortage in the mine. The present mill is a cyanide plant employing continuous counter-current decantation. In 1945, 36,016 tons of ore was mined, from which 13,476 oz. of gold, and 1,131 oz. of silver was recovered. Published company statements show that from 1933 to the end of 1945, 358,424 oz. of gold was recovered from 898,864 tons of ore mined, a recovered content of 0.399 oz. of gold per ton.

The veins of the Cariboo Gold Quartz mine are in a series of argillites, quartzites, and calcareous schists that make up the upper part of the Richfield formation. More especially are the veins found in the Rainbow member, which is one of five members into which the uppermost Richfield rocks have been subdivided. The Rainbow member is overlain by calcareous rocks of the Baker member and underlain by black argillite of the B.C. member. The Rainbow member, within the mine workings, is further subdivided into four map units which are recognizable throughout most of the mine. However, lithologic changes along the strike of the rocks have become sufficiently great to make the units largely unrecognizable on the south-east side of the Lowhee fault.

In the mine the rocks have a north-westerly strike and dip 45 degrees to the north-east. They are cut by northerly-striking faults dipping about 60 degrees east that offset the formations to the right. These faults from north-west to south-east along the Rainbow member are: No. 1 fault with an offset of about 80 feet; Rainbow fault with an offset of about 300 feet; Sanders fault with an offset of about 15 feet; Lowhee fault with an offset of about 1,000 feet; and Goldfinch fault whose offset is not known but may possibly be as much as 800 feet.

Productive quartz veins are localized mainly in the Rainbow member close to the intersections of certain northerly striking faults (*see* Figure 1). As a consequence the following vein-zones are recognized in the mine: No. 1 zone, associated with the No. 1 fault; Rainbow zone, associated with the Rainbow fault; Sanders zone, associated with the Sanders and Lowhee faults; Pinkerton zone, on the foot-wall side of the Lowhee fault; and the Butts zone, on the hanging-wall side of the Lowhee fault. To date most of the ore has been mined from, and about equally divided between, the Sanders and Rainbow zones.



CARIBOO GOLD QUARTZ MINE.

Fig. 1. Plan of the 1500 level, showing the relationship between quartz veins, the five major northerly-striking faults, and the Rainbow member (in stipple pattern). The four subdivisions of the Rainbow member are indicated.

The rock in the vein-zones is fractured in two dominant directions, giving rise to two sets of quartz veins. The set of fractures that strikes about north 30 degrees east represents tensional openings. These are occupied by the transverse veins. The other set of fractures strikes north 70 degrees east to east and is a direction of shear along which some movement may have taken place. This set is occupied by the diagonal veins. The northerly-striking faults, the transverse vein-fractures, and the diagonal vein-fractures appear to be parts of a co-ordinate fracture pattern.

Transverse veins are the most numerous. Their average width is less than 1 foot; most of them are less than 50 feet long and only the exceptional vein is 100 feet long. Diagonal veins are less numerous, and although they are narrow they are commonly wider, and are always more continuous, than the transverse veins. Most are less than 150 feet long, though the exceptional one may be as long as 250 feet.

Both transverse and diagonal quartz veins are mined. In 1945, out of forty working or workable stopes, ten were on diagonal veins. Many veins combine both transverse and diagonal directions, and consequently diagonal veins are seen with offshoots along the transverse fracture direction and transverse veins have offshoot strands along the diagonal fracture direction. Figure 2, drawn from the company's plans, shows horizontal stope-sections on veins of both types. One stope is close to 60 feet wide, yet the individual quartz veins are seldom more than a foot in width. The other stope, X-shaped in plan, shows a complexity of short veins along the two dominant

fracture directions. This stope might be taken as fairly representative of the typical discontinuity of quartz mineralization in plan. The same type of discontinuity exists in a vertical plane.

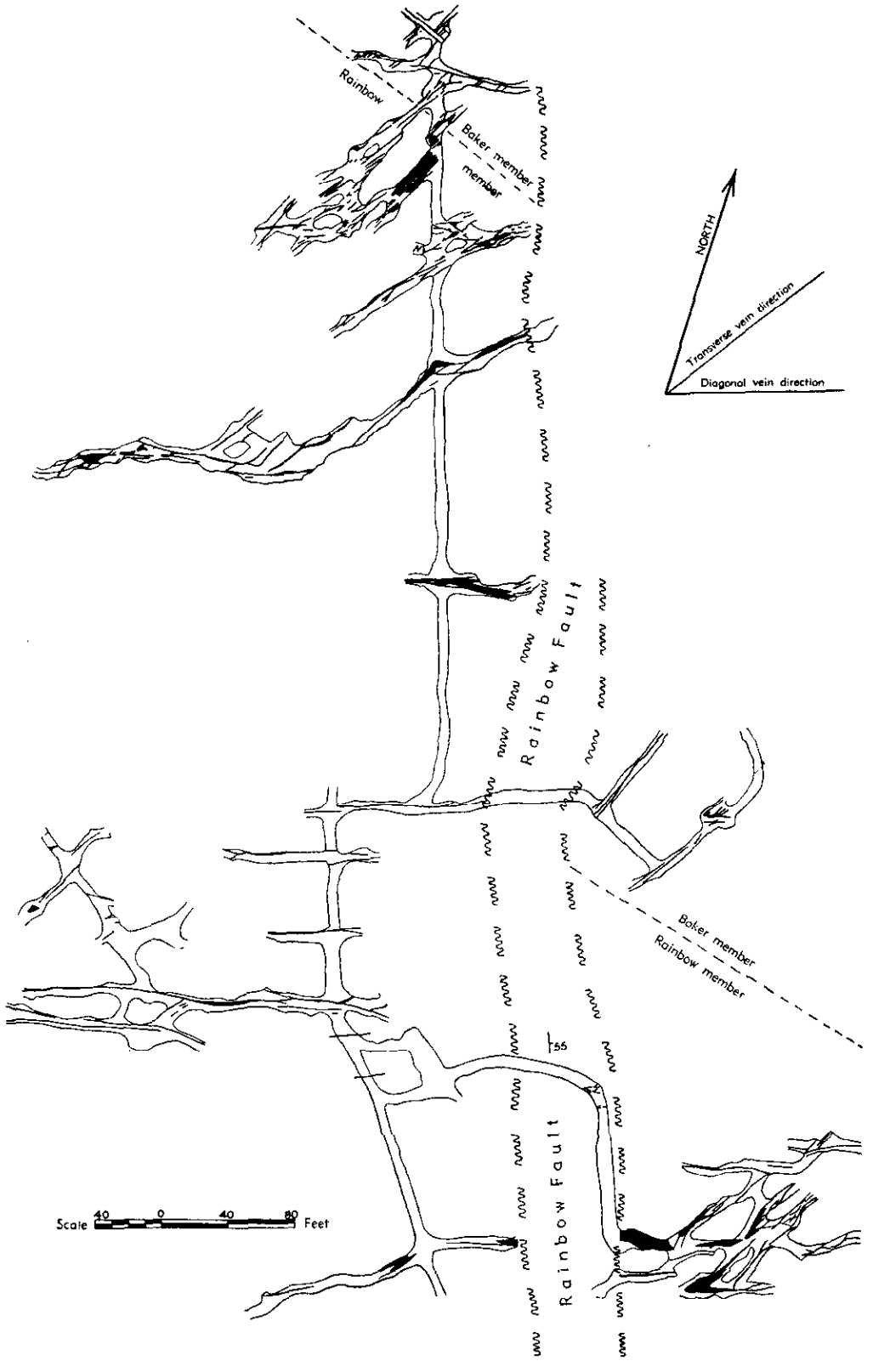
The two vein types are mineralized alike. They are quartz veins whose dominant metallic mineral is pyrite. Commercial grade quartz contains on the average 15 to 25 per cent. pyrite. The wall-rock is pyritized in varying degree but carries less gold than the veins. As a generalization it might be said that pure pyrite from a commercial or near commercial grade vein assays about 2 oz. of gold per ton or better. Other minerals that may be present are galena, sphalerite, arsenopyrite, cosalite, galena bismutite, and bismuthinite. Visible free gold is frequently in or close to nests of cosalite. The vein-quartz also contains ankerite, sericite, and scheelite.

CARIBOO GOLD QUARTZ MINE.

Fig. 2. Horizontal sections through two stopes, showing the way the quartz veins are developed along two vein directions.

The Cariboo Gold Quartz mine is developed on short, narrow quartz veins that individually are small and contain small tonnages of ore. It is only by virtue of the fact that they are so numerous and that their density, or the number of veins per unit area, is so great that they become of economic importance. Figure 3, drawn from the company's plan of the 1800 level, shows the level development in the Rainbow zone largely on the foot-wall side of the Rainbow fault. Most of the veins are within 300 feet of the fault and are in the upper three units of the Rainbow member. Both transverse and diagonal veins are present. More than a dozen major veins are present as well as numerous small ones across a width of about 700 feet measured along the fault. The figure illustrates the vein density in a vein-zone where the veins are slightly more numerous than elsewhere in the mine.

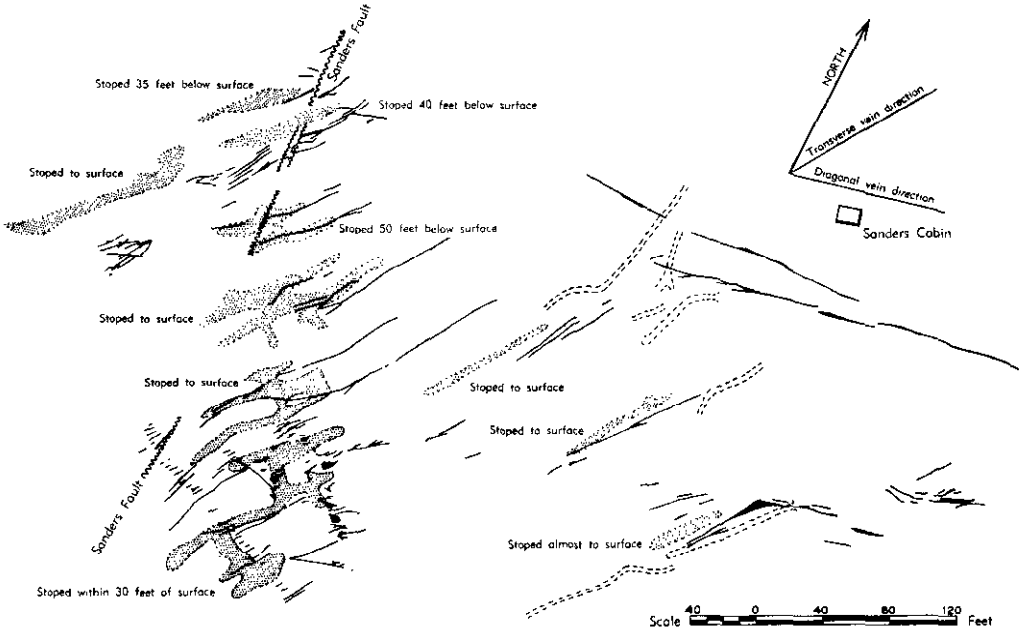
The Cariboo Gold Quartz mine contrasts strongly with the nearby Island Mountain mine where about a third of the tonnage mined comes from pyritic replacement ore.



CARIBOO GOLD QUARTZ MINE.

Fig. 3. Veins developed by the 1800-level workings in the Rainbow zone.

Replacement ore at the Cariboo Gold Quartz mine contributes an insignificant tonnage, yet from time to time pyritic replacement ore-bodies are found. The latest was found in 1944 and was being mined in the autumn of 1945. It is on the 1900 level in the Rainbow zone and lies in the lower part of the Baker member, possibly within 100 feet of the contact with the underlying Rainbow member. The replacement ore was found during the course of drifting north-eastward along a transverse quartz vein. When the rock enclosing the vein and exposed along the drift changed from argillaceous quartzite to limestone, there was a corresponding termination of the quartz vein at the edge of the calcareous beds. From the end of the vein-quartz, pyrite mineralization spreads out in to the calcareous beds and replaces them with pyrite. The ore-body has a maximum width of 7 feet and a length of about 90 feet; its height is not known. The pyrite is coarsely crystalline and occurs in streaks up to 12 inches wide or more lying parallel to the bedding. When drifting along the replacement ore, a second transverse



CARIBOO GOLD QUARTZ MINE.

Fig. 4. Surface workings and shallow adits (in broken outline) on the outcrop of the Sanders zone shown in relation to the veins developed on the 900 level, and stopes above the 900 level (in stippled pattern).

vein was found on the foot-wall side. At the time of examination (September, 1945) the ore had been mined for about 30 feet up the dip and for a stope length of about 90 feet. There appear to be no structural irregularities in the bedding, and at the lateral terminations of the ore the pyrite streaks become narrower and more widely spaced before finally disappearing. The two quartz veins terminating on the foot-wall side of the limey beds suggest that they were feeders for and localizers of the replacement ore at that point.

The primary objective of the company in 1927 and several subsequent years was the underground exploration and development of the surface showings on the Rainbow claim. These original showings are now known to be the outcrop of part of the Sanders zone. A brief description of them may be of value to those engaged in prospecting and initial development elsewhere in the general area. Figure 4 was compiled

from company plans and shows Sanders' open-cuts and shallow surface adits superimposed on the veins developed on the 900 level of the mine some 40 to 125 feet beneath the north-eastward-sloping ground surface. Stopes are shown by a stipple pattern.

Sanders' prospecting and surface work outlined an area about 200 feet square where it was possible to pan residual gold and where there was almost a stockwork of narrow veinlets intersecting bedded stringers. The vein-outcrops were oxidized, much of their pyrite was leached, and the area showed a large amount of rusty weathered rock. The visible open-cuts and short adits are interpreted as meaning that much of his work was done on the outcrops of four transverse veins.

Company development on the 900 level, about 40 feet beneath the surface, indicates that the veins that outcropped did not persist to that depth. At the same time three other sets of transverse veins were found and stoped to the surface at places where Sanders evidently did not uncover any, and certainly where no surface work was done.

Two diagonal veins, shown on Figure 4 just south of Sanders' cabin, were found by the company development on the 900 level. One was stoped to the surface at its eastern end.

Veins were most numerous in that part of the zone closest to the Sanders fault. Of seven stopes in that section, four terminated from 30 to 50 feet below the surface and three broke through to the surface. It seems remarkable that this area, about 350 feet long, 150 feet wide, and only 150 feet west, up the hill, from Sanders' surface workings, was not found in the early prospecting. Actually, more ore was mined from immediately beneath the surface of this area than from the near-by area that Sanders explored on the surface.

[References: *See* Rainbow, *Minister of Mines, B.C.*, Ann. Repts., 1922, p.119; 1924, p. 117; 1925, p. 149. *Minister of Mines, B.C.*, Ann. Repts., 1927, p. 169; 1928, p. 194; 1929, p. 190; 1930, p. 166; 1933, p. 120; 1934, p. C 20. *Geol. Surv. Canada*, Sum. Rept., 1933, Pt. A, pp. 44–48; Mem. 181, 1935, pp. 22–25. *The Miner*, August, 1938, pp. 44–53.]

Island Mountain Mines Co., Ltd.* (53° 121° S.W.) Company office, 744 Hastings Street West, Vancouver, B.C.; mine office, Wells, B.C.; F. W. Guernsey, President; H. E. Dodge, Secretary-Treasurer; J. A. Pike, Mine Manager. C. Caldwell, who has been Mine Foreman for the past two years, was recalled to Eastern Canada and was replaced by P. L. Clark. Capital: 1,100,000 shares, 50 cents par; issued, 1,050,716. This company operates the Island Mountain mine on the north side of Jack of Clubs Lake across from the Cariboo Gold Quartz mine.

About the middle of October, after watching the crew dwindle for several years, the management noted a sudden increase in the number of applications for work. By the end of October the influx of new men was so great that it was necessary to cancel a standing order for muckers until more experienced miners or timbermen could be hired or trained. Steps were taken immediately to catch up with the maintenance-work that had been neglected for some time because of the lack of men.

Exploratory and development work although reduced was done to good advantage. One crew of drillers was engaged until June in drilling for replacement ore.

On the 3375 level a drift was driven to one of the diamond-drill intersections which had cut a body of replacement ore. On the 3125 level a start was made for the first time to crosscut the Aurum fault to explore for replacement ore on the east or hanging-wall side of it. This work was stopped in the fault as neither space for the waste nor men to do the work were available. Practically all waste is used for fill; none is trammed to outside dumps unless it is absolutely necessary to do so.

Production was maintained at a good rate. The miners who stayed with the company during the war became very efficient. Working in big stopes, they probably

* By J. A. Mitchell.

produced more ore per man-shift than can ever be expected again. About two-thirds of the tonnage milled was from quartz veins and about one-third was from replacement ore-bodies in limestone.

There were no changes in stoping methods during 1945. It is proposed, however, to try a new system of obtaining fill by slashing it in checker-board fashion from both walls. The slashes will be drilled at the same time as the ore but will be blasted after the ore is removed.

A safety committee, composed of both mine officials and employees, makes regular monthly inspections and reports its findings at a meeting following each inspection. The mine manager presides at the meeting, which is attended by all mine officials and the safety committee. After discussing each point, recommendations for correcting the unsafe practice or condition are made. If not put into effect promptly, the recommendations are kept in the minutes of each monthly meeting until they are carried out. Other matters pertaining to safety are also brought up at the meetings. This arrangement keeps down accidents, as is shown by the company's good record year after year. Conditions were found to be satisfactory on all visits made by the Inspector of Mines. The Inspector of the Silicosis Branch, Workmen's Compensation Board, commended the management, staff, and crew for their efforts and success in applying dust-prevention.

A labour-management efficiency committee, composed of three members of the staff and three members of the union, was inaugurated.

Anticipating a housing shortage, the company purchased several lots, on which houses will be built as soon as labour and materials are available.

Because a moving clay-bank at the back of the mill was pushing the building off plumb, it was found necessary to remove the old cribbing, cut away part of the bank, and put in new cribbing. Water-lines that had been in the ground for ten years were also replaced.

In order to keep the total weight of skips, rope, and load below the limit of the rated rope pull of the hoist, when pulling from lower levels, it was necessary to replace the old skips with new ones of lighter design. The hoisting signals were also changed so that only the cage-tender may signal the hoistman. With this new system, the cage-tender answers the call-bell and the hoistman answers the cage-tender's bell, which is the only one that rings in the hoist-room.

Development-work done in 1945 included 382 feet of drifting, 40 feet of sinking, and 2,121 feet of diamond-drilling. A total of 22,614 tons of ore was mined and milled, yielding 10,071 oz. of gold and 1,209 oz. of silver. The average number of men employed was eighty-five.

Canusa Cariboo Gold Mines, Ltd.*

(53° 121° S.W.) Company office, 306 Crown Building, Vancouver, B.C.; John Dunsmuir, President. Capital: 3,000,000 shares, 50 cents par; issued, 1,202,605. The company holds twenty-four mineral claims and fractions lying south-west of the heads of Lowhee Creek and Stouts Gulch. Of these, the Black Bull and Waoming are old Crown grants which together with the New Black Bull Quartz, Blue Jay, Stouts, and Stouts Fraction mineral claims adjoin the St. Laurent, Cariboo, and American mineral claims belonging to Cariboo Gold Quartz Mining Company, Limited.

The showings lie on ground to which reference was made in the Annual Report of the Minister of Mines for 1933, page 124, under Cariboo Central Gold Mines Company and Blue Jay group. At that time a crosscut adit was driven about 170 feet on the Blue Jay claim; the portal is at the present Lowhee camp. In the Annual Report of the Minister of Mines for 1940, page A 56, reference is made to some further work being done by Cariboo Rainbow Mines, Incorporated. Hanson describes some of the

* By S. S. Holland.

showings under "Upper Stouts Gulch" in Geological Survey, Canada, Memoir 181, page 27.

The company's claims on the upper parts of Lowhee Creek and Stouts Gulch are underlain across a width of 1,200 to 1,500 feet by grey quartzite and argillaceous quartzite of the Lowhee member of the upper Richfield formation. On the south-west side of the Lowhee member are black argillites of the Basal member. These rocks near Watsons Gulch, on the Black Bull and New Black Bull Quartz claims, are cut by the northerly-striking Lowhee fault. The possibility that two other faults, to the east of the Lowhee, may cross the Blue Jay and New Black Bull Quartz mineral claims is suggested by abrupt, presumably fault, terminations of the south-east end of the Black Bull quartz vein exposed in the Lowhee hydraulic cut, and the north-west end of the B.C. quartz vein partly exposed by surface-stripping on the American mineral claim.

The company's showings are reported to comprise two quartz veins in Emory Gulch, three groups of quartz veins in upper Stouts Gulch, a quartz vein in the Lowhee hydraulic pit, and the Black Bull quartz vein exposed south-east of Watsons Gulch in the bottom of Lowhee Gulch.

The reported showings in Emory Gulch were covered with hydraulic tailings at the time of examination and were not seen.

Of the three groups of quartz veins mentioned by Hanson in upper Stouts Gulch, only two groups were exposed to view.

The first is a group of transverse quartz veins exposed about 900 feet south-east of the head of Stouts Gulch, on the Stouts Fraction and Midnight Fraction mineral claims. The rocks cut are grey argillaceous quartzites of the Lowhee member which strike north 75 degrees west and dip 40 to 50 degrees north. The veins, with one exception, strike north 20 degrees east and dip steeply west. Across a distance of about 170 feet seven veins are exposed for lengths ranging from 15 to 75 feet. The widths of individual veins vary along their lengths and reach a maximum of 14 to 16 inches in several instances. These veins were originally uncovered by the old hydraulic operations.

Three samples of selected heavy pyritic concentrations were taken for assay. A sample containing about 50 per cent. pyrite assayed 0.14 oz. of gold per ton, another containing about two-thirds pyrite assayed 0.09 oz. of gold per ton, and a third sample of almost solid pyrite assayed 0.07 oz. of gold per ton.

A thin band of pyritic replacement of quartzite, commonly 1 to 2 inches wide but in one place 12 inches wide, extends out from one of the westernmost veins. The length of the band is obscured by hydraulic tailings. A sample of the pyritic replacement material, containing about three-quarters pyrite, assayed 0.70 oz. of gold per ton.

A second group of narrow transverse quartz veins is exposed in the bottom of the by-wash creek about 300 feet from the head of Stouts Gulch. Five veins were seen, ranging from 1 to 4 inches in width and exposed across the creek-bottom for a length of 10 feet. A sample from one vein 4 inches wide and containing about 25 per cent. pyrite assayed 0.24 oz. of gold per ton.

The head of Lowhee pit is about 200 feet from the head of Stouts Gulch and is close to the south boundary of the Blue Jay mineral claim. It is reported that the hydraulicking in Lowhee pit in 1945 uncovered a north-easterly-striking quartz vein as much as 5 feet wide. Bed-rock was not exposed in the pit so no vein was seen.

Finally, a very large quartz vein is exposed in the bottom of Lowhee Gulch extending from its north-western termination at the Lowhee fault at Watsons Gulch south-eastward for about 850 feet. It terminates abruptly at the south-east end and presumably is cut by a fault that would strike about north. The vein is parallel to the strike of the enclosing rocks and ranges from 4 to 12 feet in width. Any original pyrite has been leached from the vein-outcrop. No attempt was made to sample this vein.

Barkerville Mining Co., Ltd.

(53° 121° S.W.) This is a new company formed by Pioneer Gold Mines of B.C., Limited, to explore and develop the Proserpine group of claims and other ground in the Cariboo acquired by option or by staking. C. E. Gordon Brown is in charge of operations. A new road to the Warspite workings was built. It starts from the Barkerville–Hudson Road just outside Barkerville, crosses Conklin Gulch, and runs along the north-west spur of Proserpine Mountain. It is approximately 17,000 feet long and rises steadily on an easy grade all the way. To obtain geological information, more than 10,000 feet of bulldozer stripping was done on the Proserpine, Rex, and Elsie groups on Proserpine Mountain.

Exploratory work was also done on several other groups, one of which includes the old Hardscrabble mine on the Willow River north-west of Island Mountain.

Wellknown and Unknown.

(53° 121° S.W.) Two groups of claims, the Wellknown Nos. 1 to 8 and the Unknown Nos. 1 to 8, were staked in the autumn of 1944 by W. H. Armstrong and Q. C. Heppner, of Wells, at the junction of Cooper Creek and Sugar Creek. The claims are about 9 miles by road and trail north-west of Wells. The claims cover veins that had been staked previously and upon which work had been done in 1934 (*see* Annual Report of the Minister of Mines, British Columbia, for 1934, page C 26).

Armstrong and Heppner continued prospecting and exploratory stripping and are reported to have found the vein-source of gold-bearing float.

PERKINS PEAK.*

Gold.

Bluebell.

(51° 125° N.E.) This group is on the north-west flank of Perkins Peak at an elevation of over 7,000 feet. The group was optioned during 1945 by T. Corless, of Quesnel, and associates from P. Evjen and partners, of Kleena Kleene and vicinity. A contract was given for some tunnel-work in October, 1945. It was reported that a 125-foot crosscut intersected the vein some distance below the outcrop where it was still heavily oxidized. It is understood that the occurrence consists of several lenses and stringers of quartz and bunches of pyrite and arsenopyrite mineralization along a sheared contact between light-coloured silicified quartzite and black graphitic argillite. In this respect it is similar to the main showings on the Mountain Boss group to the east and is probably a continuation of those showings. The geology of the area and the showings on the Mountain Boss group are described under the heading "Perkins Peak Section" on page F 38 of the Annual Report of the Minister of Mines for 1938.

TASEKO LAKE.*

Gold.

Taylor Windfall Gold Mining Co., Ltd.

(51° 123° S.E.) Company office, 612 Hall Building, Vancouver, B.C. Capital: 2,000,000 shares, $1 par; issued, 1,910,333. This company owns and has operated intermittently the property of the same name located on Battlement Creek near its junction with the Taseko River about 12 miles south-east of Taseko Lake. A very detailed description of this property is given in the Annual Report of the Minister of Mines for 1935. Since that report was written, the main shaft has been deepened and the 200 and the 300 levels have been opened up on the blind vein which was referred to in the report. Considerable drifting and crosscutting was done before the war brought about a cessation of activities in 1939.

In 1945 funds were raised to carry out a diamond-drilling programme based on recommendations of the company's engineer. The job was given to D. & B. Drillers,

* By J. A. Mitchell.

Limited, and the machinery was brought to the property late in the fall. Lack of facilities in this relatively inaccessible area coupled with the early arrival of cold weather made it impossible to drill more than two holes, the results of which were inconclusive. The drill was left at the property so that the programme could be continued without undue expense and delay in the spring. The lowest adit workings were cleaned out and drained.

Hido, Pellaire Mines, Ltd.

(51° 123° S.W.) This company was incorporated under an Ontario charter by the Quebec Gold Mining Corporation (offices, 184 Bay Street, Toronto, Ont., and 148 Royal Bank Building, Vancouver, B.C.; Col. Rainville, President; F. C. Buckland, Consulting Engineer) to take over and develop the Hido group of claims as well as adjoining ground subsequently staked. A detailed report of the Hido group is given in the Annual Report of the Minister of Mines for 1937.

The principal showings of this group consist of a series of quartz veins striking north-easterly across one spur of a northerly trending ridge which is 8,000 feet high. This ridge lies between the Lord River and Falls Creek; the showings are about 6 miles south-west of the south end of Taseko Lake. The veins outcrop in granite but they dip north-westward at a steep angle towards a complex of volcanic rocks. The veins are numbered 0 to 5 from south to north. Numbers 0 to 3 are either poorly exposed or contain low values where they are exposed, and no work has been done on them beyond that described in the Annual Report of the Minister of Mines for 1937.

Vein No. 4 is a particularly strong lead which outcrops boldly, trending diagonally down the east side of the spur from its crest to a talus-slope close to the granite-greenstone contact. The vein is hidden under granite talus slides on the west slope of the ridge, but crushed quartz exposed at several points is assumed to belong to this lead.

Vein No. 5 is parallel to vein No. 4 and lies about 100 feet north-westerly from it. Its outcrop is not nearly as strong as that of No. 4.

Results of sampling No. 4 and No. 5 veins were considered sufficiently attractive by officials of the Quebec Gold Mining Corporation to merit further exploratory work, so an option was taken on the property and adjoining ground was staked. The holdings now comprise about eighty claims which cover both sides of Falls Creek and extend about 1,900 feet down the Lord River slope of the main ridge.

A comfortable temporary camp was established at timber-line, elevation 6,600 feet, and a diamond-drill was brought to the property.

Hole No. 1 was collared on the crest of the ridge about 100 feet north of where the ridge is crossed by No. 5 vein and about 280 feet north of where it is crossed by No. 4 vein. This hole was drilled south 50 degrees east at minus 60 degrees and cut both veins in the granite; No. 5 at 70 feet from the collar and No. 4 somewhere between 268 and 284 feet from the collar. The latter intersection was poor inasmuch as the wall-rock, as on the surface, was badly decomposed on both sides of the vein and did not core well. The quartz in the vein was also badly crushed and full core-recovery was not obtained.

Hole No. 2 was drilled vertically downward from the same set-up. It also cut both veins in wide zones of decomposed granite; No. 5 at 94 feet and No. 4 at 450 feet from the collar.

Hole No. 3 was collared 100 feet to the north of the previous two holes and was drilled vertically downward. It cut No. 5 vein at 190 feet in an altered zone extending from 183 to 200 feet. It entered greenstone at 361 feet, and it is understood that it cut No. 4 lead in that rock before the water-supply froze and forced a shut-down until spring.

The water was obtained from a cirque west of the showings and east of the main ridge. It was pumped through 2,900 feet of 1-inch pipe against a difference of eleva-

tion of 530 feet. The drilling, which totalled 1,453 feet, was done by Keyes Construction, Limited, on a two-shift basis. A Boyles Brothers B.B.S. gasoline-driven drill was used. Including drillers, the crew totalled twelve.

It is proposed to build a road to the property, as soon as conditions permit, to bring in supplies for driving a long crosscut to explore the veins at depth.

BRIDGE RIVER.*

Gold.

Pioneer Gold Mines of B.C., Ltd. (50° 122° N.W.) Company office, 470 Granville Street, Vancouver, B.C.; mine office, Pioneer Mines P.O., B.C.; V. Spencer, President; A. E. Bull, Secretary-Treasurer; H. T. James, Managing Director; E. F. Emmons, Mine Manager; H. A. Rose, Mine Superintendent; P. Schutz, Mill Superintendent. Capital: 2,500,000 shares, $1 par; issued, 1,751,750. This company owns and operates the Pioneer mine on Cadwallader Creek, upper Bridge River.

The favourable development of the "27" lead at depth has added a number of years to the life of the mine. Extensive repairs, which would have to be done eventually, were done in 1945 while men were still scarce for underground work and the mine could be shut down without putting any one out of work. The No. 2 shaft was retimbered from the 500 level to the collar. This work included retimbering the station at the 200 main adit, commonly referred to as the "water tunnel." It also included placing cement-work at the collar and for some distance below it, where heavy overburden had displaced the shaft timbers to the extent that the cage could not be taken through to the surface. While this work was being done, access by shaft to the "27" lead was impossible and the development was discontinued. Consequently, no ore was being delivered to the mill and advantage was taken of the shut-down to make some repairs there. Parts of the mill-floor were concreted. The pipe-line to the mill power plant was replaced by 36-inch continuous wood-stave pipe.

During the period that the mine was being worked, a small tonnage of ore was delivered to the mill from broken reserves. Some ore was obtained also from the development of the "27" lead. A total of 10,528 tons was mined and 9,039 tons was milled, yielding 4,944 oz. of gold and 690 oz. of silver. The development consisted of 1,538 feet of drifting, 560 feet of crosscutting, and 2,284 feet of diamond-drilling. Some work was done in advancing the Taylor tunnel on the Eagle Fraction.

Bralorne Mines, Ltd. (50° 122° N.W.) Company office, 555 Burrard Street, Vancouver, B.C.; mine office, Bralorne P.O., B.C.; A. C. Taylor, President; R. H. Grace, Secretary-Treasurer; M. M. O'Brien, Managing Director; D. N. Matheson, Mine Manager; C. M. Manning, Mine Superintendent; A. A. Almstrom, Mill Superintendent. Capital: 1,250,000 shares, no par value; issued, 1,247,000. This company owns and operates the Bralorne mine on Cadwallader Creek, upper Bridge River, about 50 miles by road from Bridge River Station on the Pacific Great Eastern Railway. Development in 1945 consisted of 5,220 feet of drifts and crosscuts, 717 feet of raises, and 7,145 feet of diamond-drilling.

During 1945 development-headings were opened up on the 100, 200, 300, 1600, and 2000 levels on the "51" vein. This work revealed two very good ore-shoots in the 1651 West drift. A shoot of ore across 4½ feet was opened up in the 2051 East drift.

Drifting west on the "53" vein on the 1200 and 1500 levels developed two excellent shoots on the 1200 and a shoot 145 feet in length on the 1500 level.

On the 1500 and 1800 levels some development-work was done on the "77" vein. The connection between the Crown and Empire shafts on the 1800 level was completed by driving a crosscut to the Empire shaft from the 1877 East drift. This improved the ventilation on the lower levels. The ventilation of the lower levels was improved also

* By J. A. Mitchell.

by the installation of two new fans of axial flow design, each with a maximum capacity of 30,000 cubic feet per minute.

No development or extraction was done in the Coronation or King mines during 1945.

Surface work done during 1945 consisted of replacing the foundations of several houses and of replacing 3,500 feet of the 36-inch pipe-line to the mine power plant with creosoted fir-stave pipe, which has an expected life of thirty years. The new pipe eliminates flooding of part of the highway, which used to be a hazard in winter.

The man-power shortage was critical during the greater part of 1945. From a high of 149 men on the underground crew in January, the total gradually decreased to 93 in July and then gradually increased to 186 at the end of November. At this time it was found necessary to reopen the Bradian Camp. The surface crew remained almost constant at about 100 men. The total number of shifts worked to the end of November was 78,601. During this time, on the surface and underground, there were two fatal accidents and 56 accidents involving more than six days' lost time.

Milling was normal during 1945 with the exception of periods when development-work on the "53" vein produced large amounts of serpentine which caused depressing effects in the flotation circuits. Metallurgical tests were carried on with the object of increasing the mill capacity by the use of cyanidation. A total of 110,410 tons of ore was mined and 105,283 tons was milled. This yielded 57,364 oz. of gold and 15,570 oz. of silver.

Bralorne Mines, Limited, also has an option on the Elizabeth group on Blue Creek, a tributary of the Yalakom River, about 45 miles north of Lillooet. It also held a working option for a short time during 1945 on the Ranger group of claims.

Panger. (50° 122° N.W.) This group is situated near the head of a tributary of Truax Creek, about 4 miles south of Minto P.O. and 4 miles east of Gold Bridge P.O. The group was staked in the fall of 1944 by C. Ault, a grantee under the "War-time Prospectors' Grub-stake Act," after he had discovered interesting float in the slide-rock. It was turned over to a syndicate of ten and funds were raised for surface exploratory work. When well-mineralized quartz was found in place, the property was optioned to Bralorne Mines, Limited. The company drilled three diamond-drill holes which failed to reach solid rock. The vein was followed for about 25 feet in a surface cut and an adit which exposed vein-matter with a maximum width of about 8 feet. The vein-matter and the adjoining wall-rock, however, were so crushed and decomposed that the attitude and continuity of the vein were in doubt. The adit is at about 8,000 feet altitude, well above the timber-line. Early snow and cold weather made it difficult to obtain water for drilling, and the location of the showing made it impossible to find timber or a suitable camp-site close to the working. The Bralorne Company dropped its option on the property which, during the life of the option, was known as the Ben d'Or. The decomposed quartz-sulphide mineralization of the principal showing contains sufficient gold per ton to warrant further careful prospecting.

Gruff Wihksne Gold Mines, Ltd. (50° 122° N.W.) This company is doing exploratory work on its property lying on both sides of Cadwallader Creek, north-westerly from the Bralorne mine. The company's engineers reported favourably on this property early in 1945 and proceeded to make a large-scale geological map of the surface to assist in a proposed exploratory programme. Two areas were selected as being worthy of investigation; namely, the Don claims on the projected continuation of the greenstone intrusive, and the soda-granite-albitite area on the Alma and Millbank claims.

Trenching was done on the Don claims north of Bralorne, and Pioneer-type greenstone in contact with the Fergusson series of sedimentary rocks was exposed. The

heavy overburden, however, made it impractical to continue this work at present and it was decided to work on the Alma showings.

Old trenches in the soda-granite on the Alma claim were cleaned out and a long trench was extended in soda-granite 150 feet to the south.

Another trench 200 feet long in albitite in this area exposed a shear. Although gold was panned in the shear at the surface it was not found in a shallow winze sunk on the shear.

The soda-granite area was also tested by diamond-drilling. The first hole was drilled in a westerly direction from a set-up close to the road which leads to the camp. It was in albitite to 425 feet, soda-granite to 675 feet, and in greenstone to the end of the hole at 1,059 feet. A quartz vein was intersected at 616 feet in the soda-granite. A second hole is being drilled but information on it has not been made available yet. During 1945 the average number of men employed was two.

Pinebrayle Gold Mines, Ltd. (50° 122° N.W.) Company office, 602 Rogers Building, Vancouver, B.C.; T. C. Botterill, Manager; V. Dolmage, Consulting Engineer. This company was formed to acquire and develop a group of thirty-one claims extending along Cadwallader Creek on the western boundary of the Bralorne holdings. The initial programme included surveying, general prospecting, and trenching. One drill-hole, drilled in a direction south 30 degrees west for 1,250 feet at minus 47 degrees about half a claim-length south of the Alma showing on Grull Wihksne ground, passed througth argillaceous and cherty sedimentary rocks into intrusive rocks.

Bridge River Consolidated Gold Mines, Ltd. (50° 122° N.W.) Company office, 140 Stock Exchange Building, Vancouver, B.C.; mine office, Gold Bridge, B.C.; C. Rutherford, Consulting Engineer; H. L. Hill, engineer in charge of operations. Capital: 4,500,000 shares, $1 par; issued 2,761,131. This company owns and is exploring the property of the same name located on the Hurley River above its confluence with the Bridge River.

A major programme was started in 1944 to explore the diorite-belt lying adjacent to the serpentine exposed on both sides of the Hurley River on the Ural and Forty Thieves claims. A pilot road was built with great difficulty and at considerable expense through rock-slides and rough terrain to a point below the almost inaccessible outcrop of the Forty Thieves vein. This vein crops out on the precipitous cliffs on the east bank of the Hurley River. By the end of 1944 three diamond-drill holes, directed at the Whynot and Jewess veins, were completed.

The programme was continued throughout 1945. The road was extended about 300 feet, making it 3,300 feet long from the B.R.X. Arizona adit to the portal of the new B.R. Consolidated Ural adit. This adit is collared about 50 feet above the Hurley River in crushed rock under a shallow mantle of slide material. The condition of the ground around the portal made it necessary to put in a substantial cribbing 120 feet long and 20 feet high above and on both sides of the portal. The adit was advanced 123 feet through crushed surface rock, serpentine, and greenstone by using a portable compressor.

To obtain information prerequisite to driving this adit and to the proposed drilling programme from underground, eleven holes, totalling 4,742 feet and located at intervals along the Hurley River, were drilled on the Ural claim. The diorite-serpentine contact was found to strike north 15 degrees west and to dip 65 degrees to the west; that is, under the Hurley River. Holes which intersected the Forty Thieves vein showed subcommercial values.

A 3,000-foot power-line leads from the main Bridge River power-supply at Brexton to a new 500-cubic-foot compressor which was set up close to the portal of the Ural adit.

This unit will expedite greatly the underground development programme. During 1945 the average number of men employed was nine.

B.R.X. Mines, Ltd. (50° 122° N.W.) Company office, 616 Stock Exchange Building, Vancouver, B.C. Capital: 5,000,000 shares, 50 cents par; issued, 3,850,000. The company owns and is developing the property of the same name lying along the east side of the Hurley River above the town of Gold Bridge. E. R. Shepherd is in charge of the development programme.

To date this programme has consisted of diamond-drilling. During 1945 the California adit, located at the edge of the highway south of the main camp, was cleaned out and retimbered. A compressor was moved up from the portal of the Arizona adit and housed on the California waste-dump. Power to run it was obtained from the British Columbia Electric Railway Company's power-line which passes close by. A station was then cut at the end of the California adit and four steep drill-holes, striking from south 80 degrees west to south 40 degrees west, were fanned out to test the California vein and adjacent ground at depth. Hole No. 1 was drilled at minus 84½ degrees for 925 feet; hole No. 2 was drilled at minus 74 degrees for 1,023 feet; hole No. 3 was lost at 279 feet; and hole No. 4 was not completed at time of writing. These holes all intersected alternate bands of greenstone and diorite.

During 1945, 3,297 feet of diamond-drilling and 23 feet of raising were done. The average number of men employed was five.

Paymuck. The Bridge River Exploration, Limited, has taken an option on a group of claims on Marshall Ridge, about 5 miles north-west of Rexmount P.O. Some tunnelling and trenching was done on several showings at an elevation of about 4,800 feet.

Mineralized outcrops were discovered in 1944 on the ridge near the old Summit workings by L. J. Russell, a grantee under the "War-time Prospectors' Grub-stake Act." The Summit showings are described in the Summary Report of the Geological Survey of Canada for 1912.

Pacific (Eastern) Gold Mines, Ltd. (50° 122° N.W.) This is a company incorporated by the Quebec Gold Mining Corporation (offices, 184 Bay Street, Toronto, Ont., and 148 Royal Bank Building, Vancouver, B.C.; Col. Rainville, President; F. C. Buckland, Consulting Engineer) to acquire title to and to continue development of the Pacific Eastern group of claims lying on both sides of Cadwallader Creek above the Pioneer mine. Additional ground in this area was acquired also.

A geological survey was made of the ground held and the information obtained was plotted on maps and sections on a scale of 300 feet to the inch. Drilling was started then to check the developed theories and to gain further information. The first hole was collared on the south side of Cadwallader Creek about 1 mile above the camp buildings. It was drilled north 27 degrees east at minus 45 degrees to check formations in the regional anticline but it was lost at 220 feet while it was still in bouldery overburden. A second hole was collared on the opposite limb of the fold and was directed downwards at south 37 degrees west towards the axis of the fold but was lost in a fault at 438 feet after passing through a band of serpentine which lies on the hanging-wall of the greenstone on this limb of the fold. The third hole was given the same attitude as the second but was started off with a 6-inch casing and, after much difficulty, was drilled to the greenstone which was separated from the serpentine by a narrow band of conglomerate. The greenstone and the serpentine are abundantly mineralized with pyrite. During 1945 a total of 1,398 feet of diamond-drilling was done.

The old workings are being cleaned out preparatory to starting an extensive shaft-sinking and crosscutting programme at depth.

Minto Gold Mines, Ltd. (50° 122° N.W.) Company office, 102 Pacific Building, Vancouver, B.C. Capital: 4,000,000 shares, no par value; issued, 3,800,000 shares; under option, 200,000. A detailed description of this property is given in the Annual Report of the Minister of Mines for 1936. Since that report was written, the shaft has been sunk 347 feet farther and the 700 level has been opened up. Also, a station was cut at the 600-level horizon. The last of the treasury stock was sold in 1944, and the HiWay Construction Company, of Spokane, Washington, was employed to do some surface drilling.

After failure to get the desired results from the surface drilling done in 1944, it was decided to move the drill underground. Accordingly, a gasoline compressor was set up and the shaft was unwatered to the 600-level station. The seven holes drilled are described briefly from information submitted by W. Davidson, who directed the drilling.

The first hole was drilled to a depth of 501 feet in a direction north 32 degrees west at minus 20 degrees from the 400-level shaft station.

The second hole was drilled horizontally from the 500-level station in a direction north 74 degrees east for 75 feet. It was in the greenstone which occurs below the east-west fault cut by the shaft below the 400 level.

The third hole was drilled from the 500-level station in a direction north 36 degrees east for 116 feet at minus 34 degrees. It cut greenstone and was stopped at a flat fault indicated in the bottom of the shaft.

The next four holes were all drilled from the 600-level station. The fourth went north 75 degrees east at minus 74 degrees for 400 feet. It passed through sedimentary rocks below the flat fault.

The fifth went north 80 degrees east at about minus 50 degrees for 460 feet. It cut the lead in greenstone just above the flat fault and then entered serpentine below the fault. The lead was so close to the fault that it was badly broken and core recovery was poor.

The sixth hole was drilled for 168 feet in a direction south 71 degrees west at minus 72 degrees. It revealed a duplication of surface formations.

The seventh hole was drilled north 60 degrees east at minus 60 degrees for 547 feet. It passed into serpentine below the flat fault but entered what appeared to be brecciated greenstone and talcose stringers in the last 20 feet.

Olympic Gold Mines, Ltd. (50° 122° N.W.) Company office, 744 Hastings Street West, Vancouver, B.C.; G. S. Eldridge, President. Capital: 1,500,000 shares, no par value; issued, 924,903. This company owns the Olympic group of claims on the south side of the Bridge River opposite Minto. The property is fully described in the Annual Report of the Minister of Mines for 1934 and further work is noted in the report for 1935. Since then the property has been idle until the present programme of diamond-drilling was begun early in 1945.

Several drill-holes were put down, from a point on the surface adjacent to the lower adit, to explore the shear at shallow depth. It is reported that one or two interesting intersections were obtained.

The drill was then moved underground and a series of holes laid out to intersect the shear from the end of the lower adit. A short crosscut was also driven and a shaft collared at the end of it 75 feet above an interesting intersection obtained in drilling from the surface. The work is being done by Keyes Construction under the supervision of J. H. Marshall.

Hillstake Mining Co.—(50° 122° N.W.) This company owns some thirty-one claims that include the ground of the Reliance property on the south side of the Bridge River, opposite the Congress mine. During 1945 one man did 50 feet of crosscutting for E. R. Shepherd.

Congress Gold Mines, Ltd.

(50° 122° N.W.) Capital: 4,000,000 shares, $1 par; issued 3,096,839. This company owns and is developing the Congress mine which lies between Gun Creek and Bridge River a short distance south-west of Minto P.O. The property is described fully in the Annual Report of the Minister of Mines for 1936. Intermittent prospecting since then has resulted in the discovery of some interesting ore occurrences along the Gun Creek slope.

The present programme of the company calls for a 500-foot winze on the vein from the old hoist-chamber site on the third level. During 1945 a compressor-house, blacksmith-shop, change-house, office, pump-house, and tank were built. The compressor is a well-installed 500-cubic-foot Ingersoll-Rand machine which is belt-driven from a rebuilt 100-horse-power motor. Power is obtained from the British Columbia Electric Company's power-line which runs close to the plant.

The portal of the third level was cleaned out and retimbered. The bottom was taken up for a distance of several hundred feet from the portal and new track was laid to the winze-site. At the time of writing the rope raise for the winze is being completed.

B. W. W. McDougall is consultant and E. Hansen is in charge at the mine.

Pilot Gold Mines, Ltd.

(50° 122° N.W.) Company office, 410 Seymour Street, Vancouver, B.C.; A. B. Wing, President and General Manager; J. H. Marshall, Foreman. Capital: 3,000,000 shares, no par value; issued, 2,450,000. This company has done some development-work on the Pilot mine on the west side of Gun Lake. The property is described in the Annual Report of the Minister of Mines for 1934 and subsequent work is noted in the 1935 and 1936 reports.

After the 300-level crosscut was stopped in 1937, a diamond-drill hole passed through several feet of quartz about 33 feet ahead of the face. In 1945 the crosscut was advanced 109 feet to investigate this occurrence. In the vicinity of the drill-hole intersection it entered a zone of altered diorite in which small quartz stringers were numerous. Apparently the diamond-drill had passed along one of the stringers. This zone was drifted on for 40 feet towards Gun Lake.

Work done in 1945 consisted of unwatering the shaft, erecting a new head-frame, and driving 109 feet of crosscut and 40 feet of drift. Drifting had to be discontinued when the water-supply in Walker Creek became too low to run the 200-horse-power Pelton plant, with the result that the shaft could not be kept unwatered.

Golden Ledge Syndicate.

(50° 122° N.W.) Company office, 503–6 Rogers Building, Vancouver, B.C.; J. S. Harrison, President; J. Graham, Foreman. This is a private syndicate which owns and is doing intermittent work on its group of twenty-one Crown-granted claims which straddle the Hurley River below its confluence with Cadwallader Creek.

The property has been opened up by five levels lying between the highway and the Hurley River. The bottom level, about 80 feet above the river, is the one on which work has been done in 1945. A drift following north-westerly along a quartz lead lying along or close to a contact between greenstone and sedimentary rocks was advanced about 150 feet. It is intended to advance the drift to intersect an easterly-striking vein exposed on the inaccessible banks of the river.

New Holland Gold Mines, Ltd.

(50° 122° N.W.) This company owned the Holland group of claims lying north-west of Pioneer and south-east of Bralorne mines. It is understood that a 60-per cent. interest was given to the Santiago Mines, Limited, on condition that that company, which is associated with the Silver Slipper Mining Company of Ontario, does at least 10,000 feet of diamond-drilling within the next two years.

A drilling contract was given to Keyes Construction Company which started the first hole before the end of 1945. This is reported to be a vertical hole close to the north-west boundary of Pioneer.

Copper.

STUMP LAKE.*

Consolidated Nicola Goldfields, Ltd.—(50° 120° S.E.) This mine is at Stump Lake, 2 miles west of the Kamloops–Merritt Highway and 30 miles from Merritt. Mining, suspended on December 9th, 1942, was not resumed during 1945. A caretaker resides at the property.

Copper.

NICOLA LAKE.*

Guichon Mine, Ltd. (50° 120° S.W.) James D. Ferguson, Manager, Merritt, B.C. This company was formed late in 1945 to acquire and work the Frinsbury group of mineral claims, 2 miles south-west of Quilchena and 12 miles east of Merritt. Work was done on the Ensign claim where a shaft and an adit-level were developed. A level was driven in a north-westerly direction for 40 feet from the bottom of the shaft which is 11 feet by 6 feet and 65 feet deep.

An adit-level, 400 feet south-east of the shaft, was extended westerly into the hillside and on November 21st was in 60 feet. A diamond-drilling programme began about the end of November.

A small portable compressor provides power for running a drifter. A compressor-room and a storeroom were erected during November. Five men were employed. No camp-site has been provided yet and the workmen are transported daily to and from their homes at Merritt.

Copper.

COPPER MOUNTAIN.*

Granby Consolidated Mining, Smelting, and Power Co., Ltd. (49° 120° S.W.) Julian B. Beaty, President, New York, N.Y.; A. S. Baillie, Vice-President and General Manager, Copper Mountain, B.C.; W. I. Nelson, Assistant General Manager, Copper Mountain, B.C.; Robert S. Douglas, Mine Superintendent; J. McMynn, Assistant Mine Superintendent; Ed. Foy, Mine Foreman. Capital: 600,000 shares, $5 par; issued, 450,260.65. A steam electric-power plant in Princeton supplies power to the concentrator at Allenby, 3 to 4 miles south of Princeton, and to the mine at Copper Mountain, 12 miles south of Princeton. A branch line of the Kettle Valley Railway from Princeton connects the mine and the concentrator. The mine and concentrator have been in continuous operation since work was resumed in 1937, following a suspension of several years.

Surface elevation at the mine is about 4,000 feet. The main development of the mine is by two adit-levels, No. 2 and No. 6, and two vertical shafts. The No. 1, or main shaft, handling all men and all supplies for the upper part of the mine, extends from the surface to the No. 6, or main haulage, level. The shaft is timbered with 10- by 10-inch British Columbia fir. It is closed to the levels by doors beyond the shaft-stations to assist in controlling ventilation. No. 2 shaft is used principally for hoisting ore but, until the 7th and 8th level service raise is completed, it will continue to be used for all men and supplies for these lower levels. All the ore is passed to No. 6 level. The ore is taken out in Granby type cars, hauled by electric trolley locomotives, to the crusher located near the portal of No. 6 level. After crushing, the ore is transported by railway to the concentrator at Allenby, 8 miles distant. No. 7 and No. 8 levels received very little development during 1945. Most of the work done on these levels was the drawing of ore mined in some of the upper workings.

A diamond-drill system of mining, chiefly developed at Copper Mountain during 1944, now has displaced entirely the former percussion-drill methods. This new method has been called the Horadiam method, the name being derived from a composition of horizontal, radial, and diamond. The drilling is from raises within the ore, thus eliminating the hazards to which miners were exposed when drilling from beneath

* By E. R. Hughes.

the ore-body. Another important advantage with regard to the increased safety of workmen is a reduction in the amount of dust resulting from drilling. All blast-hole diamond-drilling is done by the T. Connors Diamond Drilling Company, Limited, who, at the end of 1945, had thirty-three men employed at Copper Mountain. A total of 320,325 feet of blast-hole diamond-drilling was done in 1945. Drifters are still used for development-work but experiments are being made in using diamond-drills in drift development.

Another new mining practice being developed is the use of slusher-drifts in place of grizzlies which were extensively used at this mine. Four 50-horse-power electric slusher hoists and scrapers were installed during 1945. Most sections being prepared for stoping are being developed to use slusher hoists and scrapers for transferring ore. In special instances, however, where this method is not practicable, broken ore will have to be passed through a system of grizzlies. Two distinct safety features are obtained in slusher-drift ore-transfer over the former grizzly method; plugging of large rocks is done on solid ground instead of over an open grizzly and a positive system of ventilation is attained more easily. A ventilation raise is driven at the end of each slusher-drift, and the upper end of the raise is provided with an auxiliary fan so that dust and smoke from scraping and blasting are carried away quickly.

Development during 1945 consisted of 3,019 feet of drifting, 7,799 feet of sinking, 3,584 feet of diamond-drilling, and the building of nine chutes and eight grizzlies. There were no major additions to surface-plant equipment. Compressed air is furnished by three Ingersoll-Rand compressors and one Sullivan compressor, the four units having a total capacity of 8,600 cubic feet per minute.

Underground ventilation was well maintained generally, although there were instances where the ample volume of air available was not used to best advantage. Inadequate ventilation at the inside end of No. 6 level and in the No. 928 block was remedied before the end of 1945. Fresh air enters the mine through the old glory-holes and ventilation raises, whence the fans force it to stopes and other working-places and thence outside. Ventilation doors with sliding panels are placed in the drifts and crosscuts to control and regulate the air. Both shafts are upcast and are closed to the levels. The potential capacity of the five fans in use on the various levels is 204,000 cubic feet of air per minute.

The company employs a safety engineer and the Copper Mountain Mine Safety Promotion Committee meets once a month to discuss the prevention of accidents. The committee consists of elected workmen and company officials. Monthly tours of inspection of mine-workings, plant, shops, accommodation, etc., are made by the committee and their recommendations are discussed at the subsequent monthly meeting. The Labour-Management Committee also meets monthly and problems relating to production and future operations are discussed. An emergency hospital with the customary equipment and supplies, including a supply of blood plasma, is maintained at the mine for the treatment of injured workmen. A trained nurse and an industrial first-aid attendant are on hand at all times. In addition to the provision made in 1944 for aluminium-dust therapy for underground workers, similar provision has now been made for the surface crew.

For the accommodation of employees there are eighty company houses, 161 private houses, three bunk-houses, a staff-house, and a girls' dormitory. These latter five buildings have a total of 138 two-bed rooms and thirteen single rooms. The buildings are provided with lavatories and the rooms are furnished with steel single beds. All bunk-house bedding is supplied by the company. A charge of $1.10 per day is made for board, and the charge for a room in a bunk-house is $6.50 per month.

A doctor visits the Copper Mountain Camp twice a week and also is available in emergencies. Before the war-time shortage of doctors, one resided at the mine camp.

The Princeton General Hospital is 12 miles from the mine and the company maintains an ambulance for transporting sick or injured persons to the doctor or hospital.

A decrease in labour turnover was noted in 1945 compared with recent years. A decided increase in the number of men available was noticed after the middle of October. The company's pay-roll, covering all operations, showed an average of 482 employees for 1945. At the mine, exclusive of townsite, staff, and diamond-drill crew, 251 men were employed at the end of 1945; of these, 168 were employed underground.

The mine, mill, and power plant were operated continuously throughout 1945. Ore milled in 1945 amounted to 785,629 tons, yielding 14,013,705 lb. of copper, 88,717 oz. of silver, and 4,309 oz. of gold.

HEDLEY.*

Gold.

Apex. (49° 119° S.W.) A. McLeod, Superintendent. This small mine is on Independence Mountain, at an elevation of about 7,000 feet, approximately 6 miles east of the Nickel Plate mine. It consists of a shaft 120 feet deep and a connecting level 210 feet long. The property had been idle for some years until it was optioned recently by R. Hunstone and A. McLeod, who did some stoping from the side of the old shaft during the fall of 1945. The ore was transported by truck to Hedley for shipment by the Great Northern Railway to the Tacoma smelter. Four men were employed.

Hedley Monarch Gold Mines, Ltd. (49° 119° S.W.) T. C. Botterill, Consulting Engineer; M. J. St. Clair, Mine Superintendent. Capital: 3,000,000 shares, 50 cents par; issued, 1,000,000. During the fall of 1945 this company began to reopen and explore the property of the old Gold Valley Mines, Limited, near Olalla, about 4 miles from Keremeos.

On November 20th work was being done on the Something Good section of the property where there are three adit-drifts, known as the No. 1, Intermediate, and No. 2 levels. Three men were cleaning out a cave and retimbering the No. 2 level. No camp had been provided and the workmen lived in Olalla.

Hedley Amalgamated Gold Mines, Ltd. (49° 120° S.E.) Capital: 3,000,000 shares, 50 cents par; issued, 2,527,508. After being inactive for several years, this company resumed exploration during the fall of 1945 when three men, under the direction of W. G. Norrie-Loewenthal, began a programme of surface diamond-drilling. On October 17th one hole had been drilled and preparations were being made for drilling a second hole from above the Upper adit on the southern slope of Stemwinder mountain, about 2 miles north-west of Hedley. By the end of 1945 a total of 700 feet of diamond-drilling had been done.

Hedley Mascot Gold Mines, Ltd. (49° 120° S.E.) Company office, 908 Royal Bank Building, Vancouver, B.C.; mine office, Hedley, B.C.; R. G. McCuish, President; W. S. Charlton, Vice-President; Wm. Paterson, Secretary-Treasurer; V. J. Creeden, General Manager; C. W. S. Tremaine, Resident Manager; J. C. S. Moore, Mine Foreman. Capital: 3,000,000 shares, $1 par; issued, 2,264,130. This company operated the Mascot mine, 1 mile north of Hedley, and did development-work on the Good Hope property.

The concentrator and mine offices of the Hedley Mascot are on the east bank of Hedley Creek and the mine camp is on the side of Nickel Plate Mountain. The ore is transported by an aerial tramway, 5,600 feet long, from an ore-bin at the mine to the mill. The two ore-skips have a capacity of 2 tons each.

The mine has been developed by an 8- by 8-foot adit, 2,500 feet long, known as the 4800 level; this is the main-haulage level. All the ore is passed to the 4800 level and is hauled out by battery-type electric locomotives. The 4300 level is the lowest level

* By E. R. Hughes.

being used, and ore from it is hoisted up the No. 2 tramway to the 4800 level. Two 3½-ton Atlas battery locomotives and one Mancha trammer provide transportation underground.

The workings of this mine are connected to the workings of the adjacent Nickel Plate mine at several points underground; these connections are open, thus permitting a joint ventilation system. During months when natural ventilation is inadequate, a 48-inch Jeffrey propellor-type fan in the 4800 level assists the natural air-current.

The main developments during 1945 were the continued advance on the 3700 level and the beginning of a new underground incline. The 3700 level was advanced 1,850 feet during 1945. The new incline, starting from the surface at an elevation of 2,700 feet, is 15 feet wide, 7½ feet high, and rises at 24 degrees. The incline will be 2,000 feet long and will connect with the 3700 level.

Frequent rock-slides in Climax Canyon caused damage to the new No. 4 surface tramway servicing the 3700 level. On October 25th a rock-slide carried out about 1,500 feet of track and compressed-air line. Because of this the surface tramway was abandoned and an aerial tramway, known as the No. 6, was put into operation in November. This tram transports men and materials from the 4300 level to the new development on the 3700 level.

The mill was operated throughout 1945 at an average rate of 185 tons per day. Average number of men employed underground was fifty and on the surface eighty-five.

Development-work done in 1945 included 2,451 feet of drifting and crosscutting, 1,121 feet of raising, and 17,260 feet of diamond-drilling. A total of 56,481 tons of ore was mined and 56,503 tons was milled, yielding 16,708 oz. of gold, 3,823 oz. of silver, and some copper.

Good Hope. (49° 120° S.E.) This property is about 4 miles south-east of Hedley, and during 1945 it was operated by the Hedley Mascot Gold Mines, Limited. Open-cut work was continued and an adit-level 70 feet long was driven. A new road, connecting the property with the old Green Mountain Road, was completed. This enables ore to be transported by motor-truck from the property to the former Canty ore-bin, above the Mascot mine, whence it is conveyed by tramway to the mine bins. A total of 1,700 tons of ore was produced and shipped to the Mascot mill for treatment. The crew, in charge of J. Lyons, comprised five workmen and a cook. Work was suspended in November for the winter.

Nickel Plate Mine, Kelowna Exploration Co., Ltd. (49° 120° S.E.) Company office, 75 West Street, New York, N.Y.; mine office, Hedley, B.C.; W. A. Kissam, Chairman; Sewell T. Tyng, President; John W. Mercer, Vice-President; R. Emmel, Secretary; J. C. Hammel, Treasurer; Wm. C. Douglass, General Manager; F. A. McGonigle, Manager; Alex. Shaak, Mine Superintendent. This is a private company operating the Nickel Plate mine. The mill, machine-shops, and general offices are at Hedley. The mine is at an elevation of 5,600 feet, four miles north of the town of Hedley.

The transportation system up the side of Nickel Plate Mountain is in two sections; a 10,000-foot tramway from the ore-bin at the mill is operated with skips having a capacity of 6 tons each. The portal of the mine is 1½ miles north of the top of the upper terminal of the gravity tramway; an electric trolley system hauls the ore from the mine to this terminal.

The Nickel Plate mine is connected underground at several points with the Hedley Mascot mine, and as the upper outlets of the Nickel Plate are approximately 2,000 feet higher than the lowest outlet of the Mascot, there is a motive column of sufficient magnitude to provide adequate natural ventilation during most of the year. However, there are times when the air is almost stagnant in some of the large stopes of the upper Nickel Plate workings.

Development during 1945 consisted of 3,431 feet of drifting and raising and 16,546 feet of diamond-drilling. There were no major developments in either surface or underground operations.

At the mill one 14- by 14-foot drum-type Northern Foundry filter was installed to increase the separation of gold solution from the cyanide tails and the depressant lime and cyanide from the flotation feed. Three 16- by 14-foot Dorr-type agitators were installed to increase contact time and aeration of the cyanide pulp.

Compressed air for the mine and mill is provided by four compressors, two at Hedley and two underground at the mine. Of the two compressors at Hedley, one is a C.I.R.-RE-2 air-compressor of 1,800 cubic feet of free air per minute capacity, direct connected to a 440-horse-power synchronous motor; and the other is a C.I.R. Class BB-3-D compressor of 1,800 cubic feet of free air per minute capacity, belt-driven by a 400-horse-power slip-ring motor. The underground compressed-air installations are auxiliary to the larger surface plant and cut in only when increased power is required. Of the underground compressors, one is a C.I.R.-PRE-2, having a capacity of 500 cubic feet of free air per minute, and is direct connected to a 100-horse-power synchronous motor; the other unit is a Sullivan WN 32 of 500 cubic feet of free air per minute capacity, belt-driven from a 100-horse-power slip-ring motor.

Regular inspections of the surface and underground are made by the Safety First Committee, composed of representatives of the miners' union and the management. Aluminium-dust therapy is available to both underground and surface employees. The labour shortage experienced during 1944 was remedied gradually and during the latter part of 1945 the crew was back to full strength. On November 30th 206 men were employed, eighty-two underground and 124 on the surface. The average total crew for 1945 was 183.

A total of 99,383 tons of ore was mined and milled, yielding 34,582 oz. of gold, 1,494 oz. of silver, and some copper.

CAMP McKINNEY.*

Gold.

Cariboo-Amelia. (49° 119° S.E.) This property at Camp McKinney was operated under lease by Ed. Wanke, Olaf Johnson, Roy and John Hallstrom, and E. A. Alm, of Rock Creek, B.C. The property is equipped with a small complete mining plant. Early in 1945 the mine was unwatered to the No. 2 level, which is 165 feet below the collar of the main shaft. The shaft was repaired and reconditioned, and ore was mined from above this level. Pumping equipment includes a 55-horse-power Petter Diesel and a 75-k.v.a. generator which produces current for a 2-stage centrifugal pump, with a capacity of 180 gallons per minute, driven by a 25-horse-power motor. A total of 306 tons was mined and shipped to Trail. This yielded 144 oz. of gold, 363 oz. of silver, and 5,316 lb. of lead.

BEAVERDELL.*

Silver-lead.

Highland Bell, Ltd. (49° 119° S.E.) Company offices, Creston, B.C.; mine office, Beaverdell, B.C.; R. V. Staples, Managing Director; A. B. Staples, Mine Manager. Capital: 1,500,000 shares, $1 par; issued, 1,315,856. The company owns and operates the Highland Bell mine on Wallace Mountain, 4 miles from Beaverdell. The property was operated continuously throughout 1945, with the exception of two weeks in July and a month in the last part of August and the first part of September. A crew of from twenty to twenty-seven men was employed. On the surface, the old camp near the mine-workings was abandoned and a complete new camp, consisting of bunk-house, cook-house, and dry-room, as well as

* By H. C. Hughes.

a manager's residence and a house for the master mechanic, was built in Beaverdell. The new camp is modern in every respect, and the men are transported daily from it to the mine. Underground development-work was practically all confined to No. 8 level and consisted of 300 feet of drifting, 210 feet of crosscutting, 139 feet of raising, and 2,600 feet of diamond-drilling. As a result of this work the downward continuation of the ore from the levels above was found beyond a fault whose throw was considerably greater than had been encountered anywhere else in the mine. No major purchase of new equipment was made during 1945. A total of 1,164 tons was mined and shipped to Trail. This yielded 54 oz. of gold, 218,077 oz. of silver, and 97,807 lb. of lead.

GREENWOOD-GRAND FORKS.*

Wellington Camp.

Gold.

Athelstan. (49° 118° S.W.) This property, in the Wellington Camp near Phoenix, is owned by W. E. McArthur, of Greenwood. During the summer of 1945 a development programme was undertaken with an average of two men employed. Eight diamond-drill holes, totalling 500 feet, the longest of which was 137 feet, had been completed when a breakdown in the machinery, together with the approach of winter, necessitated postponement of work until next year, 1946. Some encouraging results were obtained.

Jewel Lake.

Gold.

Dentonia Mines, Ltd. (49° 118° S.W.) Company office, 572 Howe Street, Vancouver, B.C.; mine office, Greenwood, B.C. Capital: 2,500,000 shares, no par value; issued, 1,716,600. This company owns and operates the Dentonia mine at Jewel Lake, 8 miles from Greenwood. The mine was reopened as a company operation in June, 1945, with a crew averaging five men, after having been worked by lessees for several years. Twelve men were employed under the direction of Godfrey T. Johnson. Two new camp buildings, a bunk-house 24 by 30 feet and a cook-house of the same size, were built, as well as a blacksmith-shop, carbide-house, fuse-house, and powder-house. In addition to diamond-drilling equipment, an electrically driven compressor and complete mining equipment have been purchased. Power is to be obtained from the West Kootenay Power and Light Company, and all transmission-lines for power and light have been installed. The telephone-line has also been put in service.

Diamond-drilling was undertaken and some 1,200 feet of hole completed from the surface and underground. Information obtained has led to preparations for additional diamond-drilling and tunnel-work to explore further the ore occurrences encountered.

Central Camp.

Gold.

Number Seven. (49° 118° S.W.) This property in the Central Camp, about 8 miles from Greenwood, was operated under lease by W. E. McArthur, of Greenwood. Two men were employed for a month on surface-trenching in an effort to trace the vein down the hill from the original workings. The argillite-serpentine contact in which the ore occurs in the old workings was found some 1,800 feet distant but did not contain ore where uncovered. A small amount of similar work was done at the north end of the property with the same result. Three men did a limited amount of development-work from the bottom of the underhand stope below the lower level. A total of 36 tons was mined and shipped to Trail. This yielded 3 oz. of gold and 253 oz. of silver.

* By H. C. Hughes.

GREENWOOD.

Silver-gold.

Providence. (49° 118° S.W.) This property, about 1½ miles north of Greenwood, was operated continuously throughout 1945 under lease by W. E. McArthur, of Greenwood. From five to nine men were employed. The property is equipped with a complete electrically driven mining plant. Development-work included 1,500 feet of diamond-drilling, 80 feet of raising, and 150 feet of drifting. An attempt was made to find extensions of the old ore-body by diamond-drilling but this proved unsuccessful. All ore recovered during 1945 was from pillars and stope remnants, and mining operations were in the nature of salvage. A total of 311 tons was mined and shipped to Trail. This yielded 98 oz. of gold, 29,560 oz. of silver, and some lead and zinc.

ROSSLAND*

Gold.

MOUNT ROBERTS.

Midnight.—(49° 117° S.W.) This property, on Mount Roberts, is owned and operated by B. A. Lins and associates, of Rossland. It is equipped with a small complete mining plant.

I.X.L. (49° 117° S.W.) This property, adjoining the Midnight, was operated under lease by C. Jorgensen, of Rossland, and is equipped with a small complete mining plant. A small amount of development-work was done and a total of 25 tons was mined and shipped to Trail. This yielded 18 oz. of gold and 28 oz. of silver.

Gold.

RED MOUNTAIN.

Gertrude Gold Mining Co., Ltd. (49° 117° S.W.) Charles Kenney, Manager and Secretary, Box 1512, Rossland, B.C. This company has an option on the Gertrude Mineral Claim on Red Mountain, adjoining the Number One owned by the Consolidated Mining and Smelting Company of Canada. Permission has been obtained from the Consolidated Mining and Smelting Company of Canada to use the Number One adit and to extend this to explore showings on the Gertrude at depth. An electrically driven single-stage Gardner-Denver compressor has been installed underground and the adit has been advanced about 125 feet. Three men have been engaged in the work.

NELSON.

Gold.

EAGLE CREEK.†

Granite-Poorman, Kenville Gold Mines, Ltd. (49° 117° S.E.) Mine office, Box 390, Nelson, B.C.; B. Brynelsen, General Manager; W. S. Hamilton, Manager; A. C. Skerl, Geologist. This company is a subsidiary of Quebec Gold Mining Corporation, 184 Bay Street, Toronto. This company acquired during the winter of 1944–45 a large tract of ground on the northern slopes of Toad Mountain, west and south of Nelson. The ground lies south of the Kootenay River, between Fortynine Creek and the watershed of Giveout Creek. The holdings include fifty-four Crown-granted and eighty-five located claims. The properties taken over include the Granite-Poorman, Venango, Royal Canadian, Nevada, Eureka, Venus-Juno, and Athabaska, to name the better known. Work for the season was concentrated on the Granite-Poorman but, in addition, all adit-portals on other claims were cleaned out, except those which were seriously caved, and surveys were made of most of the accessible workings. Headquarters were set up in the Granite-Poorman buildings,

* By H. C. Hughes.
† By M. S. Hedley and H. C. Hughes.

and an active programme of development was carried out, starting with diamond-drilling and including drifting when equipment became available later in the year.

This is one of the oldest properties in the district. A 10-stamp mill was erected close to the Kootenay River in 1889 and ore was transported to it by aerial tram. Since 1900 the property has changed hands seven times and between 1904 and 1929 it was worked almost exclusively by lessees. In 1932 the property was acquired by Livingstone Mining Company (H. R. Smith, manager), who operated intermittently until 1944. In 1933 the old mill was dismantled and was reassembled with some additions below what is now the 2570 adit-level. Past recorded production from all veins of the group to the end of 1944 reached a total of 127,421 tons, from which 47,043 oz. of gold, 16,635 oz. of silver, 3,488 lb. of copper, and 6,253 lb. of lead were recovered.

Bed-rock is very poorly exposed throughout the area and timber cover is heavy. Most of the early prospecting along Eagle Creek was done by ground-sluicing in areas of no outcrop. A new vein was discovered on the Venango in recent years by this method. The Granite-Poorman veins are in dioritic rock. This rock, evidently a near-contact variant of the granite, is locally gneissose, and variations in composition and texture are probably due to assimilation. It is intrusive into greenstone, which is for the most part massive, but is locally banded.

The five principal veins of the Granite-Poorman include, from east to west, the Beelzebub, Granite, Greenhorn, Poorman, and Hardscrabble, in a horizontal distance of about 1,700 feet. They are all alike in that they strike north 10 to 30 degrees west, have an average dip of about 45 degrees north-east, and range in width from an inch or so to a maximum of about 6 feet of quartz. They are mineralized with pyrite and chalcopyrite chiefly but also contain minor amounts of galena, scheelite, sphalerite, and some visible gold; rich pockets of visible gold are reported from earlier operations; pink feldspar is a local constituent of the veins.

Reports are that pockets of free gold occurred at intervals and that consequently the yield of the vein was greater than that indicated by sampling. The present company installed a sorting plant in order to check the value of shipments against that of sampling during the course of development-work.

The veins vary greatly in width, attitude, and in character of the quartz. The dip of a vein may range from 20 to 75 degrees with no dip apparently more favourable for ore than another. The veins are in weak fault-zones, part of a pattern of fracturing of the diorite. The hanging-wall of each vein has moved upward and southward a distance that is not known, but must be small because the vein-fissures appear to play out locally. A characteristic of the veins is the presence of flatter offshoots, principally in the foot-wall, which strike northward or a few degrees east of north. Whereas the main veins are for the most part free-walled and are accompanied by a gouge selvedge, the flatter offshoots are frozen to the walls. The offshoots are tension cracks. A second or co-ordinate direction of shearing is represented by rare veinlets which dip south-westward at about 40 degrees.

The ore-bodies rake to the south, as is shown by the stope boundaries and by individual ore-shoots within the stopes. The rake is the locus of intersection of flatter tension cracks with the steeper shears. Workings beneath the ore-bodies show narrow and somewhat erratic quartz; the tops of the ore-bodies in accessible stopes show zones of fracturing of considerable irregularity.

The veins are cut by faults and by post-mineral lamprophyre dykes, many of which are accompanied by faults. Slicing faults of steep dip drop the eastern block downward as much as 50 feet in the Hardscrabble vein. The largest fault dips 50 degrees northward and has produced an offset of the Granite and Greenhorn veins of about 300 feet to the left; this fault is seen also in the lower Beelzebub adit, and the Beelzebub vein has not been located beyond it at that level.

The ore-bodies were largely mined out by former operators and it is difficult to tell what average widths were mined. It is probable that the average was between 2 and 3 feet, although many parts of the old stopes are wider. In some instances it is plain that the overbreak was deliberate in order to mine for a few feet the narrow flatter foot-wall branches, particularly where these were numerous, and it is reported that these locally contained higher values than the main veins. The greatest width of vein in the stopes is reported to have been 8 feet, but that this was a single band of quartz seems doubtful.

The Granite, Greenhorn, and Poorman veins are stoped out to the surface and the Hardscrabble vein appears to be largely stoped. A sub-level 210 feet below the 2750 level (old No. 4) on both Poorman and Hardscrabble veins is beneath the ore-zone on both veins, although some stoping has been done from intermediate levels beneath the 2750 level. The greatest length of stoping-ground, about 1,000 feet, was on the Poorman vein and the next greatest, about 900 feet, was on the Hardscrabble. On the Granite vein, stopes extended over a length of about 800 feet and on the Greenhorn vein about 400 feet. Some stoping was done also on the Beelzebub and on the Red Rock, which latter is probably the southerly continuation of the Granite vein, 600 feet to the south of the Granite surface workings.

Two veins on the Venango have been opened up and a small amount of stoping was done on one of them in past years. These are similar to the Granite-Poorman veins and belong evidently to the same system of fracturing.

The company drilled two holes from the bottom level of the Venango in search of the downward continuation of the Venango No. 1 vein, but the main attention was given to the Granite-Poorman veins. A number of holes were put down from surface in search of possible blind veins which might occur between those already known, and holes were drilled underground to test extensions of the known veins. In the first few surface holes the cores showed several narrow widths of quartz and also patches of disseminated chalcopyrite, of which some were accompanied by quartz or silicification. The diorite does not show everywhere what may be termed a normal texture but is in many places either gneissic or of a "streaky" nature; it is perhaps significant that the latter rock is apt to contain small amounts of chalcopyrite. Some of the banding or streakiness of the diorite is original and some probably owes its origin to post-intrusive shearing. A point worth checking is whether the chalcopyrite mineralization is a general characteristic of the diorite or whether it indicates the presence of veins which, at the points intersected, were weak and insignificant.

The southerly rake of the ore-bodies at an angle between 15 and 30 degrees into the northerly sloping and locally steep hillside makes exploration difficult. The known ore-bodies occur at comparable levels on the Granite-Poorman veins and the downward continuations lie well into the hill. The property was visited in September, 1945.

Development-work done in 1945 consists of 10,999 feet of diamond-drilling, about 40 per cent. of which was done from underground and the remainder from surface. The old mill adit, now known as the 257 level, was repaired and has been driven as a crosscut for 200 feet to its intersection with the Hardscrabble vein and as a drift for 600 feet along this vein. This working will be continued to connect with workings at the bottom of the old Hardscrabble winze. The 275 level, formerly the old No. 4 level of the Poorman, has been reconditioned and a crosscut has been driven some 200 feet from the Poorman vein eastward to develop a drill intersection between the Poorman and Granite veins. On the surface, the old Granite-Poorman mechanical equipment has been thoroughly overhauled and considerable additional equipment acquired. This includes a 350-cubic-foot Ingersoll-Rand semi-portable Diesel-driven compressor, a 210-foot Schramm gasoline-driven portable compressor, and an Ingersoll-Rand steel-sharpener and oil furnace. New underground equipment purchased included two

Eimco loaders and two Mancha trammers. A complete sorting and sampling plant has been built in the old Granite-Poorman mill and so arranged that the old mill bins were utilized to good advantage. This plant consists of a grizzly above the main mill bin and a conveyer-belt which carries material from this bin to a sorting-belt which is so arranged that a great variation in speed is possible to facilitate the sorting of any type of ore. Chute and bin arrangements from the sorting-belt are also arranged so that either waste or ore may be sorted from the belts and fines kept separate from the rest of the material, making the whole plant quite flexible. The lower part of the mill has been utilized for a blacksmith and steel-sharpening shop while another intermediate section has been converted into a modern sanitary change-house accommodating about forty men. The office is being remodelled and, when completed, will include a well-equipped first-aid room. At the end of 1945 about sixty-five men were employed.

Morning Mountain.*

Gold.

Irene Group.—(49° 117° S.E.) Three men, under the direction of A. St. Clair Brindle, of Vancouver, did trenching and surface-stripping on mineralized shear-zones on this property.

Hall Creek.

Gold.

Golden Eagle and T.S.* (49° 117° S.E.) This property on Hall Creek is operated by a small local syndicate under the direction of W. Rozan, of Nelson. During 1945 the old shaft on the T.S. vein was repaired and retimbered for examination and sampling, and about 40 feet of tunnel was driven on a showing on the Golden Eagle mineral claim. All work was done by hand-steel and no ore was shipped.

Fern.† (49° 117° S.E.) This property on Hall Creek has been optioned by Harold Lakes and associates, of Nelson, and development-work has been carried on under the direction of Mr. Lakes. Premier Border Gold Mining Company, Limited, and Quatsino Copper-Gold, Limited, have agreed jointly with Mr. Lakes to provide necessary funds. The road from Hall Siding to the mine was repaired and put in condition for truck-hauling. The old Fern camp buildings were renovated and made to provide accommodation for eight to ten men.

A diamond-drilling programme was undertaken to locate the extensions of the vein, particularly to the south of a fault which had bounded the stoped areas of the mine. Six holes, totalling 2,120.5 feet, were drilled from the surface; two holes were drilled to the north and four to the south of the fault. Intersections were obtained in all holes, and from those south of the fault the position of the vein on the surface was projected. A total of 185 feet of trenching was done to expose the vein south of the fault. An adit-site was chosen about 100 feet vertically below the outcrop and preparations are being made to drive on the vein. A blacksmith-shop and compressor-house were built near the site and a small mining plant, including a 105-cubic-foot single-stage gasoline-driven Schramm compressor, was installed. It is hoped to have underground work started by the end of 1945. A 15-horse-power Caterpillar tractor with bulldozer blade was also purchased to keep the road open and to transport supplies during the winter. The number of men employed averaged three.

Ymir.

Oxide.‡ (49° 117° S.E.) This property, owned by Ed. Haukedahl, A. Bremner, and A. Phare, of Ymir, was optioned by International Mining Corporation, 85 Richmond Street West, Toronto. It is on the ridge between Oscar (Bear) Creek and Porcupine Creek, about 4 miles from Ymir. The showings

* By H. C. Hughes.
† By H. C. Hughes and M. S. Hedley.
‡ By M. S. Hedley.

extend across the ridge at an elevation of 5,500 feet between quartzites on the west and crumpled argillite and limestone on the east in what appears to be a fault-zone, possibly of regional extent. The deposit is completely oxidized to a gossan that contains values in lead and zinc; it has not been fully outlined but appears to be about 1,500 feet long and locally 30 or more feet wide. A considerable amount of trenching was done under the direction of H. C. Gunning, extending down the Porcupine Creek slope over a vertical range of 700 feet. Diamond-drilling began late in 1945.

Gold.

Ymir Good-Hope Mining Co.*

(49° 117° S.E.) Head office, 503 Westlake North, Seattle, Washington; local office, Medical Arts Building, Nelson, B.C.; Sarkis Terzian, Manager. Capital: 250,000 A shares, $1 par, and 1,500,000 B shares, 10 cents par; issued, 28,375 A and 1,500,000 B. This company works the X-Ray group on Huckleberry Creek, about 6 miles from Ymir. Development-work on this property was continued during 1945. Early in the summer about 1,200 feet of underground diamond-drilling was done from the crosscut driven in 1944. A promising intersection was obtained on a vein which was encountered in the crosscut about 400 feet from the portal, and encouragement was also obtained from holes which were drilled ahead in the general direction of the crosscut. As the result of this work the crosscut was extended for 100 feet, and 100 feet of drifting was done on the vein mentioned above. The drift showed the vein to be from 6 inches to 2 feet wide and fairly abundantly mineralized. The Diesel-driven compressor installed in 1900 was replaced by an Ingersoll-Rand gasoline-driven portable compressor. An average crew of five men was employed during the summer and autumn. No ore was shipped.

ERIE CREEK.*

Gold.

Arlington.

(49° 117° S.E.) This property on Keystone Mountain, about 3½ miles from Erie, has been purchased from Relief Arlington Mines, Limited, by B. and K. Golac and A. Shrieves, Box 223, Nelson, B.C. It was operated for the greater part of 1945, two to three men being employed. Ore was recovered from pillars and stope remnants. Investigation of the foot-wall in several areas established the existence of closely parallel ore occurrences within the vein-shear, indicating a possibility of considerable tonnage. Hand-steel only was used. A total of 256 tons was mined and shipped to Trail. This yielded 275 oz. of gold, 733 oz. of silver, and 16,173 lb. of lead.

Second Relief.

(49° 117° S.E.) This property on Erie Creek, about 13 miles from Erie, is owned and operated by a local syndicate consisting of A. and M. Burgess, G. Murray, M. Towriss, and M. C. Donaldson, of Salmo. It is equipped with a small complete mining plant which can be driven by either Diesel or water power. Ore was recovered from pillars and stope remnants left by former operators and, in addition, some work was done on a parallel vein which had received very little attention in former years. A total of 242 tons was shipped to Trail and this yielded 375 oz. of gold and 165 oz. of silver. The average number of men employed was three.

SOUTH KOOTENAY LAKE.*

Gold.

Bayonne Consolidated Mines, Ltd.

(49° 116° S.W.) Company office, 308 Pacific Building, Vancouver, B.C.; mine office, Sirdar, B.C.; C. Rutherford, Consulting Engineer; R. B. King, Manager. Capital: 2,500,000 shares, no par value; issued, 2,500,000. The company owns and operates the Bayonne mine on Summit Creek, 23 miles by road from Tye Siding. This property was closed down in

* By H. C. Hughes.

1943 and was reopened in the late summer of 1945 with the object of putting it into production again. The road was cleaned out and repaired, the camp and power plant were renovated and overhauled, and underground development-work was started. It is planned to sink a 250-foot shaft from No. 8 level at a point in the crosscut connecting the A and B veins on that level, near the B vein. To this end the ditch on the No. 8 level was widened from the portal of the drift on the A vein to the shaft location and a station and hoist-room were cut. A 50-foot rope raise and a 30-foot raise for the head-frame were completed. About 12 feet of sinking was done by the end of 1945. In addition to this about 100 feet of drifting was done on a showing on No. 4 level. About twenty-five men were employed.

SHEEP CREEK.

Gold.

Kootenay Belle.* (49° 117° S.E.) This property on Sheep Creek, about 10 miles from Salmo, has been leased from Kootenay Belle Gold Mines, Limited, by Russel Thompson and associates, of Sheep Creek. During 1945 a small electrically driven compressor was installed and preparations were made underground for machine-mining. Ore recovered from pillars and stope remnants above the No. 6 level was shipped to Trail.

Sheep Creek Gold Mines, Ltd.† (49° 117° S.E.) Company office, 616 Stock Exchange Building, Vancouver, B.C.; mine office, Sheep Creek, B.C.; C. E. Marr, President; J. Anderson, Secretary-Treasurer; H. E. Doelle, General Superintendent and Managing Director. Capital: 2,000,000 shares, 50 cents par; issued, 1,875,000. The company owns and operates the Queen mine on Waldie Creek, a tributary of Sheep Creek. The mine was operated continuously throughout 1945 but, owing to labour shortage, the mill was closed down during the months of January and May and was operated intermittently and at a reduced tonnage during the other months. In the early part of 1945 the crew was down to about forty-six men but near the end of the year it increased to about seventy. The number was as high as ninety at one time during the autumn.

Eleven sub-parallel quartz veins have been discovered along the course of a north-south anticlinal structure in quartzite. The veins strike from north 56 degrees to north 73 degrees east and dip steeply south-eastward. From the north they are successively named the Yellowstone, Queen, 92, 85, 83, 81, 76, 75, 68, 57, and 44 veins. Mining and development during the past few years have been concentrated on the 92 to 57 veins, inclusive. What is presumably a second belt containing additional sub-parallel veins lies about 1,000 feet to the east and remains to be explored at depth.

The mine is opened by two adit-levels, the No. 3 level on the Queen vein and the No. 2 extending from the 92 to 68 veins. A vertical shaft extends from the No. 3 to No. 12 level, a distance of 1,015 feet, in the foot-wall of the Queen vein. Nos. 5, 7, and 9 levels are driven south from the shaft to explore the southern veins and, in 1945, No. 10 was started as a general crosscutting level to explore the other veins at this new depth. No. 7 level in addition cuts the Yellowstone vein and is also extended east to the eastern belt of veins. Other levels are driven as intermediates on the individual veins.

Stoping during 1945 was done mostly on the 81 vein. A total of 854 feet of drifting, 183 feet of crosscutting, 175 feet of raising, and 900 feet of diamond-drilling was done. Included in this total was work done on the 92 vein on Nos. 3 and 10 levels; on the 85 vein on the No. 7 level; on the 83 vein on the Nos. 7 and 9 levels; on the 81 vein on Nos. 3, 6, 7, and 9 levels; on the 75 vein on No. 7 level. A total of 24,504 tons was milled, about one-half the tonnage in normal years; this yielded 9,925 oz. of gold and 2,712 oz. of silver.

* By H. C. Hughes.

† By H. C. Hughes and M. S. Hedley.

Gold Belt Mining Co., Ltd.*

(49° 117° S.E.) Company office, 616 Stock Exchange Building, Vancouver, B.C.; mine office, Sheep Creek, B.C.; A. E. Jukes, President; J. Anderson, Secretary-Treasurer; F. W. Reger, Mine Manager. Capital: 1,687,000 shares, 50 cents par; issued, 1,237,000. The company owns and operates the Gold Belt mine on Sheep Creek. This property was closed early in 1943 because of labour shortage, at which time practically all the readily available ore had been mined. It was reopened in the autumn of 1945 with an average crew of sixteen men.

Near the portal of the 600 level, where a former camp was destroyed by fire, a compressor-house 18 by 36 feet, a blacksmith-shop 16 by 20 feet, a bunk-house 24 by 52 feet, and a cook-house 24 by 36 feet have been built. In addition, a powder-house, oil-house, and fuse-house have been built in suitable locations. The camp is modern in every respect and is built to accommodate about twenty men. The branch from the Nugget Road was repaired, and dams, water-lines, and electric power installations were put in. The compressor plant and blacksmithing equipment formerly at the 1850-level portal were moved up to the new site and installed. The only new equipment purchased was a tractor and bulldozer.

The company plans to drive the 600 level ahead to the north and make connections with a raise which is to be completed from the 1400 level. This will explore the anticlinal structure which rises to the north and permit ore to be transferred underground to the 2100, or mill, level. In addition to salvaging equipment from old workings and laying track in the 600 level, 96 feet of crosscutting was done.

Nugget.†

(49° 117° S.E.) This property, adjoining the Motherlode and Reno, is owned and operated by A. Endersby, Jr., of Fruitvale. It is equipped with a water-driven compressor at the Reno mill-site, compressed air being piped to the Nugget workings through the 4900 level and Motherlode workings. During the summer ore was recovered from a stope between Nos. 2 and 3 levels in the old Nugget mine. When snow conditions made it impossible to haul from the old workings, these were closed for the winter and mining was carried on in the lower Nugget workings accessible from the 4900 crosscut. Five men were employed. No development-work was done. A total of 641 tons was mined and shipped to Trail. This yielded 206 oz. of gold and 227 oz. of silver.

AINSWORTH.

Silver-lead-zinc.

Ainsmore Consolidated Mines, Ltd.*

(49° 116° N.W.) Company office, Ainsworth, B.C.; Carl M. Mohr, Manager; C. D. N. Taylor, General Superintendent. This company owns the Spokane group of claims on Munn Creek, about 3 miles by road west of Ainsworth, and has recently acquired a number of claims to give holdings which extend in an almost unbroken line from Coffee Creek to Cedar Creek. Early in 1945 the company bought the Kootenay Florence mill and plant, 2 miles north of Ainsworth, and leased the Kootenay Florence property with an option to purchase from the owner, George Webster, of Toronto.

The Spokane, formerly a shipper of high-grade lead ore, was operated almost continuously throughout 1945. Milling-ore was mined above the upper adit-level and put through the Florence mill. In addition, a special mill-feed dump of several hundred tons was milled, as well as some from the main dump. Sixty-eight feet of development-work was done and three to four men were employed.

Work started at the Kootenay Florence in April. A rock-raise was put up to surface near the portal of the No. 9 main-haulage level to serve as storage for ore

* By H. C. Hughes and M. S. Hedley.
† By H. C. Hughes.

trucked in from other properties. Development-work included 195 feet of crosscutting, 502 feet of drifting, and 246 feet of raising. Milling commenced on about 1,500 tons of broken ore left in the stopes from the earlier operation by Wartime Metals Corporation; this work was done on contract for the owner. In addition to ore from company operations, custom ore was received—149 tons from the Bell near Retallack and 110 tons from the New Jerusalem in the Ainsworth camp. The Spokane contributed 852 tons from the dumps and 2,858 tons from stoping operations. The Kootenay Florence provided a total of 1,669 tons from stopes and 3,530 tons from development. The mill was operated on a two-shift basis and treated about 60 tons per day. From the total of 9,900 tons milled, 850 tons of concentrates were shipped to Kellogg, Idaho. From this, 12,590 oz. of silver, 738,107 lb. of lead, 250,873 lb. of zinc, and some cadmium were recovered. The average number of men employed was twenty-six.

In the Kootenay Florence mine a 405-foot 60-degree raise had been put up by Wartime Metals Corporation from the lowest, or No. 9, adit-level to connect with No. 5, the lowest adit-level of early operations. The principal work in 1945 consisted of the development of No. 7 level from this raise, about 220 feet vertically above No. 9 and 130 feet below No. 5 level. Development-work for 1945 included 502 feet of drifting and 246 feet of raising.

Scranton-Pontiac.* (49° 117° N.E.) No work was done during 1945 on this property, which is near the head of Woodbury Creek. However, the company began constructing a road which will connect the mine with the Nelson–Kaslo Highway. About 3 miles of this road was completed before snow conditions forced the work to be discontinued until 1946. A caterpillar tractor and bulldozer and a portable compressor were used. The work was under the direction of W. T. Graham, of Forest Grove, Oregon.

KASLO-THREE FORKS.

Silver-lead-zinc.

Shutty Bench.* (49° 116° N.W.) This property, on the hill above Shutty Bench, about 6 miles north of Kaslo, is owned by John Kuz, of Kaslo. The showings consist of a flatly dipping limestone-bed showing a considerable amount of zinc replacement. This bed is from 4 to 6 feet thick and has been traced on the surface by short adits and open-cuts for a distance of about 400 feet.

Kokanee Chief.* (49° 117° N.E.) This property, near the head of Keen Creek, is under option to R. G. McLeod, of Seattle, Washington. The showings, consisting of narrow quartz-filled fissures in granite of the Nelson batholith, have been developed by two adits 100 and 40 feet long. A limited amount of underground hand-steel work was done by two men. Values are chiefly in silver.

Voyageur.* (50° 117° S.E.) This property, at the head of 10-Mile Creek and about 18 miles from Kaslo, at an elevation of about 6,500 feet, is being operated by Empire Mines Corporation, of Walla Walla, Washington, under the direction of Roy Wallace. A truck-road about 7½ miles long, joining the mine to the Kaslo–New Denver Highway, was completed in 1945 after being under construction for the past three years. At the mine the portal of the adit-level was retimbered.

Bell.* (50° 117° S.E.) This property, in the Jackson Basin and about 7 miles from Retallack, was operated under lease and bond by Joe Gallo and associates, of Nelson. A total of 149 tons of ore, averaging about 30 per cent. zinc, was recovered from surface dumps and from pillars and stope remnants underground. This ore was treated in the Kootenay Florence mill and the concentrates included in their shipments. A limited amount of surface-trenching was also undertaken. Two men were employed and all the work was done by hand-steel.

* By H. C. Hughes.

Whitewater, Retallack Mines, Ltd.*

(50° 117° S.E.) Registered office, 475 Howe Street, Vancouver, B.C.; mine office, Kaslo, B.C.; J. L. Trumbull, President; J. A. Clark, Secretary; James Hamilton, Richard Dowsey, W. R. Burgess, and Donald McLeod, Directors; V. McDowall, Manager. Incorporated, June, 1943. Capital: 250,000 shares of $1 par; all issued, 60 per cent. owned by Kootenay Belle Gold Mines, Limited, and 40 per cent. owned by Whitewater Mines, Limited. Operations at this property were carried out intermittently because of power shortages until September, 1945, when the mine and mill were closed down. From the beginning of 1945 until the first week in April the mill was operated continuously at a capacity of 160 tons per day but was closed at that time owing to a shortage of water for the hydro-electric plant and to the necessity of making repairs in the power-house. Milling operations were resumed on May 4th at a capacity of about 140 tons per day when the spring run-off began. On May 23rd the entire Diesel power plant was destroyed completely by fire. There being a plentiful supply of water for hydro-electric power at this time, operations were resumed shortly after the fire and were continued with some interruption until September 20th when the mine and mill were closed down. For a large part of this latter period the mill operated at a capacity of 200 tons per day.

During the early part of 1945 the mill was supplied with magnetite-pyrrhotite-zinc replacement ore from above No. 1472 level and with the more common siderite-zinc replacement ore from a small stope below No. 14 level in the east end of the mine. Mining of the old upper mine dumps was resumed later, and during the last stage of operations ore was coming almost exclusively from the large composite dump between Nos. 7 and 3 levels, which exists as a comparatively thin veneer on the steep hillside. The earlier use of scrapers was found unsatisfactory, and the muck was moved by bull-dozer into a loading-pocket from which it was trucked to the mill. Coming from workings driven primarily in search of silver-lead ore, the muck naturally contained a higher proportion of these metals than that from the lower mine.

Development-work included 88 feet of drifting, 50 feet of crosscutting, 30 feet of raising, and 1,869 feet of diamond-drilling. In addition, about 500 feet of old workings were reconditioned. A total of 29,561 tons of ore was treated in the mill; of this, 26,000 came from underground workings and the remainder from the surface dump. Concentrates were shipped under a contract with Metals Reserve Corporation to the American Smelting and Refining Company, and yielded 11,676 oz. of silver, 209,985 lb. of lead, and 2,688,400 lb. of zinc. The number of men employed ranged from about 100 near the beginning of 1945 to fifty when the property was closed. The company has tentative plans for operating on ore from the dump in 1946 during the months when a plentiful supply of water will assure electric power. No custom ore was treated in the Whitewater mill in 1945.

Lucky Jim, Zincton Mines, Ltd.*

(50° 117° S.E.) Mine office, Zincton, B.C. This company, a subsidiary of Sheep Creek Gold Mines, Limited, owns and operates the Lucky Jim mine at Zincton. In 1945 F. R. Thompson, mine manager, was transferred to the company's operation at Sheep Creek and J. S. McIntosh was appointed manager at Zincton. The mine was operated continuously at a daily capacity of 320 tons until the end of June, when it was closed because of cancellation of its contract with Metals Reserve Corporation, under which zinc concentrates were shipped to the Anaconda Smelter in Butte, Montana. Milling operations were resumed on October 12th at a daily capacity of about 200 tons, which was shortly increased to the normal figure as more men became available. The mill continued to operate at this capacity for the remainder of 1945, the concentrates being shipped to the Trail smelter.

* By M. S. Hedley and H. C. Hughes.

While the mill was closed, a development crew was employed. The main haulage on No. 9 adit-level was graded and retracked and haulage equipment was reconditioned. Some exploratory drifting was done south-east of the main raise on No. 8 level. On the surface, a road 3½ miles in length was built to the old No. 1 adit which is to be driven ahead to intersect mineral located by diamond-drilling in 1943 and 1944. Late in 1945 power capacity was increased by the installation of a 450-horse-power Fairbanks-Morse Diesel engine and generator in an addition built on to the back of the power-house. On November 9th the mess-house was completely destroyed by fire and temporary accommodation was provided in the recreation-hall; it is planned to build a new mess-house in the spring.

Most of the tonnage milled came from stopes above No. 9 level and a small amount was mined above No. 850 level. Stoping was commenced early in 1945 above No. 10, a new level 70 feet below No. 9, which is developed by a 20-degree winze.

Development for 1945 included 373 feet of drifting, 178 feet of raising, and 7,861 feet of diamond-drilling. While the mill was operating, the total number employed ranged from forty to sixty men. A total of 63,322 tons of ore was milled, producing 10,896 tons of zinc concentrates which was shipped to Anaconda and Trail. This yielded 10,792,579 lb. of zinc.

SANDON.*

Silver-lead-zinc.

Victor. (49° 117° N.E.) This property, 3 miles from Sandon, is owned by Mrs. D. Petty, of Nelson, and was operated continuously during 1945 under lease by E. Doney, of Sandon. A total of 60 tons of ore was mined by hand-steel and 30 tons was shipped to Trail. This yielded 10,870 oz. of silver, 28,543 lb. of lead, and some zinc.

Silver Ridge, Excelda Mines, Ltd. (49° 117° N.E.) Head office, Box 338, Vernon, B.C.; Lloyd R. Smith, Manager. This company has an option on the old Silver Ridge group, adjoining the Black Colt and about 2 miles from Sandon. During the summer a crew of five men was engaged in rehabilitating the camp buildings and cleaning up and retimbering the underground workings. A proposed programme of underground diamond-drilling was postponed until 1946 because of early heavy snowfall. The property is equipped with a small mining plant.

Sunshine, Silver Ridge Mining Co. (49° 117° N.E.) Company office, Sandon, B.C.; R. A. Grimes, President; D. D. Townsend, Secretary-Treasurer. Capital: 2,000,000 shares, 50 cents par; issued, 662,400. This company owns and operates the Sunshine group, situated on Silver Ridge, about 3½ miles from Sandon. The property, which is equipped with a small Diesel mining plant, is to be reopened after having been idle since March, 1941. In November, 1945, a small crew was engaged in overhauling mining equipment and cleaning up the underground workings in preparation for further development. Present plans are to extend the crosscut driven during the last operation, which is more than 2,000 feet in length. By the end of 1945, 200 feet of crosscutting had been done. The operators plan to continue work throughout the winter.

Noble Five. (49° 117° N.E.) From this property, about 2½ miles from Sandon, P. Lincoln shipped 20 tons of lead concentrates and 13 tons of zinc concentrates. These yielded 1,595 oz. of silver, 16,842 lb. of lead, and 13,305 lb. of zinc.

SILVERTON-NEW DENVER.*

Gold.

L.H. (49° 117° N.E.) This property on L. H. Creek, about 7 miles from Silverton, has been optioned from A. R. Fingland, of Silverton, by Kenville Gold Mines, Limited, a subsidiary of Quebec Gold Mining Corporation. Work was commenced in September. The road was cleaned out and

* By H. C. Hughes.

repaired and the old camp buildings renovated to accommodate a small crew. A programme of diamond-drilling was undertaken from the underground workings of No. 3 level, elevation about 5,200 feet, and about 2,000 feet of drilling was completed by the end of 1945. It is planned to continue this work during the winter as long as transportation conditions permit. About seven men were employed.

Silver-lead-zinc.

Standard, Mammoth, and Enterprise, Western Exploration Co.

(49° 117° N.E.) Company office, Silverton, B.C.; A. M. Ham, General Manager; R. A. Avison, Mine Superintendent. Capital: 2,000,000 shares, 50 cents par; issued, 1,489,654. This company operates the Standard mine on Emily Creek, about 3 miles from Silverton; the Mammoth mine on Avison Creek, about 4½ miles from Silverton; and the Enterprise mine on Enterprise Creek, about 17 miles from Silverton. The Standard mill was operated continuously until the end of June, when it was closed on the cancellation of the contract with Metals Reserve Corporation, which provided for shipment to the smelter at Kellogg, Idaho. Ore was supplied from both the Standard and Mammoth mines for this operation.

The Mammoth mine was closed on May 31st after all ore had been taken from above the lowest, or No. 7, level, at an elevation of 5,028 feet. Diamond-drilling of the downward extension of the ore-body had been done in 1944, but deeper development was not undertaken in view of the uncertainty of the times. An exploratory crosscut adit was begun in 1944, following surface drilling, and was completed in January, 1945. This adit is at an elevation of 5,349 feet, is 465 feet long in an average direction of north 25 degrees east, and is 340 feet west of the western face on No. 7 level. A zone containing some mineralization was cut 75 feet from the face of this adit, and it appears probable that the Mammoth vein, if it comes through, is following here the bedding of the argillites. Development at the Mammoth during 1945 included 79 feet of drifting, 213 feet of crosscutting, 57 feet of raising, and 392 feet of diamond-drilling. A maximum crew of fifty and a minimum of thirty-five was employed.

At the Standard mine, development was undertaken after the mill was closed. This was directed towards exploring areas in the vicinity of the old stopes between No. 6 level and the surface, and included sinking a 40-foot winze on a showing in the floor of No. 6 level below the innermost ore-body. Development on No. 6 has included investigations in the vicinity of the original "big" stope and may eventually solve some problems relating to localization of this large ore-body which was mined in past years; new mineralization has been found in the hanging-wall of the shear-zone or lode near the "big" stope. No. 3 level was cleaned out from the surface, a distance of 1,100 feet, at considerable expense. No. 4 level was reached from an inner part of No. 5, but the level is caved; a connection is to be made between Nos. 5 and 3 levels. Development for 1945 included 1,845 feet of drifting, 286 feet of crosscutting, 341 feet of raising, 40 feet of sinking, and 3,109 feet of diamond-drilling. An average crew of 110 men was employed in the mine, mill, and power plant while the mill was operating but the crew was reduced to about thirty after milling ceased. A total of 17,266 tons of ore from the Mammoth and Standard mines was milled and the concentrates were shipped to Kellogg, Idaho. This yielded 20 oz. of gold, 151,195 oz. of silver, 856,156 lb. of lead, and 2,082,800 lb. of zinc.

At the Enterprise mine, active development was undertaken as soon as weather conditions permitted in the late spring. The road up Enterprise Creek from the main Slocan Highway to the mine, a distance of 5 miles, was completely repaired and reconditioned; 3 miles of mine road was also repaired. The old Enterprise Camp was practically rebuilt. At the mine an ore-bin was built at the portal of No. 7 level and a

small mining plant, consisting of a portable gasoline-driven compressor, blacksmith equipment, etc., was installed. Underground, about 2,500 feet of the Nos. 7 and 5 levels were opened up and repaired; 822 feet of drifting was done and 76 feet of raising was done from the No. 7 level to connect eventually with No. 6 level. This will provide good natural ventilation and a second opening from the lower workings. A crew of about fifteen men was employed in this work. Present plans are to haul ore from the Enterprise mine to the Standard mill by truck. It is not expected that stoping will begin before the spring of 1946.

Hewitt. (49° 117° N.E.) This property, about 6 miles from Silverton, was leased late in 1945 by Frank Mills, S. S. Clough, and J. Kelly, of Silverton. The No. 10, or lowest, adit-level was retimbered and a small Diesel-driven compressor was installed before work was suspended for the winter. The operators plan to ship a milling-grade of lead-zinc ore to the Standard mill at Silverton.

Bosun, Santiago Mines, Ltd. (49° 117° N.E.) Mine office, New Denver, B.C.; head office, 423 Hamilton Street, Vancouver, B.C.; T. R. Buckham, Mine Manager. This company works the Bosun mine on Slocan Lake, about 1½ miles south of New Denver. During the latter part of 1945 a crew of six men was engaged in retimbering and reconditioning the No. 6, or lowest, adit-level. About 430 feet of this level was repaired. No mechanical equipment was used for this work.

DUNCAN RIVER.

Erdahl and Pinchbeck Claims.* (50° 116° N.W.) The five unsurveyed claims staked in June, 1945, by R. E. Erdahl and J. E. Pinchbeck, of Trail, comprise the Tin City, Canyon, Old Glory, Cyclone, and Erbeck claims. They extend north-westerly on the north-east side of the Duncan River Valley in the vicinity of Cockle (Bear) Creek, about 10 miles north of the head of Duncan Lake. A small cabin, built by the owners, stands by the east bank of the Duncan River across from Healy's Landing. The cabin may be reached by chartered river-boat, except in periods of low water, or by some 14 miles of forestry trail extending from the head of Duncan Lake.

In the vicinity of the exposures the rocks are greyish-green and brown schist and gneiss, limestone, and quartzite. The foliation strikes north 75 degrees to 45 degrees west and dips north-easterly at angles ranging from 50 to 90 degrees. Narrow, discontinuous, and irregular veins, stringers, and lenses of glassy quartz containing varying amounts of dark tourmaline, mica, amphibole, and carbonate cut the rocks, usually at a large angle to the foliation. Scattered grains of scheelite occur in many of the veins, and sulphides are present in local concentrations. Traces of tin and beryllium were detected by spectrographic analysis, the estimates for each metal ranging from *nil* to 0.04 per cent., but the tin- and beryllium-bearing minerals were not recognized.

The Tin City claim lies north of Cockle (Bear) Creek Canyon at the north-westerly end of the group and covers the area of the initial discovery of tin, beryllium, and tungsten mineralization. The showings lie near the forestry trail, about 1½ miles up from the owners' cabin, at an elevation of 700 to 800 feet above the Duncan River.

Greyish-green mica-amphibole schist and gneiss, containing variable amounts of carbonate, lie south-west of bedded limestone and quartzite. Quartz veins, stringers, and lenses cut the schist and gneiss at large angles to the foliation. The foliation strikes north 75 degrees to 50 degrees west and dips 50 degrees to 90 degrees north-east approximately parallel to the bedding of the limestone and quartzite. The veins strike north 5 degrees to 25 degrees east and dip 40 degrees to 80 degrees south-easterly. They vary in width from 10 inches to less than 1 inch within intervals of 20

* By W. J. Lynott.

to 30 feet. All of the showings are in a northerly-trending zone some 500 feet in length. Parts of the veins and lenses are covered by overburden but some exposures show blunt or pointed vein-terminations. The veins are composed of glassy quartz, tourmaline, amphibole, mica, and carbonate and are frequently banded parallel to the walls. Scheelite occurs as scattered grains. The wall-rocks are tourmalinized locally.

Assays of chip samples are as follows:—

Location.	Width of Vein.	Tin.	Beryllium.	Tungsten.
	Inches.	Per Cent.	Per Cent.	Per Cent.
Lowest exposed vein	10	*Nil*	0.04	Trace
Chip samples taken across vein at 2-foot intervals along 8-foot length extending from 53 feet to 61 feet from sample 1	7 (av.)	0.04	0.04	0.03
Chip sample across vein exposure 490 feet from sample 1	8	*Nil*	0.04	1.99

Cockle (Bear) Creek, in a sheer deep canyon, crosses the Canyon claim between the Tin City and Old Glory claims. Nothing of interest has been discovered on the Canyon claim.

Near the location-line of the Old Glory claim schist and gneiss are cut by veins of quartz and other minerals. A vein, similar to those on the Tin City claim, is exposed from approximately 70 feet to 134 feet down-slope south-west of the initial post, the extensions being covered by overburden. The width averages 12 inches over an exposed length of 57 feet from the lower end and then narrows to 2 inches at the upper end of the exposure. Assays of two samples across the vein show no traces of tin, beryllium, or tungsten.

About 300 feet south of the initial post two short adits have been driven into an irregular mineralized shear-zone. The mineralized material consists of quartz, wall-rock fragments, and carbonate with arsenopyrite and small amounts of pyrite.

An assay of selected mineral specimens is as follows: Gold, 0.01 oz. per ton; silver, 1.0 oz. per ton; copper, trace; lead, 0.3 per cent.; tin, 0.04 per cent.; beryllium, trace; tungsten, *nil.*

The Cyclone claim adjoins the south-east boundary of the Old Glory claim. Several veins, veinlets, and lenses of quartz, tourmaline, etc., cut gneiss and schist near the centre of the claim, along the location-line. The showings are similar to those on the Tin City claim. Approximately 100 feet north of the south-easterly and of the location-line, near the base of a steep bluff, a flat-lying vein up to 17 inches wide is exposed for a length of about 40 feet. A few feet from the southern end of this exposure a vein up to 12 inches wide is exposed up the face of the bluff for an estimated slope distance of 80 feet, striking north 35 degrees east and dipping 70 degrees to the south-east.

Assays of chip samples across the veins are as follows:—

Location.	Width sampled.	Gold.	Silver.	Tin.	Beryllium.	Tungsten.
	Inches.	Oz. per Ton.	Oz. per Ton.	Per Cent.	Per Cent.	Per Cent.
Flat vein	17	Trace	*Nil*	*Nil*	*Nil*	*Nil*
Steep vein	10	Trace	0.4	*Nil*	*Nil*	Trace

The Erbeck claim adjoins the south-easterly boundary of the Cyclone claim. The underlying rocks are greyish-green and brown schist, quartzite, and limestone cut by quartz veins. One vein, containing small amounts of pyrite and up to 36 inches in width, is exposed for approximately 100 feet. Mr. Erdahl reports that greater width and length of vein containing pyrite, pyrrhotite, and galena have been observed elsewhere on the claim. Assays of vein material from the Erbeck claim show negligible values in gold and silver, and occasional traces of tin.

FERGUSON.*

Silver-lead-zinc.

True-Fissure, Comara Mining & Milling Co., Ltd.

(50° 117° N.E.) Head office, 815 Queen Street West, Toronto 3, Ont.; mine office, Ferguson, B.C.; O. Tischauer, Mine Manager. This company operates the True-Fissure mine about 3½ miles from Ferguson. During 1945 the road from Ferguson to the mine was completely repaired and the camp renovated. Surface exploration was undertaken. This included 2,200 feet of surface diamond-drilling, 1,300 feet of which was done beneath the True-Fissure outcrop and the remainder near the St. Elmo workings. In addition to this, some trenches and test-pits were dug near the St. Elmo in an attempt to trace the St. Elmo vein south and to find its intersection with the True-Fissure vein. Work was suspended in November with intention to resume in 1946.

KIMBERLEY.*

Silver-lead-zinc.

Sullivan, Consolidated Mining and Smelting Co. of Canada, Ltd.

(49° 115° N.W.) Company office, 215 St. James Street, Montreal, Que.; mine and smelter office, Trail, B.C.; R. W. Diamond, Trail, President; R. E. Stavert, Montreal, Vice-President; J. E. Riley, Montreal, Secretary; H. B. Fuller, Trail, Comptroller; Sullivan mine office, Kimberley, B.C.; J. R. Giegerich, Mine Superintendent; H. R. Banks, Mill Superintendent. Capital: 4,000,000 shares, $5 par; issued, 3,276,329. The company owns and operates the Sullivan mine on Mark Creek, near Kimberley, and the Sullivan concentrator at Chapman Camp, about 3 miles away. During 1945 the output was increased substantially above that of 1944. The reasons for this were a better supply of labour, chiefly towards the end of the year, and more advanced stope preparation for diamond-drill blasting on the lower levels. The back-fill programme was not as extensive as in 1944, and this also resulted in more men being available for production.

The accident record of the company showed a marked improvement over 1944 but it was still far below the enviable position it held during the pre-war years. A great deal of attention is being paid to the matter of safety and a very complete staff is maintained under the direction of a safety engineer. Increased attention is being given to the necessity for shiftbosses and foremen seeing that the men under them are properly instructed in the safest methods of doing their work. The results of this will undoubtedly show up in the future in an improved accident record.

Although the general system of ventilation of the underground workings was not changed materially during 1945, progress was made on a new programme which, when completed, should provide adequate ventilation throughout the mine. A new exhaust raise north of the ore-body was started from the 3900 level and completed to the surface, a total length of 1,115 feet. This raise is now being enlarged from 6 by 16 feet to 12 feet by 16 feet. Two fans, each of 125,000-cubic-foot capacity, are to be installed at the head of this raise in the spring. In addition to the two main surface fans at present in use with a total capacity of 158,000 cubic feet per minute, there are four "booster" fans underground which at present take care of the main ventilation. Late in 1945 one of the main surface fans, a 96-inch Sheldon aerodynamic driven by a 100-horse-power motor, was destroyed by fire. The fan is to be replaced as soon as possible, but it is not anticipated that the temporary loss of this unit will be felt seriously during the winter while a strong natural circulation can be maintained. Twenty-three auxiliary units, ranging in capacity from 2,000 to 45,000 cubic feet per minute, are in use underground to provide distribution of air to the more remote parts of the mine.

* By H. C. Hughes.

Dust counts were made regularly every month, and the average for 1945 for the whole mine was 487 particles per cubic centimetre. This is slightly higher than in 1944. The use of atomizers and sprays is being stressed and dustless-type drifters are being tried out, four being in operation at the present time.

Development-work done during 1945 included 4,485 feet of drifting and cross-cutting, 22,160 feet of raising, and 475 feet of sinking. In addition to this, 8,400 feet of sub-levels were driven for long-hole diamond-drilling and slusher-drift stopes and 164,000 feet of core-drilling was done. Sinking operations to continue the 3360 shaft below the 3350 level were begun and 20 feet was completed towards the end of 1945. The shaft, when completed, will serve that part of the mine below the 3350 level. Present plans are to sink a pilot shaft for a distance of 800 feet at a slope of 38 degrees and to drive the main shaft as a raise from the pilot shaft. The other 455 feet of sinking was done from the surface and comprised the sinking of shafts through unconsolidated material and rock for back-filling purposes.

New equipment for underground work included two Conway mucking-machines, ten 90-cubic-foot ore-cars, and six 156-cubic-foot ore-cars. The latter were built in the company shops in Kimberley. All underground shops at the north end of the mine were moved to a new location between the north and south end stations. These new shops, which include accommodation for machinists, electricians, carpenters, drill-repairers, diamond-drillers, first-aid requirements, and lunch-rooms, all open off a central haulage-way. The shops have concrete floors and are completely whitewashed inside, presenting a very attractive and efficient appearance.

In the methods of mining used there was a further increase during 1945 in the footage drilled with diamond-drills over that drilled with conventional steel and detachable bits, although the increase was not as marked as in 1944. A total of 1,724,173 feet of hole was drilled in preparing ground for blasting in stopes and development-work. Of this, 101,000 feet was drilled by conventional steel, 1,186,631 feet by detachable bits, and 436,542 by diamond-drill for blast-hole purposes. A total of 1,309,300 tons of ore was broken by conventional steel and detachable bits and 1,137,670 tons was broken by diamond-drilling. The number of stopes which are still being mined by the old method of benching beneath a high back has decreased very markedly, and now this method is being used chiefly to open up slots for diamond-drill blasting in the stopes below the 3900 level. A considerable amount of preparation was made for pillar-extraction above the 3900 level in areas where back-filling had been completed. The method employed is to drive sub-level slusher-drifts with draw-holes in the foot-wall below the pillars and connect the draw-holes together to form a slot for diamond-drilling. The pillar is then mined by a system of diamond-drill hole rings which retreat down the foot-wall.

Back-filling operations from the surface were commenced as soon as conditions permitted in the spring and were continued until about the middle of November. Back-filling placed during 1945 amounted to 992,990 cubic yards: 916,820 yards from surface, 34,170 yards from mine waste, and 42,000 yards from caving. The work of placing concrete bulkheads underground in strategic locations in preparation for next season's work is being continued.

The new hoist-house, shaft-house, and head-frame for the 3360 shaft are located a short distance north of the old upper mine townsite. The work was started in the autumn under contract and the buildings were about half completed by the end of 1945.

During 1945 there was an average of about 1,460 men on the pay-roll. Of these, about 770 worked underground, 320 in various capacities on the surface at the mine, and 370 at the concentrator. The employment situation showed a decided improvement towards the end of 1945.

Of the total of 2,446,969 tons of ore mined during 1945, 1,264,581 tons came from above the 3900 level and 1,182,388 tons from below the 3900 level. The proportion of ore from below the 3900 level has substantially increased over that in 1944.

FIELD.*

Silver-lead-zinc.

Monarch and Kicking Horse, Base Metals Mining Corp., Ltd.

(51° 116° S.E.) Company office, 350 Bay Street, Toronto, Ont.; mine office, Field, B.C.; J. H. C. Waite, President; G. C. Ames, Secretary-Treasurer; H. D. Forman, Manager; E. G. Cameron, Mine Superintendent; John Vallance, Mill Superintendent. Capital: 3,000,000 shares, no par value; issued, 2,330,714. This company operates the Monarch mine on Mount Stephen, south of the Kicking Horse River, and the Kicking Horse mine on Mount Field, north of the river. The Kicking Horse mine was operated continuously throughout 1945, supplying the mill with a total of about 36,000 tons of ore averaging 1.2 per cent. lead and 16.3 per cent. zinc. Development-work at this property included 55 feet of drifting and 386 feet of diamond-drilling. The Monarch mine was operated more or less intermittently but, as demand for lead increased towards the end of 1945, more attention was concentrated on this part of the operation. A total of about 11,000 tons, averaging 7½ per cent. lead and 4.3 per cent. zinc, was mined from this property. Development included 42 feet of drifting in the vicinity of 175 D stope.

The mill was operated continuously throughout 1945 on a two-shift basis six days a week. An average of sixty-eight men was employed throughout 1945. Present ore reserves are believed to be sufficient to carry the operation until spring. In the meantime limited development is being undertaken. A total of 47,777 tons of 2.7 per cent. lead and 13.5 per cent. zinc ore was milled. Until June 30th all metal was sold under a contract with Metals Reserve Corporation, but on the expiration of this contract, new ones were arranged as follows: Zinc concentrates were sold to the American Zinc Company of Illinois at East St. Louis, Ill., and lead concentrates to the American Smelting and Refining Company, East Helena, Montana. The concentrates yielded 72,598 oz. of silver, 2,152,007 lb. of lead, and 9,660,898 lb. of zinc.

SKAGIT RIVER.†

Silver-lead-zinc.

Invermay Annex, Skagit River Development Co., Ltd.

(49° 121° S.E.) G. Allan MacPherson, Manager; A. D. MacIsaac, Mine Superintendent. The mine is approximately 25 miles south-east of Hope in the part of the Skagit River area known as 23-Mile Camp. It is reached from the Skagit River Road by a trail 4 miles long, which climbs steeply along the north side of Silver Daisy Creek. The The workings on the property include Nos. 1, 2, and 3, and A and B adits, together with several open-cuts, all at elevations between 5,890 feet and 5,350 feet.

The work being done on September 10th was surface diamond-drilling. One hole had been completed and a second hole was being drilled. The diamond-drilling was being done on contract by the D & B Diamond Drilling Company, who had four men at work.

An aerial tramway approximately 2½ miles long, of single continuous-wire type, was used formerly for taking supplies from the lower terminal near the Skagit River, 1 mile south of 23-Mile Camp, to the upper terminal at the mine camp, at an elevation of approximately 5,100 feet. This tramway and other surface equipment installed by former owners reverted to the Crown and were sold to private interests; the present operators considered such equipment unsatisfactory for use in further development.

The workings of the mine were described in some detail in the Annual Report of the Minister of Mines for 1938, pages F 23 to F 26.

* By H. C. Hughes.

† By E. R. Hughes.

RUSKIN.*

Gold.

L.A.P. Mining Co.

(49° 122° S.E.) This company, owned by L. A. Prosser, has a small operation about ½ mile up the Stave River from the Ruskin power-dam. A crosscut is now in 50 feet from the surface. The company expects to reach a vein by driving the crosscut 200 feet farther. Five men are employed.

HOWE SOUND.*

Copper.

Britannia Mining and Smelting Co., Ltd.

(49° 123° N.E.) Company office, 730 Fifth Avenue, New York City; mine office, Britannia Beach, B.C.; H. H. Sharpe, President; C. P. Charlton, Secretary-Treasurer; C. P. Browning, General Manager; E. C. Roper, Superintendent. Capital: 100,000 shares, $25 par; issued, 91,966. This company operates the Britannia mines at Britannia Beach, Howe Sound. The mines being worked at present are the Victoria, No. 5, Fairview, Bluff, and 4100-tunnel district, which includes No. 8 shaft. Regular development operations were hampered greatly because of labour shortage, but towards the end of 1945 a slight improvement in the employment situation was evident. Development-work in the No. 8 shaft area was carried out methodically and regular stoping operations were carried on in other parts of the mine.

In the No. 5 and Victoria mines the method of stoping is the square set and in the Bluff area the powder-blast method is employed.

Development-work at these mines in 1945 totalled 6,079 feet, or 1.15 miles, made up as follows: Drifts, 2,554 feet; crosscuts, 269 feet; powder-blast workings, 750 feet; and winzes, 2,506 feet. A total of 6,370 feet of diamond-drilling was done. The total production of all the mines amounted to 566,500 tons, compared with 606,717 tons in 1944.

The total production, including copper from the copper precipitation plant, was 11,599,650 lb. of copper, 7,832 oz. of gold, 43,587 oz. of silver, and 9,095 dry tons of pyrite.

Ventilation and dust-control received careful consideration throughout 1945, and the aluminium-dispersal units installed in all the dry-rooms in 1944 were used continuously throughout the year.

The experiments carried out in 1944 with dustless Leyner drilling-machines were considered very satisfactory and the use of these machines was increased in 1945. A school for training men in timbering, etc., was started in the Victoria mine, and in the Bluff mine a school for training miners in stoping, drifting, raising, etc., was started with gratifying results. The men themselves are taking a keen interest in this work and giving the officials every co-operation.

During 1945 the average number of men employed was 488 and at the end of the year the total number of men employed underground, on the surface, and in the mill was 555.

TEXADA ISLAND.

As a result of the success that attended the rehabilitation of the Little Billie mine by diamond-drilling and underground work, prospectors and prospecting companies were active on the island during 1945. Several of the larger well-established companies actively prospected many of the older properties over an area at the north end of the island extending from the east to the west coasts. The only underground exploration, other than at the Little Billie, was at the old Marble Bay mine. Elsewhere on the island work was confined to surface work and to diamond-drilling.

* By James Strang.

Gold.

Gem.* (49° 124° N.W.) *This property, about 4 miles south-westerly from* Vananda, was unwatered and completely examined by an engineer of the Granby Consolidated Mining, Smelting, and Power Company in the summer of 1945. No other work was done and the shaft was allowed to fill with water. A watchman is kept on the property.

Red Hawk Gold Mines, Ltd.* (49° 124° N.W.) Company office, 808 Pender Street West, Vancouver, B.C.; L. A. Weinrib, President; Egil Lorntzen in charge of work in 1945. This company owns the R.W. group of six claims and a fraction, east of the road to Gillies Bay, about 5 miles south-westerly from Vananda. It includes in part the showings of the old Red Wing property. During 1945 trenches and pits were dug on the property. The showings consist of a few short fractures in limestone, some mineralized with pyrite and sphalerite and some with galena and sphalerite. The gold values are low.

Copper King.† (49° 124° N.W.) The Copper King Crown-granted claim is on Surprise Mountain in the northern part of Texada Island. A half mile of road, now overgrown, leads to the showings from a point on the Iron Mines Road about 4 miles from the town of Vananda. Most of the work on this claim was done at the close of the last century. The claim is held by Berkley Grieve, of Sandwick, B.C., and his associates.

The showings occur in massive greenstone of the Texada formation. A zone of slight shearing, striking south 10 to 20 degrees east and dipping 70 degrees eastward, is exposed in one of the workings.

A shaft, now flooded, said to be 63 feet deep, has been sunk in the greenstones on or close to the shear-zone. A grab sample from a high-grade dump adjacent to the shaft assayed: Gold, *nil;* silver, *nil;* copper, 5.3 per cent.

A short trench, now filled with rubble, lies 50 feet south 30 degrees east of the shaft. A channel sample from the south end of the trench across 48 inches of sparsely mineralized greenstone assayed: Gold, 0.02 oz. per ton; silver, 0.2 oz. per ton; and copper, 0.2 per cent.

A second trench, exposing brecciated and slightly sheared greenstone, lies 60 feet south 5 degrees east of this trench. This rock is sparsely mineralized with pyrite, chalcopyrite, and vuggy quartz. A grab sample from the dump assayed: Gold, trace; copper, 0.8 per cent.

Surprise Gold Mines, Ltd.‡ (49° 124° N.W.) This company, largely financed by the Quebec Gold *Mining Corporation, owns several Crown grants on Surprise Mountain* on the west side of Texada Island. Three-quarters of a mile of road, now overgrown, leads to the Surprise shaft from a point on the Iron Mines Road about 4 miles from the town of Vananda.

Most of the work on the Surprise claim was done in 1897 and 1898, at which time the Surprise shaft was sunk. Work during 1945 was concerned mainly with making a geological survey of the ground and in building a camp. Several of the old trenches were cleaned out and examined. In the autumn diamond-drilling was begun with the object of exploring a mineralized shear-zone that averages almost 5 feet in width and extends for about 3,000 feet north-westerly from the Surprise shaft to the north-western boundary of the Silver Tip claim. A branch from this shear extends from *near the Surprise shaft northerly to the Nancy Bell shaft. The Surprise shaft, sunk* on the shear-zone, is inclined south-westerly at an angle of 75 degrees. A drift 8 feet

* By John S. Stevenson.
† By W. H. Mathews.
‡ By John S. Stevenson and W. H. Mathews.

below the collar extends 12 feet north-westerly on the shear which is here 5 feet wide. The shaft is reported to extend to a depth of 365 feet. It is now flooded to within a few feet of the top. The rocks are mainly basaltic lava flows which strike north-westerly and dip 10 degrees to 45 degrees north-eastward. A bed of limestone from 8 to 10 feet wide outcrops about 300 feet north-west of the Surprise shaft. The same bed presumably has been cut by the Nancy Bell shaft. The mineralization in the main, or Silver Tip, shear consists of narrow criss-crossing quartz stringers in sheared greenstone. The quartz contains a moderate amount of sphalerite and small amounts of chalcopyrite and galena. Judging from specimens on the dump, the Nancy Bell shear, where cut in the shaft, contained an abundance of sphalerite which is almost black and very fine-grained and dense in texture. Good values in gold are found in both shears.

Gold-copper.

Little Billie, Vananda Mining Co., Ltd.*

(49° 124° N.W.) Company office, 607 Rogers Building, Vancouver, B.C.; H. T. James, President; Chas. R. Cox, Manager. The Little Billie mine is near Vananda, Texada Island. A detailed report on the property was published in the Annual Report of the Minister of Mines for 1944. During 1945 the shaft was deepened from the 280 to the 480 level. This part of the shaft has three compartments and is tightly lagged throughout. An exploration drift was driven about 350 feet in a direction south 20 degrees west from the 480 shaft station. It reached an ore-body revealed by diamond-drilling from the 280-foot level. At 130 feet from the shaft the level passed south-westerly from quartz-diorite into cream-coloured garnet rock containing patches of quartz. Between 45 and 70 feet south-west of the shaft a strong shear-zone striking north 35 degrees east was crossed. This does not appear to be the main fault that is found in the upper levels. A total of 444 feet of diamond-drilling was also completed on the 480-foot level during 1945. Additions have been made to the power plant and dumping equipment has been erected at the head-frame. Twenty-two men are employed in the whole operation, which includes a small sawmill.

Marble Bay Mining Co.†

(49° 124° N.W.) This company has taken over the Marble Bay mine from L. A. Prosser. The old Marble Bay shaft has been unwatered to a point 60 feet below the sixth level and some exploratory diamond-drilling was done from the fifth level. Diamond-drilling during 1945, including a large number of holes drilled from the surface, totalled 8,000 feet. George Griffiths is in charge at the mine. Eight men were employed.

Loyal.‡

(49° 124° N.W.) During 1945 this old property, 1 mile east of Blubber Bay and now covered by the Bay-Sun group of claims, was prospected by the International Mining Corporation, 85 Richmond Street West, Toronto, with J. M. Baker in charge. The ground was thoroughly mapped and several diamond-drill holes put down. The results were inconclusive and the work was suspended in July, 1945.

PORT ALBERNI.‡

During 1945 the road up China Creek from Port Alberni to the Havilah mine was reconditioned. Preliminary exploration of this property was undertaken by Mr. Greene and associates, of Port Alberni, but it is reported that little besides reconditioning the camps was accomplished.

Farther down Alberni Canal the road from Underwood Cove was extended beyond the junction of Museum and Franklin Creeks to the Black Panther mine. This prop-

* By James Strang and John S. Stevenson.
† By James Strang.
‡ By John S. Stevenson.

erty is under development by Nitinat Golds, Limited, of 221 Hall Building, Vancouver, B.C. It is reported that most of the work was confined to road-building and to erecting a small mill on the property.

The Havilah and Black Panther properties have been fully described in the Annual Report of the Minister of Mines for 1944, pages 153–154 and pages 157–159.

GREAT CENTRAL LAKE.*

The main activity in this area was the work done by the Cangold Mining and Exploration Company on the Sherwood property near the headwaters of Drinkwater Creek. It is understood also that prospectors worked in the area between the headwaters of Drinkwater Creek and Bedwell River.

Gold.

Sherwood, Cangold Mining and Exploration Co., Ltd.

(49° 125° S.W.) Company office, Credit Foncier Building, Vancouver, B.C.; Robert B. Gayer, Vice-President and Managing Director, Vancouver, B.C.; Charles Bruder, Secretary-Treasurer, Vancouver, B.C.; E. H. Bates, Mines Superintendent. Pioneer Gold Mines of B.C., Limited, did considerable underground work on this property in 1940. This work has been described fully in Bulletin 13 of the British Columbia Department of Mines, 1941, pages 86–95. Cangold Mining and Exploration Company, Limited, took over the option on the Sherwood property in the early part of 1945. The property consists of twenty claims and fractions and is located on the headwaters of Drinkwater Creek, approximately 9 miles by road and trail north-west of the upper end of Great Central Lake. An old logging-railway grade, extending north-west from the lake for a distance of 5½ miles, was repaired and converted into a well-graded truck-road. This work included the repairing of several bridges. The company also ran a location-line, 19,500 feet long, for a road from the end of the railroad grade to the bottom of the hill below the mine. The camp buildings at the mine were repaired and an average crew of ten men was employed at the property from May 25th to October 30th. The work undertaken consisted of surface-stripping, surveys for camps, mill-site, tram-line, and power-site, together with Crown-grant surveys for the claims held by location. Repair-work was carried on in the lower adit, the raise from No. 7 level to No. 5 level, and the sub-level off No. 5 level; the raise and sub-level were also surveyed and sampled. Surface-prospecting above the present mine-workings found outcrops of several new gold-bearing quartz veins. These were discovered late in the season and remain to be opened up by stripping and trenching.

According to reports the work accomplished during the 1945 season has enabled the executive to decide on the construction of a 50-ton mill and surface plant to provide power for further underground development and diamond-drilling. It is expected that this work will begin as early as possible in 1946.

HERBERT ARM.†

Gold.

Berton Gold Mines, Ltd.

(49° 125° S.W.) Company office, 815 Hastings Street West, Vancouver, B.C.; B. L. Clayton, President and Superintendent; Russel Walker, Vice-President; James E. Cameron, Secretary-Treasurer. Capital: 3,000,000 shares, no par value. During 1945 Berton Gold Mines, Limited, acquired the Abco property at the head of Herbert Arm. Since the last complete description of the property in the Annual Report of the Minister of Mines for 1935, pages F 40–F 43, it is understood that considerable underground work was

* By John S. Stevenson and James Strang.
† By John S. Stevenson.

done by Premier Gold Mines, Limited. During 1945 the present company did 44 feet of drifting. The average number of men employed was two.

ZEBALLOS.*

The producing mines in this area have been closed since 1942 but during this time watchmen have been kept at the three main producers, Privateer Mine, Limited, Spud Valley Gold Mines, Limited, and Central Gold Mines, Limited. The road from the town of Zeballos at the beach to the mines was kept in good condition by the Provincial Department of Public Works during the shut-down period. Late in October, 1945, Privateer Mine, Limited, sent a large crew of men to recondition the Privateer and Prident mines, preparatory to production early in 1946.

Prospectors were active in the area during 1945 and several prospects were being opened up. However, since the Zeballos mining camp will be fully described in a forthcoming bulletin of the Department of Mines, only brief mention of prospecting activity will be given here.

At the Beano property Victory Mines, Limited, had a small crew of men, under the supervision of V. Davies, engaged in building a tram-line from the end of the road to the mine. The road only recently constructed from the beach to the mine, is 3 miles long. Victory Mines, Limited, plan to mine and ship high-grade ore from the Beano early in 1946.

At the Golden Portal, formerly Golden Gate, three men with one machine extended the drift on the one adit on the property.

At the Barnacle property, on Lime Creek, A. Morod and W. MacLean continued hand-mining in the drift on their main vein and prospected other showings on the property.

At the Churchill property, at the headwaters of Lime and Fault Creeks, S. M. Ray and J. Foster continued surface-prospecting of a vein carrying values in silver and lead.

At the Cordova property, on Black Sand Creek, R. V. Murphy continued underground work by hand on a strong quartz vein.

At the I.X.L. property, on the north-east side of Spud Creek, V. Davies, owner, employed one man in driving a drift by hand on a high-grade gold-quartz vein. By the end of September, 1945, this drift was in about 40 feet.

Gold.

Privateer Mine, Ltd.† (50° 126° S.W.) Company office, 602 Stock Exchange Building, Vancouver, B.C.; D. S. Tait, President; N. E. McConnell, Managing Director; C. Harry Hewat, Manager. The Privateer mine in Spud Valley, about 4 miles by road from Zeballos, was reopened during October, 1945, after being closed down for about two years because of war conditions. The mine is being put in condition for operating; drifting is being carried on in the 1100 level and preparations are being made to take the water out of the shaft to open up the 1225 level. The Prident mine, which adjoins the Privateer and is connected to it by a crosscut and raise, is also operated by the Privateer Company. The 400, 500, and 600 levels in the Prident are being drifted on, preparatory to blocking out ore for stoping. It is expected that the mill at the Privateer will be in operation by the end of February, 1946. Thirty-eight men are employed on the surface and underground at the two mines. Development-work consisted of 40 feet of crosscutting and 525 feet of drifting.

* By John S. Stevenson.
† By James Strang.

INSPECTION OF METAL MINES.

BY

JAMES DICKSON.

PRODUCTION.

The output of metal mines for 1945 was 4,377,722 tons. This tonnage was produced from thirty-six mines, of which twenty-seven produced 100 tons or more.

FATAL ACCIDENTS IN METAL MINES (INCLUDING UNDERGROUND PLACER-MINING).

There were nine fatal accidents in and around the metal mines and concentrators in 1945, being an increase of five over 1944. There was one fatality at a surface placer operation in Atlin and one teamster was killed on the highway near Bralorne. There were no fatalities in the quarries in 1945. There were 3,683 persons employed under and above ground in the metal mines and 822 persons in the concentrators in 1945. The ratio of fatal accidents per 1,000 persons employed was 1.99 compared with 0.87 in 1944.

The tonnage mined per fatal accident during 1945 was 486,413 tons compared with 1,217,439 tons in 1944. The tonnage mined per fatal accident during the last ten-year period was 504,572 tons.

The following table shows the mines at which fatal accidents occurred during 1945 and the comparative figures for 1944:—

Mining Division.	Mine.	No. of Fatal Accidents.	
		1945.	1944.
Vancouver	Britannia	1	....
Lillooet	Bralorne	2	2
Similkameen	Copper Mountain	1	....
Ainsworth	Whitewater	1	....
Fort Steele	Sullivan	3	1
Portland Canal	Silbak Premier	1	1
Totals		9	4

The fatal accident which occurred to Richard Burrows, miner, Copper Mountain mine, on January 11th, 1945, resulted from a fall of ground while he was barring down near the top of a short raise which had been idle for some time. He was found in a semiconscious condition at the foot of the raise where he had rolled or been carried by a comparatively small amount of loose material. His partner was also found in an injured condition some distance away, but neither man was able to state what had occurred. Burrows died the following day from his injuries.

The fatal accident which occurred to Robert Chimety, miner, Retallack Mines, Limited, Retallack (Whitewater), on February 8th, 1945, resulted from a fall of ground. Chimety and his partner had drilled fifteen holes through the slab that fell and injured *both men. Chimety died while being taken to the hospital at Kaslo.*

A fatal accident occurred to Joseph I. Graas, chuteman, Sullivan mine, on February 20th, 1945, when he was struck by a rock while barring at a loading-chute. He *was trying to bar a small rock from the chute when a larger rock came through the* chute and caused him to lose his balance and fall into the car, where the smaller rock fell on him and killed him instantly.

A fatal accident occurred to Clifford L. de Pencier, trackman, Sullivan mine, on March 12th, 1945, when he fell through an open dump while trying to pass a standing

train by passing along a spill block only 7 inches from the train. He slipped off the spill block and went down the raise. There was a crossover platform over the dump and a good footway on the other side of the track.

A fatal accident occurred to Benjamin R. Stuart, tramway lineman, Silbak Premier Mining Company, on June 2nd, 1945, when he was struck on the head by a piece of a temporary gin-pole, which was being used to put the aerial tram rope into position. The pole broke when strained and a falling piece struck Stuart, who died from his injuries the following day. He had selected the gin-pole himself and after the accident it was found to be defective because of rot. This accident occurred in Alaskan territory, through which the Silbak Premier tram-line passes.

The fatal accident which occurred to Edvin Benson, placer-miner, Wickstrom, Sunde, and Benson, Atlin, on July 30th, 1945, resulted from strangulation. Benson had attempted to enter and repair a stationary water-wheel, feet first, and apparently his weight was sufficient to cause the wheel to turn before he got completely inside, with the result that his head was caught on a board outside the wheel and one of the spokes pressed on his neck with a fatal result. He was alone at the time.

A fatal accident occurred to Mirko Starcevic, barman, Sullivan mine, on August 27th, 1945, when he was struck and carried down the foot-wall on a 40-degree slope by moving muck. Starcevic was barring down loose material on the foot-wall and had a safety-rope with him, but while the rope was securely fastened to an eye-bolt, he had not secured himself to the rope.

A fatal accident occurred to Frederick Curley, teamster, Bralorne mine, on September 4th, 1945, when he was run over by a run-away team of horses and wagon. While he was unloading the wagon at the incinerator, the horses took fright and bolted, causing Curley to fall from the wagon and slightly injure his arm, and the horses and wagon left the road. Curley went to the near-by hospital and had his arm treated, and several hours later went back to assist in getting the wagon onto the road. This was done, but the horses again bolted and Curley, in trying to stop them, was knocked down and run over, receiving injuries from which he died immediately. After his first injury, Curley had gone back merely to give instructions to the man who was to handle the horses while he was recovering.

A fatal accident occurred to James Miron, miner, Bralorne Mines, Limited, on September 10th, 1945. He was carried down and suffocated by a run of muck which gave way over a hung-up chute.

The fatal accident to Edward Pearce, mucker, Britannia Mining and Smelting Company, Limited, on October 24th, occurred when he fell in a grizzly through which he had just barred a large piece of ore. The ore carried his bar with it; he could not release his hold in time and he was pulled into the grizzly, which discharged through a series of wing raises for a distance of 250 feet. Death was apparently instantaneous.

The fatal accident which occurred to Anthony D'Ercole, miner, Bralorne mine, on December 12th, 1945, resulted from a fall of ground where he was barring down after blasting. He was pinned down by a heavy slab of rock which had to be lifted by jacks before he could be released. This was accomplished about half an hour after the accident, but D'Ercole died before reaching the portal of the mine.

DANGEROUS OCCURRENCES.

On January 8th, 1945, a belt pulley on a 245-horse-power Winton engine in the power-house at the Whitewater mine at Retallack flew apart while the engine was being tested. The pulley, a new one, 68 inches in diameter with a 24-inch face, was of the split type and was made of cast iron. One piece tore a hole about 2 feet by 6 feet in the roof of the power-house and another piece made a small hole in the wall at the west end. The normal speed of the engine was 250 revolutions per minute but it was

running at only 150 revolutions per minute when the pulley went to pieces. An examination of the pieces of the rim of the pulley showed blow-holes and defects in the casting and a variation in thickness in the rim of ¼ to ⅞ of an inch. The pulley was obviously defective. No person was injured.

On January 24th, 1945, in No. 2 shaft of Pioneer mine, the west-side cage was hoisted by error into the upper part of the shaft where heavy overburden had forced the shaft timbers out of alignment, and at a point above the main adit-level collar. This upper part of the shaft was not in use, pending repairs. It was not realized that the cage was hung up until a considerable length of slack rope was payed out on the west side while the east cage was being hoisted. The vibration of the east cage was apparently sufficient to free the west cage, which fell to the limit of the slack rope, at which point the cage was arrested with considerable damage to the shaft timbers, the cage, and the rope. No person was injured. The shaft was retimbered from the 500-foot level to the surface before the end of 1945.

On February 11th, while one of the storage-battery locomotives was being lowered in No. 2 shaft, Pioneer mine, the locomotive fouled the shaft timbers and the storage-battery was thrown into a recess above the 1400-foot station and lodged there. The cage and locomotive were damaged but no person was injured. Additional precautions were adopted to prevent a recurrence of this type of mishap.

On May 22nd, 1945, the power-house and power plant of the Whitewater mine at Retallack was entirely destroyed by fire. The origin of the fire was unknown but there is no evidence to show that it might have started from the exhausts from the Diesels. A plentiful supply of water under pressure was available but once the fuel and lubricating oil caught fire nothing could be done. Two of the engines in the power-house were running at the time.

On August 24th, 1945, the rope raise of the 3901 shaft at the Sullivan mine, between the collar of the shaft and the head sheave, showed decided evidence of pressure. This raise was protected by a substantial concrete covering consisting of two side-walls about 14 inches thick, a centre partition between the Nos. 1 and 2 compartments about 6 inches thick, and an arched concrete slab over the back 12 to 14 inches thick. As the result of pressure from back-fill and possibly ground movements, the centre partition was completely crushed for a length of about 20 feet and the side-walls and roof slab, especially on the south side, showed signs of failure. The south compartment was then solidly filled with concrete for the distance affected, leaving a small hole through the centre for the hoisting-rope. On September 14th, following a heavy blast in which some 8,000 tons were broken 300 feet from the shaft, additional pressure developed in the north compartment. This was then reinforced by 12- by 14-inch timber for a distance of about 30 feet. There has been no evidence of movement since that time.

About the 15th of November one of the main ventilating-fans at the Sullivan mine was completely destroyed by fire. This is a Sheldon aerodynamic 96-inch fan with a capacity of about 75,000 cubic feet per minute and driven by a 100-horse-power motor. It is located on the surface at the collar of the No. 14 shaft and is used to exhaust air from the mine. The fan-blades were broken in a manner which would suggest that some object had struck them while they were turning at practically full speed. One of the main bearings of the fan was also badly broken, although an examination showed that both bearings were well lubricated. There is no definite evidence which would indicate that the cause of the fire resulted from an electrical or mechanical defect. The fan is to be replaced as soon as possible.

On November 4th, 1945, in No. 2 shaft, Pioneer mine, the descending east cage was temporarily arrested by newly installed guides which had swollen to oversize. The safety-catches also came into action and held the cage, although some 100 feet of

slack rope was payed out before the hoistman noticed the absence of the load. No person was injured and no damage resulted to equipment.

On November 9th, 1945, the cook-house and dining-room at the Lucky Jim mine at Zincton were completely destroyed by fire. The fire apparently started in the hood over the stove, where it went through the attic of the cook-house. Although a plentiful supply of water under pressure was available, the fire could not be brought under control because of the difficulty of getting at the attic of the building. The recreation-hall is to be used for temporary cook-house accommodation until the spring.

On November 10th, 1945, in No. 1 shaft, Island Mountain mine, a sump on the 3750 level overflowed and the water ran into the shaft ore-pocket, evidently causing a surge of ore which forced the lip of the chute to discharge into the shaft. This took place late in the afternoon shift. When the hoistman came on shift, both skips were at the surface and he lowered one to the shaft-bottom to put them in balance. When the other skip was lowered, it fouled the projecting chute and damaged the guides, but it was held there by the damaged guides, in which the safety-catches were firmly embedded, and by the chute. About 600 feet of slack rope had been unwound on top of the skip before this occurrence was discovered and 160 feet of rope at the skip end had to be cut off because of kinks. No person was injured.

EXPLOSIVES USED IN MINES.

During 1945 the quantity of explosives used in metal mines and quarries showed an increase over 1944. The high explosives amounted to 3,677,200 lb.; fuse detonators, 1,151,000; electric detonators, 28,200; delay electric detonators, 6,200; primacord, 135,000 feet; and safety-fuse, 7,315,000 feet.

During 1945 the Inspector of Mines supervised the removal and destruction of small amounts of explosives found at abandoned properties.

PROSECUTIONS (METALLIFEROUS).

During 1945 there were no prosecutions for infractions of the "Metalliferous Mines Regulation Act."

AIR-SAMPLING.

Air samples were taken in cases where conditions indicated the possibility of noxious gases such as carbon monoxide or nitrous oxide being present, or oxygen content being below normal. The analyses showed no dangerous conditions but in some cases augmented ventilation was considered necessary and was ordered by the Inspector.

DUST AND VENTILATION.

The ventilation at all the larger mines and many of the smaller ones continues to show general improvement as the value of power-produced and controlled ventilation is recognized. Although there is room for improvement in the case of long single drifts and raises. They are receiving attention.

The use of aluminium-dust therapy is now standard practice at all the larger mines in the Province and, from the reports available, has met with the full approval of the men employed. Only a few individuals, for various personal reasons, have refused this treatment and the total of those so objecting is less than a dozen.

The number of the dustless Leyner drills in use has increased during 1945 and there is little doubt that all machine replacements will be of this type.

The application of water and water sprays on muck-piles and at transfer points is not only on the increase but the men engaged at these points seem to be imbued with the value of this precaution instead of merely using the water because the regulations require it.

SAFETY AND FIRST-AID WORK.

The Mine Safety Associations in the different mining areas of the Province carried on and fostered first-aid work and safety education in their respective districts of Vancouver Island, Britannia, Princeton, East Kootenay, and Bridge River, to which work the safety engineers at the various mines and the District Inspectors of Mines added their efforts throughout 1945.

In addition to their other activities, the above associations held first-aid and safety demonstrations at which not only the men engaged in the mines took part but also many women, girls, and boys, so that the value of safety and first aid beyond the immediate needs of the mines is being recognized.

While the success of this work depends very largely on the efforts of the personnel of the Mine Safety Associations, the Department of Mines, by means of financial grants, supplies most of the funds required to meet any necessary expenses.

The shortage of labour and the fact that so many of the new men entering the mines are inexperienced have placed greater responsibility on both management and experienced workmen to carry on safety education and to keep up the usual proportion of trained first-aid men. In spite of these difficulties, very good progress has been made during 1945.

PLACER-MINING.

CONTENTS.

ATLIN.*

During 1945 no new development or increase in production took place and the large surface operations were idle.

SPRUCE CREEK.

Dream, New Year, and Shamrock Leases, Columbia Development, Ltd.

(59° 133° N.W.) J. H. Eastman, Managing Director. Capital: 50,000 shares, $1 par; issued, 50,000. This is the largest underground placer operation in the district. The company has a lease or lay from John W. Noland, which will expire on August 25th, 1946. Actual mining operations at present are on the Shamrock and New Year leases. Because of the time-limit on the lease, work is being concentrated on the rich section in the centre of the pay-channel, and the B and J drives which were being advanced outside the pay-channel have been discontinued. Pillar-extraction is also being carried on by the method described in previous reports. Haulage is by storage-battery locomotive on B drive. The company has been short of labour and has been able to work only one shift, employing thirty-three men.

Dream Lease.

(59° 133° N.W.) J. W. Noland, Operator. During 1945 operations were carried on intermittently, with seldom more than three men employed. The work included removing pillars and driving a small drift for drainage toward workings on the Shamrock lease of Columbia Development, Limited. Mr. Noland has also acquired the leases of the Spruce Creek Mining Company, Limited, but has not done any mining on them yet.

Several other leases, each employing one to three men, most of whom were laymen in partnerships, were worked during 1945.

* By Charles Graham.

Ruby Creek.

Gladstone, Graystone, and Redstone Leases, Columbia Development, Ltd.

(59° 133° N.E.) J. H. Eastman, Managing Director. Capital: 50,000 shares, $1 par; issued, 50,000. This company has taken an option on the Gladstone and Graystone leases owned by E. Krumbeigel, and has staked the Redstone lease. Mr. Krumbeigel had sunk a 7½- by 4½-foot two-compartment shaft to a depth of 141 feet when he was forced to stop by a lack of finance. The shaft passes through 133 feet of lava and penetrates 8 feet into the underlying gravel. The shaft was unwatered by two Cornish beam pumps driven by a water-wheel, and the guides and ladder-way were renewed.

The hoist is gasoline-driven and uses half-inch cable; it has a drum 16 inches wide and 6 inches in diameter, a cone clutch, and a foot brake. A Canadian blower-fan with 8-inch discharge, which is belt-driven from the water-wheel, was installed.

Farmer Lease.

(59° 133° N.E.) Wickstrom, Sande, and Nelson, laymen. The property, owned by J. W. Noland, has been worked previously by other laymen. The present operators were opening up the inclined shaft and building a shaft-house; a water-wheel, sluice-boxes, and a flume. The hoist will be operated from the water-wheel.

Otter Creek (59° 133° N.E.).

Walter Johnson and Company, of San Francisco, have acquired the property of the Compagnie Française des Mines d'Or du Canada. The ground was tested by Keystone-drilling during the summer of 1945.

Boulder Creek (59° 133° N.E.).

Lay of Norman Fisher and partners. The property is owned by the Consolidated Mining and Smelting Company of Canada, Limited, and is worked as a lay by Mr. Fisher and six other men. It is a hydraulic operation, having two runs of water daily, each lasting from three to four hours.

Consolation Creek (59° 133° N.E.).

This creek runs into Gladys Lake, north-east of Atlin. Men and materials are flown in or taken up Surprise Lake by boat and over a trail to the creek. During the spring of 1945 seven men, working in partnership, sunk an 8- by 4-foot shaft to a depth of 47 feet. They are now on rim and have started to drive up-stream to locate a channel.

McKee Creek (59° 133° S.W.).

Three groups of two men each are driving drifts into the bench on three leases.

CARIBOO.*

Willow River.

Lowhee Mining Co., Ltd.

(53° 121° S.W.) This private company works the Lowhee placer mine, situated on Lowhee Creek which empties into Jack of Clubs Lake at Wells. The shortage of water resulting from extremely small snowfall during the winter of 1944–45 curtailed the amount of work done at this property. A connection between Lowhee and Stouts Gulches was not made and the reason for the difference in the bed-rock elevations of the two gulches still remains unknown. It was impossible to make a complete clean-up with the result that production decreased. It was necessary to put a dam and flush-gate in the ditch to get intermittent flows of water of sufficient volume to move material through the long

* By J. A. Mitchell.

4-foot flume. It was also necessary to sledge a greater proportion of boulders than in previous years. J. House, Superintendent, supplied the information that work began on April 16th and was stopped on October 25th, about 125,000 cubic yards of gravel having been moved from the pit. The crew consisted of twelve men and a cook. The mine was worked on staggered shifts.

J. Powell Estate Lease.

(53° 121° S.W.) J. Chouse, with a new partner, C. Theriault, piped intermittently for six weeks and, despite a shortage of water, removed about 7,000 cubic yards of gravel. The pay-streak is under about 60 feet of gravel, slum, and boulder-clay. The rest of the season was spent on maintenance-work.

Other operators within the Willow River drainage-basin are:—

J. Fry, who continued to maintain the Rouchon Creek pit with one other man and a cook.

C. Risberg, on Kong Foo Creek.

P. McColm, who continued working the shallow ground on the Dr. Hougen lease at Beaver Pass.

K. K. Langford, who continued with the tunnel started in 1944 at the confluence of Aura Fina Creek and Tregillus Creek.

Ailport Bros., who sluiced 1,000 cubic yards on their lease on Nelson Creek.

J. J. Gunn, layman on Red Gulch near Wells.

E. Rask, who reported the removal of 3,000 cubic yards on his ground in Devil's Canyon.

Wm. Hong, who reported piping out 6,000 cubic yards on the Toon Sing Tong claim on Slough Creek.

Tom Elder, who removed 6,000 cubic yards from his lease on the east shore of Jack of Clubs Lake.

L. Bedford and K. Huttula, who removed an estimated 1,000 cubic yards by drifting on the Barton lease in Devil's Canyon.

B. Stoyva, who removed 2,000 cubic yards from the Waldron lease on Burns Creek.

R. McDougall, who employed five men cleaning up bed-rock in the old Ketch pit and moved an estimated 15,000 cubic yards of ground.

Big Valley Creek (53° 121° S.W.).*

The Freeport Exploration Company, between June 27th and August 7th, 1945, drilled a total footage of 542 feet by Keystone drill on Big Valley Creek, on leases which have now been allowed to lapse. Five holes were drilled in a line across the valley, the line being 750 feet north of the final post of Lease 4540. The first of these holes was about 100 feet east of the road and about 500 feet north of the point where the road crosses Stewart Creek. From this hole the line continues eastward with holes at intervals of 200 feet. The first hole reached bed-rock at a depth of 38 feet, the second at 62 feet, the third at 73 feet, the fourth at 109 feet; the fifth hole was stopped at a depth of 103 feet without reaching bed-rock. The total footage drilled includes some drilling on holes which were abandoned because of difficulties and were redrilled.

The material was glacial drift, consisting of silt and boulder-clay, with some sand and gravel.

Williams Creek.

Operators in this subdivision of the Willow River drainage-basin are:—

J. Marok, who piped 2,000 cubic yards in sniping operations in Stouts Gulch.

R. Sehl and M. Landyga, laymen, who removed 2,000 cubic yards from Mink Gulch.

* Based on information supplied by the company.

K. Johannson, operating a small monitor on Walker Gulch.

J. J. Curtis, who continued to operate until midsummer on the east side of Williams Creek opposite the town of Barkerville.

Antler Creek.

Operators who worked within the Antler Creek drainage-basin include:—

Wm. Moore, who continued to pipe the shallow ground of the Waverly Placers on Grouse Creek.

N. M. Hansen, on Nugget Gulch.

E. S. Dowsett, on Wolf Creek.

J. A. Sauve, at the junction of Nugget Gulch and Antler Creek.

Guyet Placers, Limited, on Mount Guyet.

C. Bindschedlar, who reported ground-sluicing 55 cubic yards of gravel.

A. Hom and T. Peterson, partners, who reported the removal of 1,200 cubic yards.

J. Doody, on Pinus Creek.

M. A. Anderson, on Eight-mile Lake.

Cunningham Creek.

The leases of Wm. Beamish and D. Jorgenson were both worked.

Lightning Creek.

Operators who worked during 1945 within the Lightning Creek drainage-basin include:—

I. I. Felker, who worked his lease on Butcher Bench.

Messrs. Hind and Freeman, who were piping in Grub Gulch.

Mr. and Mrs. L. Biggs, on Houseman Creek.

Magnus Sundburg, on Donovan Creek.

Alfred Brown, who was sinking a shaft at the mouth of Last Chance Creek.

Collins Pacific, Limited (N.P.L.), drilling on Peters Creek.

Mr. and Mrs. B. Carlson, on Angus Creek, adjoining Slade Placers on the west, who removed 1,300 cubic yards of shallow gravels by piping. They also acquired a portion of the Slade Placers ground which had been allowed to lapse.

Cottonwood River.

A. E. Kent Interests. (53° 122° N.W. and S.W.) These interests have large leaseholdings on the Swift River and elsewhere in the Cariboo. During 1945 additional leases were acquired and test-pitting done on leases already held. A large number of test-pits was put down in Lost Valley, which lies immediately east of the Swift River about 1½ miles above its confluence with the Cottonwood River. Pits were also sunk along the Swift River just above the Cottonwood.

Quesnel River.

A. E. Kent Interests.—(52° 122° N.E.) These interests acquired during 1945 a special lease on the Quesnel River about 12 miles from Quesnel. Test-pits were sunk on part of this lease.

North American Goldfields, Ltd. (52° 122° N.E.) Company office, c/o Glenville A. Collins, Royal Bank Building, Vancouver, B.C. This company has acquired 5 miles of special leases at Beavermouth on the Quesnel River. A dredge was under construction during the summer and early autumn. Machinery for this dredge was ordered early in 1945 but it was not delivered. Some repairs were done on the Quesnel River Road between Dragon Lake and about the Erickson Creek Hill.

The same company owns a special lease on French Flats, close to Quesnel, and it has also acquired the old Ashby and Speers property on the North Fork of Quesnel River.

Lease of P. L. Cameron.—(52° 121° N.W.) This lease is at the mouth of Goose Creek on the south-east shore of Cariboo Lake. After trying unsuccessfully for several years to reach the channel up-stream from old workings, the operators attempted to drill it in 1945. It is understood that the drill-hole, which was located about 700 feet from the lake-shore, went through 21 feet of gravel then glacial clay to 84 feet when the hole and 60 feet of casing were lost.

Cariboo Northland Mining Co.—(52° 121° N.E.) A. Von Alvensleben, Superintendent. Work on this company's ground on Cedar Creek was restricted to prospecting. Several test-pits were put down south-easterly or up-stream from the old showings.

Lease of Adolph Anderson.—(53° 121° N.W.) At this small operation, A. Anderson continued to shovel into his sluices.

Others working intermittently in the Keithley Creek area during 1945 include:—

E. Lang and G. Stengl, who drifted from the Onward pit in search of a back channel for the Placer Engineers, Limited, and who spent the summer sniping around this pit.

W. Hasbrouck and Baker, on Barr Creek where the clean-up was the poorest in several years.

McGregor and two partners, on upper Keithley Creek.

Cariboo Keithley Placers, drilling on French Snowshoe Creek.

J. Chester, ground-sluicing at Four Mile Creek.

Wm. Olsen, drifting near the old Kitchener pit on lower Keithley Creek.

Oscar Hagen, drifting above Harvey Creek.

Raymond Rawn, drifting beyond Pine Creek.

Albert Sandberg, who was drifting on Duck Creek.

LILLOOET.*

Lease of L. Leonard.—(50° 121° N.W.) Mr. Leonard did a considerable amount of maintenance-work and drove one short tunnel on this property on Sallus Creek. He also installed 2,500 feet of "V" flume, 140 feet of pipe, and cleared some ground preparatory to hydraulicking in 1946.

Other leasers who did maintenance-work during 1945 in the Lillooet area include:—

W. Haylmore, who continued his open-cut work at the mouth of the Hurley River.

C. P. Ashmore, on Tyaughton Creek.

Carl Wihksne, adjoining W. Haylmore.

J. Hogstrom, above W. Haylmore on Hurley River.

Frank Haugh, on Marshall Creek.

W. B. Sirett, who owns a lease below the highway bridge crossing the Fraser River at Lillooet.

* By J. A. Mitchell.

NON-METALLICS.

(INCLUDING STRUCTURAL MATERIALS.)

CONTENTS.

The section on non-metallics includes brief notes on properties and operations and is subdivided into parts, each of which deals with a particular mineral or material. Statistics regarding production appear in Table I., page 19, under the headings "Non-metallics" and "Clay Products and other Structural Materials." Table X., page 30, "Production in Detail of Structural Materials," and Table XI., "Production in Detail of Miscellaneous Metals, Minerals, and Materials," page 31, give further information.

A non-metallic item of large gross value is sulphur, which is recovered from waste gases at the Trail smelter and is the valuable constituent of pyrite concentrates recovered as a by-product in milling the copper ore of the Britannia mines. No notes are offered concerning sulphur as it is a by-product, and no notes are offered concerning several items, including mica, sodium carbonate, roofing granules, and iron oxide, which in 1945 had an aggregate value of about $40,000.

Another product of great value is cement, which is manufactured at Bamberton, using limestone and greenstone quarried in that vicinity, also limestone from Texada Island, and some gypsum from Falkland. Limestone also finds a market in the wood-pulp industry, in the building trade for stone and stucco-dash and as quicklime for mortar, in agriculture as a soil conditioner, and in smelters for flux. Gypsum, used commonly in plaster and wall-board, is also used as a soil conditioner. Gypsum from the Falkland deposit is processed in New Westminster. In 1945 gypsum amounting to 2,300 tons was shipped from the Mayook deposit (Fort Steele Mining Division) to the plant of Western Gypsum Products, Limited, at Calgary. Barite, used as a constituent of paint and also as a filler, has in recent years found a market as permanent ballast for ships.

The manufacture of common brick, special bricks, fire bricks and blocks, hollow tile blocks, drain-tile and sewer-pipe from clay and shale is an important part of the non-metallic industry.

The use of silica for smelter flux and the use of sand, gravel, stone, and rock in structures and in surfacing roads, airports, etc., are other important outlets for non-metallic materials.

Deposits of sand and gravel, clay or shale, and limestone are widespread throughout the Province and are developed only in the vicinity of industrial and agricultural markets. Deposits of gypsum and barite are less common and have, therefore, been operated in areas more remote from markets.

BARITE.*

GOLDEN.

Summit Lime Works. Capital: 1,000 shares, $100 par; issued, 500; Head office, Lethbridge, Alta.; mine office, Parson, B.C. This company owns and operates the Parson barite quarry, about 6 miles from Parson (51° 116° S.W.), and the Brisco barite quarry, about 6½ miles from Brisco (50° 116° N.E.) Operations were carried on by the Northern Construction Company and J. W. Stewart, Limited, who had a contract to supply 45,000 long tons to be used as permanent ballast in 10,000-ton freight ships. In May it became evident that the Parson quarry was not going to be able to supply the total tonnage required at a reasonable cost but would fall short by about 18,000 tons. In order to get this additional material, another barite deposit near Brisco was opened up. It was necessary to construct some 2½ miles of road in order to make this deposit accessible. The contracts were completed and the operation closed down late in the summer. Mining at both properties was carried on by quarrying methods and the material loaded into trucks by a gasoline-shovel and hauled to the railroad. The barite in the Brisco quarry, although of good grade and suitable for ballast, is badly discoloured and can not be used for paint or other purposes where colour is a consideration. The Summit Lime Works plan to continue operations on a small scale at the Parson quarry in order to supply material for this purpose. Their normal output is about 1,000 tons a year, which in the past has been mined by hand methods. About twenty men were employed by the Northern Construction Company during the period in which they operated.

CLAY AND SHALE.†

NEW WESTMINSTER.

Clayburn Co., Ltd. Company office, 850 Hastings Street West, Vancouver, B.C.; W. C. Cummings, Secretary-Treasurer; J. W. Ball, Manager. The mines and plant of this company are at Kilgard (49° 122° S.E.), about 50 miles east of Vancouver. In the mines the method of working is by room and pillar. There are three mines and a shale quarry. The fireclay from the Kilgard mine is hauled to the plant by storage-battery locomotive and from No. 4B and No. 9 mine by truck. Nineteen men are employed steadily underground. The production for 1945 amounted to: Fireclay from Kilgard, 17,707 tons; No. 4B, 2,211 tons; No. 9, 2,680 tons; and shale from quarry, 410 tons; total production, 23,008 tons.

Richmix Clay Co.—Company office, 2891 Twelfth Avenue East, Vancouver, B. C.; George Richmond, Manager. This company operated a small mine on the eastern boundary of the Clayburn company's property at Kilgard (49° 122° S.E.). Two men were employed. The mine was closed down about the middle of 1945.

GABRIOLA ISLAND.

Gabriola Shale Products Quarry.—(49° 123° S.W.) Evans, Coleman and Evans, Operators, Vancouver, B.C.; F. A. Higgs, Manager, Vancouver, B.C.; J. Atkinson, Foreman, Gabriola Island, B.C. This quarry has been operated continuously during 1945, except for a brief period in the late summer when it was closed for lack of sufficient water. An average crew of twenty-four men has been steadily engaged in the quarry and brick-making plant, producing a total of 1,800,000 bricks which were shipped to Vancouver for distribution to the various markets.

* By H. C. Hughes.

† By James Strang.

GYPSUM.

FALKLAND.*

Gypsum, Lime & Alabastine, Canada, Ltd.

(50° 119° N.W.) Head office, Paris, Ontario; British Columbia office, 509 Richards Street, Vancouver, B.C.; Norman Jessiman, Vancouver, B.C., British Columbia Manager; Alex. Jessiman, Falkland, B.C., Quarry Superintendent. This company again confined its work at Falkland in 1945 to the No. 2 and No. 5 quarries, 40 miles south of Kamloops, near the Vernon–Kamloops Highway. The gypsum is shipped over the Canadian National Railways from Falkland to the company's mill at New Westminster, B.C. As the overburden is thin, the gypsum is mined in open quarries. The height above the floors increases as the quarries advance into the hillside; therefore, the safety of the workmen requires that the walls be kept at a safe inclination and well barred down. Drilling is done by compressed-air operated jack-hammers. After being blasted, the gypsum is loaded into auto-trucks by a gasoline-shovel and transported to the railway-bunkers at Falkland. The quarries are at an elevation of 500 to 600 feet above the railway. A crew averaging eleven men produced about 150 tons daily of gypsum and waste.

CRANBROOK.†

Western Gypsum Products, Ltd.

(49° 115° S.W.) Head office, 504 MacArthur Building, Winnipeg, Man.; mine office, Box 785, Cranbrook, B.C.; B. M. Jordan, Mine Manager. This company operates the Mayook gypsum quarry near Mayook, B.C., about 16 miles east of Cranbrook. This property was opened up to obtain gypsum for the manufacture of plaster and wall-board in a new plant erected by the company in Calgary. The deposit appears to underlie a considerable area of rolling land and seems to be of better thickness and grade near the tops of numerous small knolls. Mining is carried out by quarrying methods. The material is broken by drills operated by a 250-cubic-foot LeRoi gasoline-driven portable compressor. It is loaded into a truck by hand and hauled to a loading-bin at the railroad, about 1 mile distant. Operations were commenced in August, 1945. About 1 mile of road was built from the quarry to Mayook Siding and a ramp and bin constructed there. A small powder-house and tool-shed were built at the quarry. Parts of the deposit were stripped by tractor and bulldozer. Total production for 1945 was about 2,500 tons. Seven men were employed. The gypsum, although of good grade, is somewhat discoloured and has not proved satisfactory for plaster and other purposes where colour is important.

LIMESTONE.

KOEYE RIVER.‡

Koeye Limestone Co.—(51° 127° N.W.) P. Christensen, Manager. The property is located on Koeye River, less than a mile from tide-water. Two small quarries were operated during 1945 by ten men working one shift per day. The entire output is taken by the Pacific Mills Company at Ocean Falls, B.C.

TEXADA ISLAND.§

Pacific Lime Co.—(49° 124° S.W.) Chas. W. Lowman, Manager. Capital: 5,000 preferred, $100 par; 10,000 common, $100 par; issued, 2,500 preferred, 7,500 common. No. 2 quarry is the principal source of limestone at present. Several diamond-drill

* By E. R. Hughes.
† By H. C. Hughes.
‡ By Charles Graham.
§ By James Strang.

holes were put down on various parts of the property. Six kilns have been operated during 1945, and both quicklime and hydrated lime were produced at the plant. Thirty-eight men were employed in the quarry at the time of the last inspection.

Texada Quarry, B.C. Cement Co.—(49° 124° S.W.) This quarry is situated on the east shore of Blubber Bay. Nineteen men were employed at time of inspection. Practically all the limestone produced is shipped to the company's cement plant at Bamberton, Vancouver Island. Production was steady throughout 1945 but could have been greatly increased had more men been available.

Vananda Quarries.—(49° 124° S.W.) Operated by Beale Quarries, Limited. W. D. Webster, Superintendent. The quarry is 1 mile east of Vananda, and the average number of men employed in 1945 was twenty-two. Limestone is shipped to pulp-mills and crushed limestone of different sizes is produced for various industries. An agricultural lime plant capable of producing 60 tons per day was in operation part of 1945 as demand required.

Beale Quarry.—(49° 124° S.W.) Operated for the greater part of 1945 by Stanley Beale, Jr. This is a small quarry, about 2 miles south of Vananda, supplying limestone for the Powell River mills. Two men were employed.

VANCOUVER ISLAND.*

Bamberton Quarry and Cement Plant, B.C. Cement Co.—(48° 123° N.W.) Company office, corner of Fort and Wharf Streets, Victoria, B.C. Capital shares: 15,995 A preferred, $100 par; 15,995 B preferred, $100 par; 10 common, $100 par; issued, 32,000. The number of men employed at the cement plant and quarry at Bamberton averaged about 120. Production could have been greatly increased had more men been available throughout 1945. The company also operates a quarry on Texada Island.

FRASER VALLEY.†

Agassiz Lime Quarry.—(49° 121° S.W.) This quarry, 2 miles south-west of Agassiz, was acquired in April, 1945, by Hiram Cutler and son from its former owner, Mr. Tuitton. Limestone from the quarry is crushed near-by in a mill whose capacity is approximately 1 ton per hour. The agricultural limestone and chicken and turkey grit produced are marketed locally.

GRAND FORKS.‡

Fife Limestone Quarry.—(49° 118° S.E.) Consolidated Mining and Smelting Company of Canada, Limited. This company owns and operates the Fife limestone quarry near Christina Lake. Work was commenced in March, 1945, and continued throughout the year. All mining was by quarrying methods. The compressor plant and gasoline-shovel formerly used at the Bailey silica quarry was moved to this property. Limestone shipped to Trail, to be used as a flux in the smelter, amounted to 27,000 tons. Six men were employed under the direction of G. E. Clayton, of Trail.

MARL.§

PRINCETON.

Allison (Burns) Lake Marl Deposit, B. C. Marl Co., Ltd.—(49° 120° N.W.) E. W. Johnstone, Manager. This deposit is approximately 20 miles north of Princeton, on the Princeton–Merritt Highway. Operations in 1945 consisted of excavating marl from the southern shore of Allison (Burns) Lake. The marl was loaded by a gasoline-

* By James Strang.
† By W. H. Mathews.
‡ By H. C. Hughes.
§ By E. R. Hughes.

shovel into motor-trucks, transported to a loading-chute on the Kettle Valley Railway at Princeton, and shipped to Fraser Valley and Coast points for use as an agricultural fertilizer.

STONE, SAND, AND GRAVEL.*

North Vancouver.

Deeks Sand and Gravel Co., Ltd.—(49° 123° S.E.) Company office, 101 First Avenue, Vancouver, B.C.; T. O. Burgess, Superintendent. Eleven men were employed. This plant was operated steadily during 1945.

Highland Sand and Gravel Co.—(49° 123° S.E.) North Vancouver. Nine men were employed during 1945.

Road Materials, Ltd.—(49° 123° S.E.) North Vancouver. Nine men were employed during 1945.

New Westminster.

Gilley Bros., Ltd.—(49° 122° S.W.) A granite quarry and crushing plant were operated by this company at Silver Valley, Pitt River. Early in 1945 a fire destroyed the crushing plant, and operations were not resumed by the end of the year. It is understood, however, that the company intends to rebuild the plant as soon as materials and machinery are available.

Maryhill Sand and Gravel Co.—(49° 122° S.W.) A sand and gravel pit and a screening plant are operated by Gilley Brothers on the north bank of the Fraser River, about 3 miles south of Coquitlam. The plant was very busy during 1945, twenty-six men being employed.

Deeks Sand and Gravel Co., Ltd.—(49° 122° S.W.) This company operates a sand and gravel pit and screening plant about 2½ miles north of Coquitlam, along the old Pipe-line Road, employing nine men during 1945.

Nelson Island.

Vancouver Granite Co.—(49° 124° S.E.) A dimension stone granite quarry is operated by this company on Nelson Island when there is a demand for stone, ten or twelve men being employed.

* By James Strang.

COAL-MINING.

BY

JAMES DICKSON, CHIEF INSPECTOR OF MINES.

CONTENTS.

THE INSPECTION BRANCH.

Inspectors of Mines.

James Dickson, Chief Inspector	Victoria.
James Strang	Victoria.
Hamilton C. Hughes	Victoria.
L. Wardman, Electrical Inspector	Victoria.
John MacDonald	Nanaimo.
J. W. Peck	Lillooet.
E. R. Hughes	Princeton.
James A. Mitchell	Nelson.
Robert B. Bonar	Fernie.
Charles Graham	Prince Rupert.

The Inspectors are now (June, 1946) stationed at the points listed, and inspect coal mines, metalliferous mines, and quarries in their respective districts. Mr. Peck at Lillooet and Mr. Wardman at Victoria have recently joined the staff of the Inspection Branch. Mr. Wardman has been appointed as Electrical Inspector.

H. E. Miard, who had been an Inspector of Mines for twenty-seven years and for many years had been a member of the Board of Examiners, retired at Fernie at the end of April, 1946.

Mr. Miard's connection with coal-mining in British Columbia began forty-five years ago, early in the development of mining on Coal Creek. In 1914 he left the position of overman at Coal Creek to return to France as a soldier of the Republic. His gallant service in the French Army led to his capture by the enemy in 1916 and he remained a prisoner of war until hostilities were ended in November, 1918. In 1919, shortly after returning to Fernie, Mr. Miard joined the staff of the Inspection Branch. His duties as Inspector of Mines and as a member of the Board of Examiners took him to many of the mining camps of the Province. His keen scientific approach to the problems and practice of both coal- and metal-mining permitted him to supply much useful guidance to many coal- and metal-mining operations, in addition to carrying out conscientiously his duties designed to safeguard the health and safety of those engaged in mining. His genial and understanding nature, ready humour and social gifts added yearly to numbers glad to claim friendship or acquaintance with him.

Board of Examiners for Coal-mine Officials.

James Dickson	Chairman, Victoria.
James Strang	Secretary, Victoria.
H. E. Miard	Member, Fernie.

Messrs. Strang and Miard and the Inspector of Mines of the district in which an examination is being held form the Board for granting certificates of competency to coal-miners.

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

Instructors, Mine-rescue Stations.

Richard Nichol	Nanaimo Station.
James L. Brown	Cumberland Station.
Alfred Gould	Princeton Station.
Joseph J. Haile	Fernie Station.

PRODUCTION.

The total tonnage produced by the coal mines of the Province for the year 1945 was 1,518,673 tons, being a decrease of 414,966 tons or 21.5 per cent. from 1944.

The Coast District, which includes Vancouver Island, Nicola-Princeton, and Northern Districts, produced 649,026 tons, a decrease of 163,368 tons or 20.1 per cent. from 1944.

Vancouver Island collieries produced 557,778 tons, a decrease of 131,936 tons or 19.1 per cent. from 1944.

The Northern District produced 33,043 tons, a decrease of 5,190 tons or 13.6 per cent. from 1944.

The Nicola-Princeton District produced 58,205 tons, a decrease of 26,822 tons or 31.5 per cent. from 1944.

The East Kootenay District produced 869,647 tons, a decrease of 251,018 tons or 22.4 per cent. from 1944.

The following table shows the output and *per capita* production daily and for the year 1945 at the various mines:—

OUTPUT AND PER CAPITA PRODUCTION, 1945.

Colliery and Mine.	Total Coal mined during year, Tons.	Days worked.	Total No. of Employees.	Coal mined per Employee daily, Tons.	Coal mined per Employee for Year, Tons.	No. of Employees Underground.	Coal mined per Underground Employee daily, Tons.	Coal mined per Underground Employee for Year, Tons.
Comox Colliery (No. 5 mine)	111,241	257	306	1.41	363	223	1.93	498
Comox Colliery (No. 8 mine)	174,672	260	393	1.71	444	306	2.19	570
South Wellington (No. 10 mine)	219,986	257	284	3.01	774	249	3.43	883
Prospect mine	3,514	271	7	1.84	502	6	2.16	586
White Rapids mine	35,433	269	99	1.33	358	90	1.46	393
Chambers' mine	2,015	238	6	1.41	336	4	2.12	504
Loudon mine	1,610	224	5	1.39	322	5	1.39	322
Cassidy mine	1,476	228	5	1.29	295	4	1.62	369
Lewis mine	101	34	2	1.47	50	2	1.47	50
Old Timberlands mine	448	149	2	1.50	224	2	1.50	224
Deer Home mine	2,187	212	6	1.56	332	5	2.06	437
Lake Road mine	2,048	243	4	2.10	512	4	2.10	512
Wellington No. 9 mine	730	251	2	1.45	365	2	1.45	365
Pacific mine	480	223	2	1.08	240	2	1.08	240
Stronach mine	1,672	212	6	1.31	279	5	1.59	334
Furnace Portal mine	165	52	2	1.57	82	1	2.99	165
Tulameen Collieries	51,802	279	79	2.35	656	67	2.77	773
Jackson mine (British Lands)	141	48	2	1.46	70	2	1.46	70
Merritt Coal Mines, Ltd.	4,862	96	26	1.92	185	17	2.96	284
Coldwater mine (Merritt)	1,400	283	4	1.23	350	4	1.23	350
Bulkley Valley Colliery	10,562	238	30	1.50	352	25	1.77	422
Telcoal Colliery	15,048	177	44	1.93	342	31	2.70	485
Hat Creek Colliery	52	14	3	1.21	17	3	1.21	17
Packwood mine (Peace River)	831	56	10	1.48	83	7	2.10	118
Gething mine (Peace River)	810	57	7	2.03	116	5	2.84	162
Hasler Creek mine (Peace River)	3,156	63	22	2.27	143	17	2.94	185
Peace River mine (Peace River)	2,584	174	5	2.97	517	3	4.94	861
Elk River Colliery	279,920	270	382	2.71	733	292	3.55	958
Michel Colliery	589,727	276	685	3.12	861	544	3.57	1,084

COLLIERIES OF VANCOUVER ISLAND INSPECTION DISTRICT.

The output of Vancouver Island collieries was 557,778 tons. Of this amount, 96,948 tons or 17.3 per cent. was lost in preparation for the market, 4,388 tons or 0.7

per cent. was consumed by operating companies as fuel, 457,103 tons was sold in the competitive market. Of the amount sold in the competitive market, 424,340 tons or 92.8 per cent. was sold in Canada and 32,763 tons or 7.2 per cent. was sold in the United States.

Collieries of the Nicola-Princeton District.

Of the gross output of 58,205 tons produced by the collieries of the Nicola-Princeton District, 316 tons was consumed by the operating companies as fuel, 40 tons was added to stock, and 57,849 tons was sold in the competitive market.

Collieries of the Northern District.

Out of a total of 33,043 tons produced, 804 tons was used by operating companies as fuel and 32,239 tons was sold in Canada.

Collieries of the East Kootenay District.

The output of the collieries in the East Kootenay District was 869,647 tons. Of this amount, 62,528 tons or 7.2 per cent. was lost in preparation for the market, 18,110 tons or 2.1 per cent. was consumed by producing companies as fuel, 89,821 tons or 10.3 per cent. was used in making coke, and 699,210 tons was sold in the competitive market. Of the amount sold in the competitive market, 587,282 tons or 84 per cent. was sold in Canada and 111,928 tons or 16 per cent. was sold in the United States.

The following table shows the *per capita* production of the various districts for the past five years. Similar figures for the years prior to 1941 are shown in previous annual reports.

Output and Per Capita Production in Various Districts.

Year.	District.	Gross Tons of Coal mined during Year.	Total No. of Employees at Producing Collieries.	Coal mined per Employee for Year, Tons.	No. of Men employed Underground in Producing Collieries.	Coal mined per Underground Employee for Year, Tons.
1941	East Kootenay District	1,026,053	921	1,114	753	1,632
	Coast District	776,300	1,802	431	1,476	526
	Whole Province	1,802,353	2,723	662	2,229	808
1942	East Kootenay District	1,047,713	864	1,210	696	1,505
	Coast District	890,445	1,496	599	1,196	744
	Whole Province	1,938,158	2,360	821	1,892	1,024
1943	East Kootenay District	927,482	1,150	806	885	1,048
	Coast District	894,172	1,701	525	1,355	659
	Whole Province	1,821,654	2,851	639	2,240	813
1944	East Kootenay District	1,120,665	1,179	950	858	1,306
	Coast District	812,974	1,660	489	1,292	629
	Whole Province	1,933,639	2,839	681	2,150	899
1945	East Kootenay District	869,647	1,067	815	836	1,040
	Coast District	649,026	1,363	476	1,091	595
	Whole Province	1,518,673	2,430	625	1,927	788

The following table shows the production and distribution of coal by the various collieries and districts, compiled from returns furnished by the owners:—

COLLIERIES OF BRITISH COLUMBIA—PRODUCTION, 1945.

Mine.	Sold.			Total Sales.	Lost in Washing	Used in making Coke.	Used under Companies' Boilers, etc.	Total for Colliery Use.	Stocks.		Difference.		Output for the Year 1945.
	In Canada.	In U.S.A.	Elsewhere.						First of Year.	Last of Year.	Added to.	Taken from.	
Vancouver Island District.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Canadian Collieries (D.), Ltd.—													
Comox Colliery (No. 5 mine)	89,863	5,580	.....	95,443	14,284	.....	1,464	15,748	1,268	1,318	50	.....	111,241
Comox Colliery (No. 8 mine)	137,465	8,535	.....	146,000	26,372	.....	2,241	28,613	140	199	59	.....	174,672
South Wellington (No. 10 mine)	157,985	9,539	.....	167,524	52,773	.....	609	53,382	2,204	1,284	.....	920	219,986
Prospect mine	2,794	.....	.....	2,794	720	.....	.....	720	.....	.....	.....	.....	3,514
White Rapids mine	23,301	9,109	.....	32,410	2,799	.....	74	2,873	.....	150	150	.....	35,433
Chambers' mine	2,015	.....	.....	2,015	.....	.....	.....	.....	.....	.....	.....	.....	2,015
Loudon mine	1,610	.....	.....	1,610	.....	.....	.....	.....	.....	.....	.....	.....	1,610
Cassidy mine	1,476	.....	.....	1,476	.....	.....	.....	.....	.....	.....	.....	.....	1,476
Lewis mine	101	.....	.....	101	.....	.....	.....	.....	.....	.....	.....	.....	101
Old Timberlands mine	448	.....	.....	448	.....	.....	.....	.....	.....	.....	.....	.....	448
Deer Home mine	2,187	.....	.....	2,187	.....	.....	.....	.....	.....	.....	.....	.....	2,187
Lake Road mine	2,048	.....	.....	2,048	.....	.....	.....	.....	.....	.....	.....	.....	2,048
Wellington No. 9	730	.....	.....	730	.....	.....	.....	.....	.....	.....	.....	.....	730
Pacific mine	480	.....	.....	480	.....	.....	.....	.....	.....	.....	.....	.....	480
Stronach mine	1,672	.....	.....	1,672	.....	.....	.....	.....	.....	.....	.....	.....	1,672
Furnace Portal mine (Biggs)	165	.....	.....	165	.....	.....	.....	.....	.....	.....	.....	.....	165
Totals, Vancouver Island District	424,340	32,763	.....	457,103	96,948	.....	4,388	101,336	3,612	2,951	259	920	557,778
Nicola-Princeton District.													
Tulameen Collieries	51,802	.....	.....	51,802	.....	.....	.....	.....	.....	.....	.....	.....	51,802
Jackson mine (British Lands)	101	.....	.....	101	.....	.....	.....	.....	.....	40	40	.....	141
Merritt Coal Mines, Ltd.	4,546	.....	.....	4,546	.....	.....	316	316	.....	.....	.....	.....	4,862
Coldwater mine	1,400	.....	.....	1,400	.....	.....	.....	.....	.....	.....	.....	.....	1,400
Totals, Nicola-Princeton District	57,849	.....	.....	57,849	.....	.....	316	316	.....	40	40	.....	58,205
Northern District.													
Bulkley Valley Colliery	10,562	.....	.....	10,562	.....	.....	.....	.....	.....	.....	.....	.....	10,562
Telcoal Colliery	14,286	.....	.....	14,286	.....	.....	762	762	.....	.....	.....	.....	15,048
Hat Creek Colliery	52	.....	.....	52	.....	.....	.....	.....	.....	.....	.....	.....	52
Packwood mine (Peace River)	831	.....	.....	831	.....	.....	.....	.....	.....	.....	.....	.....	831
Gething mine (Peace River)	810	.....	.....	810	.....	.....	.....	.....	.....	.....	.....	.....	810
Hasler Creek mine (Peace River)	3,156	.....	.....	3,156	.....	.....	.....	.....	.....	.....	.....	.....	3,156
Peace River mine (Peace River)	2,542	.....	.....	2,542	.....	.....	42	42	.....	.....	.....	.....	2,584
Totals, Northern District	32,239	.....	.....	32,239	.....	.....	804	804	.....	.....	.....	.....	33,043
East Kootenay District.													
Crow's Nest Pass Coal Co., Ltd.—													
Elk River Colliery	192,406	62,906	.....	255,312	21,084	.....	3,546	24,630	78	56	.....	22	279,920
Michel Colliery	394,876	49,022	.....	443,898	41,444	89,821	14,564	145,829	.....	.....	.....	.....	589,727
Totals, East Kootenay District	587,282	111,928	.....	699,210	62,528	89,821	18,110	170,459	78	56	.....	22	869,647
Coal.													
Grand totals for Province	1,101,710	144,691	.....	1,246,401	159,476	89,821	23,618	272,915	3,690	3,047	299	942	1,518,673
Coke.													
Crow's Nest Pass Coal Co., Ltd.—													
Michel Colliery	35,176	28,012	.....	63,188	.....	.....	.....	.....	3,536	5,122	1,586	.....	64,774

Collieries of British Columbia—Men employed, 1945.

Mine.	White Men.																		Indians.			Japanese and Chinese.									Total Men employed.		
	Supervision and Clerical.			Miners.			Helpers.			Labourers.			Mechanics and Skilled Labour.			Boys.			Labourers.			Miners.			Helpers.			Labourers.					
Vancouver Island District.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	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.—																																	
Comox Colliery (No. 5 mine)	12	7	19	112		112				19	19	38	74	38	112	6	5	11											14	14	223	83	306
Comox Colliery (No. 8 mine)	17	6	23	169		169				21	23	44	90	37	127	9	6	15											15	15	306	87	393
South Wellington (No. 10 mine)	13	4	17	128		128				94	20	114	14	8	22		3	3													249	35	284
Prospect mine	1		1	5		5								1	1																6	1	7
White Rapids mine	3		3	67		67				17	4	21	3	4	7		1	1													90	9	99
Chambers' mine				4		4					1	1																	1	1	4	2	6
Loudon mine				5		5																									5		5
Cassidy mine	1	1	2	3		3																									4	1	5
Lewis mine				2		2																									2		2
Old Timberlands mine				2		2																									2		2
Deer Home mine	1		1	3		3	1		1		1	1																			5	1	6
Lake Road mine				4		4																									4		4
Wellington No. 9				2		2																									2		2
Pacific mine				2		2																									2		2
Stronach mine	1	1	2	4		4																									5	1	6
Furnace Portal mine (Biggs)				1		1					1	1																			1	1	2
Totals, Vancouver Island District	49	19	68	513		513	1		1	151	69	220	181	88	269	15	15	30											30	30	910	221	1131
Nicola-Princeton District.																																	
Tulameen Collieries	5	3	8	50		50	4		4	4	5	9	4	4	8																67	12	79
Jackson mine (British Lands)	1		1	1		1																									2		2
Merritt Coal Mines, Ltd.	2	1	3	13		13				1	4	5	1	4	5																17	9	26
Coldwater mine				4		4																									4		4
Totals, Nicola-Princeton District	8	4	12	68		68	4		4	5	9	14	5	8	13																90	21	111
Northern District.																																	
Bulkley Valley Colliery	3	2	5	10		10	10		10	2		2		3	3																25	5	30
Telcoal Colliery	3	4	7	22		22	4		4		5	5	2	4	6																31	13	44
Hat Creek Colliery	1		1	2		2																									3		3
Packwood mine (Peace River)	1	1	2	5		5				1	1	2		1	1																7	3	10
Gething mine (Peace River)	1		1	3		3				1	1	2		1	1																5	2	7
Hasler Creek mine (Peace River)	1	1	2	6		6	6		6	4	2	6		2	2																17	5	22
Peace River mine (Peace River)		1	1	1		1	1		1	1		1		1	1																3	2	5
Totals, Northern District	10	9	19	49		49	21		21	9	9	18	2	12	14																91	30	121
East Kootenay District.																																	
Crow's Nest Pass Coal Co., Ltd.—																																	
Elk River Colliery	11	20	31	166		166	114		114		37	37	1	27	28		6	6													292	90	382
Michel Colliery	24	25	49	260		260	244		244		72	72	3	42	45	13	2	15													544	141	685
Totals, East Kootenay District	35	45	80	426		426	358		358		109	109	4	69	73	13	8	21													836	231	1067
Grand totals for Province	102	77	179	1056		1056	384		384	165	196	361	192	177	369	28	23	51											30	30	1927	503	2430

Note.—U=Underground; A=Above ground; T=Total.

LABOUR AND EMPLOYMENT.

During 1945, 2,430 persons were employed in and about the coal mines of the Province, a decrease of 409 from 1944. Taking the average of the principal mines in the Vancouver Island District, about 15 per cent. of the working-days were lost principally through Saturday afternoon crews not working and a two weeks' strike in the autumn. In the Nicola-Princeton District over 10 per cent. of the working-days were lost. In the East Kootenay District the mines worked about 90 per cent. of the working-days, the remainder being lost principally through a strike.

COMPETITION OF COAL PRODUCED OUTSIDE BRITISH COLUMBIA.

During 1945 the shipment of Alberta coal to British Columbia totalled 868,396 short tons. Coke shipped was 43,087 tons and briquettes 39,329 tons. The following table shows the amount of Alberta coal brought into British Columbia during past years:—

Year.	Short Tons.	Year.	Short Tons.
1936	244,928	1941	304,928
1937	269,023	1942	652,222
1938	238,435	1943	963,000
1939	239,227	1944	678,960
1940	311,232	1945	868,396

Of the 1,246,401 tons of British Columbia coal marketed, 171,737 tons was sold for domestic and industrial uses in the Provinces of Alberta, Saskatchewan, and Manitoba; 364,988 tons was sold for railroad use in Canada; 34,104 tons was sold for railroad use in the United States; 110,581 tons was exported to the United States; and 54,254 tons was sold for ships' bunkers. The tonnage of British Columbia coal used for domestic and industrial purposes in the Province was 510,737 tons.

ACCIDENTS IN AND AROUND COAL MINES.

During 1945, 2,430 persons were employed in and around coal mines. Five fatal accidents occurred during the year as compared with three during 1944. The ratio of fatal accidents per 1,000 persons employed was 2.05 as compared with 1.06 for 1944.

In 1943 the ratio was 2.80; in 1942, 4.23; in 1941, 1.47; in 1940, 2.08; in 1939, 0.67; in 1938, 3.37; in 1937, 3.17; and in 1936, 2.84. The average for the ten-year period was 2.35.

The number of fatal accidents per 1,000,000 tons produced during 1945 was 3.29; during 1944 the figure was 1.55; in 1943, 4.33; in 1942, 5.15; in 1941, 2.21; in 1940, 3.65; in 1939, 1.35; in 1938, 7.63; in 1937, 6.92; and in 1936, 5.94. The average for the ten-year period was 4.05 per 1,000,000 tons raised.

The following table shows the collieries at which the fatal accidents occurred during 1945 and comparative figures for 1944:—

Name of Company.	Name of Colliery.	1945.	1944.
Canadian Collieries (D.), Ltd.	No. 10 mine, South Wellington	1	1
Lewis & Son	Lewis mine	1	....
Crow's Nest Pass Coal Co.	Elk River Colliery	1	2
Crow's Nest Pass Coal Co.	Michel Colliery	2	....
Totals		5	3

The following table shows the various causes of fatal accidents in 1945 and their percentages of the whole and comparative figures for 1944:—

Cause.	1945.		1944.	
	No.	Per Cent.	No.	Per Cent.
By falls of roof and coal	3	60.00	1	33.33
By mine-cars and haulage	....	.....	1	33.33
By bumps	1	20.00	....	.....
Miscellaneous (surface)	1	20.00	1	33.33
Totals	5	100.00	3	100.00

The following table shows the number of tons of coal mined for each fatal accident in their respective classes in the years 1945 and 1944:—

Cause.	1945.		1944.	
	No. of Fatal Accidents.	Tons of Coal mined per Fatal Accident.	No. of Fatal Accidents.	Tons of Coal mined per Fatal Accident.
By falls of roof and coal	3	506,224	1	1,933,639
By mine-cars and haulage	....	.....	1	1,933,639
By bumps	1	1,518,673	....	.....
Miscellaneous (surface)	1	1,518,673	1	1,933,639
Totals	5	303,734	3	644,546

The number of tons of coal mined per fatal accident during 1945 was 303,734 tons, compared with 644,546 tons in 1944. The average for the ten-year period was 246,375 tons.

The following table shows the fatalities from various causes in coal mines during the year 1945, compared with 1944, according to Inspection Districts:—

District.	Number of Deaths from Accidents.				Totals.	
	Falls of Roof and Coal.	Mine-cars and Haulage.	Bumps	Miscellaneous (Surface).	1945.	1944.
Vancouver Island	1	....	....	1	2	1
Nicola-Princeton	....	....	....	....	....	....
East Kootenay	2	....	1	....	3	2
Northern	....	....	....	....	....	....
Province, 1945	3	....	1	1	5	....
Province, 1944	1	1	....	1	....	3

RATIO OF ACCIDENTS.

District.	Accident Death-rate.			
	Per 1,000 Persons employed.		Per 1,000,000 Tons of Coal mined.	
	1945.	1944.	1945.	1944.
Vancouver Island	1.76	0.82	3.58	1.44
Nicola-Princeton	.....	.....	.....	.....
East Kootenay	2.71	1.69	3.44	1.78
Northern	.....	.....	.....	.....
Totals, 1945	2.05	.....	3.29	.....
Totals, 1944	.....	1.06	.....	1.55

The details regarding the occurrences of fatal accidents in coal mines during 1945 are as follows:—

The fatal accident to Walter J. Smith, railroad switcher, No. 10 mine, South Wellington, on January 26th, 1945, resulted from deceased being crushed by the bumper of a narrow-gauge locomotive from which he stepped or fell. The locomotive was moving slowly and deceased was preparing to couple on to a trip of mine-cars at the time of the accident. He died in Nanaimo hospital a few hours after being injured.

The fatal accident to Thomas Lewis, miner, Lewis No. 3 mine, on February 12th, 1945, resulted from deceased being struck on the head by a timber which was displaced by some coal which slid from the working-face. Deceased knew that the coal was moving and stepped back to a place of presumed safety, but apparently overlooked the possibility of the coal displacing the prop.

The fatal accident which occurred to Joseph Gydosic, miner, Michel Colliery, on May 22nd, 1945, resulted from a fall of roof-rock while he was engaged in timbering his working-place. He died from his injuries on June 4th, 1945.

The fatal accident to Harold Travis, miner, Michel Colliery, on June 14th, 1945, resulted from a fall of roof on a long-wall machine-cut face. He was instantly killed. There was a distance of 25 feet untimbered along the face-line at the point where this accident occurred, although there was an adequate supply of timber available to him within 40 feet from where he was killed.

The fatal accident which occurred to John W. Ashmore, miner, No. 1 East mine, Elk River Colliery, on June 26th, 1945, resulted from suffocation. Deceased was covered by about 4 feet of fine coal which had been thrown down by a severe bump. The body was recovered some four hours after the bump, which did considerable damage to this part of the mine and slightly injured several other miners.

EXPLOSIVES.

The following table shows the quantity of explosives used in coal mines during 1945, together with the number of shots fired, tons of coal produced per pound of explosive used, and the average pounds of explosive per shot fired (these quantities include all explosives used for breaking coal and for rock-work in coal mines):—

VANCOUVER ISLAND DISTRICT.

Colliery.	Quantity of Explosives used in Pounds.	Coal mined, Tons.	Total No. of Shots fired.	Tons of Coal per Pound of Explosive used.	Average Pounds of Explosives per Shot fired.
Comox Colliery (No. 5 mine)	25,908	111,241	46,888	4.29	0.55
Comox Colliery (No. 8 mine)	58,225	174,672	82,900	3.00	0.70
South Wellington (No. 10 mine)	69,750	219,986	75,692	3.15	0.92
Prospect mine	1,500	3,514	1,500	2.34	1.00
White Rapids mine	17,850	35,433	26,500	1.98	0.71
Chambers' mine	1,300	2,015	2,500	1.55	0.52
Loudon mine	1,800	1,610	1,081	0.89	1.69
Cassidy mine	600	1,476	1,200	2.46	0.50
Lewis mine	50	101	75	2.05	0.66
Old Timberlands mine	700	448	1,250	0.64	0.56
Deer Home mine	1,750	2,187	2,500	1.25	0.70
Lake Road mine	950	2,048	1,140	2.15	0.83
Wellington No. 9	950	730	900	0.76	1.05
Pacific mine	200	480	500	2.40	0.40
Stronach mine	1,700	1,672	1,500	0.98	0.88
Furnace Portal mine	100	165	150	1.65	0.66
Totals for district	183,333	557,778	246,276	3.04	0.74

NICOLA-PRINCETON DISTRICT.

Tulameen Collieries	15,500	51,802	27,300	3.34	0.56
Jackson mine (British Lands)	40	141	72	3.52	0.55
Merritt Coal Mines, Ltd.	1,850	4,862	2,500	2.62	0.74
Coldwater mine	750	1,400	1,100	1.86	0.68
Totals for district	18,140	58,205	30,972	3.20	0.58

NORTHERN DISTRICT.

Bulkley Valley Colliery	4,000	10,562	6,000	2.64	0.66
Telcoal Colliery	3,210	15,048	5,000	4.68	0.64
Hat Creek Colliery	500	52	650	0.10	0.77
Packwood mine (Peace River)	400	831	500	2.08	0.80
Gething mine (Peace River)	600	810	900	1.35	0.66
Hasler Creek mine (Peace River)	1,400	3,156	4,500	2.25	0.31
Peace River mine (Peace River)	1,000	2,584	4,000	2.58	0.25
Totals for district	11,110	33,043	21,550	2.97	0.51

EAST KOOTENAY DISTRICT.

Elk River Colliery	35,600	279,920	35,600	7.86	1.00
Michel Colliery	52,869	589,727	57,938	11.15	0.93
Totals for district	88,469	869,647	93,538	9.83	0.94
Totals for Province	301,052	1,518,673	392,336	5.04	0.76

QUANTITY OF DIFFERENT EXPLOSIVES USED.

	Lb.
Monobel of different grades	278,207
Permissible rock-powder	22,845
Total	301,052

MACHINE-MINED COAL.

During the year 1945 mining-machines produced approximately 1,187,368 tons or 78 per cent. of the total.

The following table gives the district, number of machines, how driven, and type of machines used:—

District.	NUMBER DRIVEN BY		TYPE OF MACHINE USED.	
	Electricity.	Compressed Air.	Chain Undercutting.	Puncher Type.
Vancouver Island	....	27	21	6
Nicola-Princeton	....	5	....	5
East Kootenay	....	59	9	50
Northern	....	5	....	5
Totals	....	96	30	66

In addition to the above, 141 air-picks are used in the mines of the Crow's Nest Pass Coal Company.

SAFETY-LAMPS.

There were 2,544 safety-lamps in use in the coal mines of the Province. Of this amount, 216 were flame safety-lamps of the Wolf type and 2,328 were electric lamps of various makes.

The following table shows the distribution of lamps by district, method of locking, and illuminant used:—

Vancouver Island District.

Colliery and Mine.	Method of Locking.		Illuminant used.	
	Magnetic Lock.	Automatic Clip.	Naphtha Gasoline.	Electricity.
Comox Colliery (No. 5 mine)	51	220	24	247
Comox Colliery (No. 8 mine)	94	309	32	371
South Wellington (No. 10 mine)	14	295	14	295
Prospect mine	2	22	2	22
White Rapids mine	8	144	8	144
Chambers' mine	1	7	1	7
Loudon mine	7	.....	2	5
Cassidy mine	2	.....	2	.....
Lewis mine	1	2	1	2
Old Timberlands mine	1	2	1	2
Deer Home mine	3	18	3	18
Lake Road mine	2	.....	2	.....
Wellington No. 9	2	5	2	5
Pacific mine	1	2	1	2
Stronach mine	5	9	2	12
Furnace Portal mine	1	2	1	2
Totals for district	195	1,037	98	1,134

Nicola-Princeton District.

Tulameen Collieries	5	70	5	70
Jackson mine (British Lands)	2	10	2	10
Merritt Coal Mines, Ltd.	3	22	3	22
Coldwater mine	2	6	2	6
Totals for district	12	108	12	108

Northern District.

Bulkley Valley Colliery	33	.....	3	30
Telcoal Colliery	39	.....	3	36
Hat Creek Colliery	1	.....	1	.....
Packwood mine (Peace River)	12	.....	1	11
Gething mine (Peace River)	18	.....	1	17
Hasler Creek mine (Peace River)	8	.....	1	7
Peace River mine (Peace River)	16	.....	1	15
Totals for district	127	.....	11	116

East Kootenay District.

Elk River Colliery	30	330	30	330
Michel Colliery	65	640	65	640
Totals for district	95	970	95	970
Totals for Province	429	2,115	216	2,328

Approved Safety-lamps, Electric and Flame.

A list of the approved safety-lamps, both electric and flame, was published in the 1930 Annual Report. The following lamps, all electric, are now also approved:—

No. 8.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 18 of the United States Bureau of Mines. The only bulb approved for use in this lamp carries the symbol BM-18 and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio.

No. 9.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 18F of the United States Bureau of Mines. This model of Edison lamp in reality represents an extension of the lamp approval given under Approval No. 18. The only bulb approved for use with this lamp carries the symbol BM-18F and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio.

No. 10.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 18H of the United States Bureau of Mines. This lamp represents an extension of the No. 18 approval of the United States Bureau of Mines. The only bulb approved for use with this lamp carries the symbol BM-18H and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio.

No. 11.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 24 of the United States Bureau of Mines. The only bulb approved for use with this lamp carries the symbol BM-24 and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio. This lamp is known as the Edison Model J lamp.

No. 12.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 25 of the United States Bureau of Mines. The only bulb approved for use with this lamp carries the symbol BM-25 and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio. This lamp is known as the Edison Model K lamp.

No. 13.—The electric lamp manufactured by the Koehler Manufacturing Company, and known as the Super-Wheat Model "W" electric safety cap-lamp under Approval No. 20 of the United States Bureau of Mines.

No. 14.—The electric lamp manufactured by The Portable Lamp and Equipment Company, and known as the "Portable" electric safety cap-lamp under Approval No. 27 of the United States Bureau of Mines.

(Unless otherwise specified, all lamps are cap-lamps.)

NOTE.—*While the use of flame safety-lamps is permitted, it is the policy of the Department of Mines to encourage the use of approved electric safety-lamps for all persons underground in the coal mines, except such flame-lamps as may be required by the officials of the mines in the carrying-out of their duty and in such cases as it is considered advisable to provide flame safety-lamps in addition to the electric safety-lamps.*

ELECTRICITY.

Electricity is used for various purposes on the surface at nine mines and underground at four.

The purpose for which it is used, together with the average horse-power in each instance, is shown in the following table:—

Nature of its use.	Average H.P.
Above ground—	
Winding or hoisting	2,085
Ventilation	1,910
Haulage	1,012
Coal-washing	2,137
Miscellaneous	5,575
Total horse-power	12,719
Underground—	
Haulage	1,412
Pumping	1,200
Coal-cutting	
Miscellaneous	43
Total horse-power	2,655
Total horse-power above and below ground	15,374

Of the above, practically all the current is alternating.

VENTILATION.

The reports of the District Inspectors give detailed information regarding the ventilation in the main airways and working splits of the different mines, the figures given being those resulting from air measurements taken during the last inspections of 1945.

At the Comox Colliery the production of methane makes it necessary to have a separate ventilating split for each long-wall and even a liberal supply of air passing along the faces. The additional gas released by intermittent roof movements makes it necessary to prohibit shot-firing at times. In such cases the Inspector orders that no shot-firing shall be done until further inspection and report.

METHANE DETECTION.

The Burrell Methane Detector and the M.S.A. Methane Detector were in general use throughout 1945 to detect the presence of methane in percentages less than could be detected by means of the flame safety-lamp.

The flame safety-lamp is in general use as the everyday means of testing for the presence of methane by the firebosses and mine officials, and during 1945 intensive efforts were made by the Inspectors to train firebosses and miners to estimate closely the percentage of methane indicated by very small " gas-caps " on the flame safety-lamp. This work was carried out underground where the gas-caps could be calibrated immediately with the results found at the same time and place by one of the above-named methane detectors.

While practically all workmen underground use the electric safety-lamp, many of the miners were given practical instruction in the use of the flame safety-lamp as a methane detector, and all new men who apply for a coal-miner's certificate of competency must show that they possess this knowledge.

MINE-AIR SAMPLES.

The work of sampling mine-air was maintained throughout 1945 according to the conditions existing or anticipated. While the results of the analyses of the samples are not as immediately available as the information obtained by the methane detectors or the flame safety-lamp, the report of analyses forms a valuable record and offers

a means of checking the accuracy of the other means of methane testing. During 1945, 181 samples were taken.

INSPECTION COMMITTEES.

At all the larger mines the miners fully observed the provisions of the "Coal-mines Regulation Act," section 101, General Rule 37, by appointing and maintaining Inspection Committees to inspect the mines on behalf of the workmen every month, and as the personnel of these committees is changed frequently, a considerable number of men are brought into a direct contact with safety work in the course of time.

The reports of the various committees are generally of a practical nature and cover current conditions underground as seen from the view-point of the miner.

A report of each monthly inspection is sent to the District Inspector of Mines for his information.

COAL-DUST.

During 1945 the sampling and analysing of coal-dust was well maintained, 1,486 samples being analysed.

Very few samples showed less than 50 per cent. incombustible content. If samples show less than 50 per cent. incombustible content, or if in successive samples a tendency for the incombustible content to decrease is noted, further treatment with lime-dust is ordered immediately.

DANGEROUS OCCURRENCES.

On March 12th, 1945, the insulation of one of the electric cables supplying power to the air heaters at the top of No. 8 shaft, Comox Colliery, caught fire and was partly burned. The fire was promptly dealt with and extinguished before much damage was done. It was at first suspected that an electrical short circuit had caused the fire, but the cables were found to be intact. A cutting-torch had been in use a few hours earlier in the vicinity of the heaters, and it is believed that a piece of hot metal from this burning operation had fallen near the cable and had caused smouldering for some hours before the actual fire broke out.

On April 29th, 1945, fire broke out at the tipple of No. 10 mine, South Wellington, and considerably damaged the machinery before the fire was extinguished. No person was injured, but the mine was shut down for eight days because of the damage.

On May 16th, 1945, in No. 5 mine, Comox Colliery, the wooden brake-blocks on the Main slope hoist caught fire due to overheating. The fire was extinguished before any damage was done.

On October 25th, 1945, in No. 5 mine, Comox Colliery, the wooden brake-blocks on the middle hoist on the Main slope caught fire due to overheating and oil on blocks. The fire was extinguished before any damage resulted.

On October 26th, 1945, at the top landing, No. 8 shaft, Comox Colliery, while normal hoisting was being carried on, one of the up-coming cages was raised too high and the top cager pushed an empty car forward with the expectation that the cage would stop at the rail-level, but the hoistman overwound the cage and the car fell down the shaft and broke some of the buntons 500 feet below. The automatic overwind came into operation and prevented any damage to the cage, rope, or pit-head. No person was injured.

On November 2nd, 1945, at No. 5 mine, Comox Colliery, an empty car was released from the car retarder with too much force and pushed the safety-block aside, then crashed through the shaft-gate and fell down the shaft and damaged the cage which was resting at the shaft-bottom. The design of the shaft-gates was altered to prevent a recurrence of this type of accident.

Bumps.

During 1945 a number of bumps occurred in No. 1 East mine, Elk River Colliery. These were of varying intensity, and some of the more severe bumps did considerable damage to the parts of the mine affected.

These bumps were in the same general area where the same phenomena caused the abandonment of part of No. 2 mine, in a seam 200 feet lower in the series, some thirty years ago.

As a result of the experience at that time the workings of No. 1 East mine were designed to form large pillars with a view to preventing or reducing the hazard to life and property presented by bumps. Various methods of work have been applied in efforts to deal with this problem, but so far no satisfactory method of dealing with bumps has been devised.

Details of the bumps in No. 1 East mine are given in the report of the Inspector of Mines.

Outbursts of Gas.

There were no outbursts of gas reported during 1945, but the regulation established at No. 10 mine, South Wellington, Canadian Collieries (D.), Limited, to deal with areas susceptible to outbursts during 1944 still remains in force:—

"*Re 'Coal-mines Regulation Act,' Section 101, General Rule (c), Amendment, 1940.*

"In view of the emergent conditions that exist due to repeated outbursts of gas in the workings of the Dip side of the 7 Right level, No. 1 Diagonal slope, No. 10 mine, Canadian Collieries (D.), Limited, and in accordance with the provisions of the 'Coal-mines Regulation Act,' Section 101, General Rule 12 (*c*), 1940 Amendment, I prescribe hereby the conditions under which explosives may be used in above-described area, namely:—

"(1.) That an interval of not less than two hours shall elapse between the firing of shots in any one working-face.

"(2.) That two shots, but not more than two shots, may be fired simultaneously in one working-face by being connected electrically.

"(3.) That where two shots are fired simultaneously no one shot shall be dependent on the work of the other shot.

"(4.) That where a new working-face is being started near the face of an existing working-face both faces, for the purposes of this regulation, shall be considered as one face until both working-faces have been advanced at least twenty-five feet from the point of their divergence.

"(5.) That all persons authorized to fire shots in the above-defined area shall be supplied with and acknowledge the receipt of this order.

"(6.) That this regulation is now in force and until further notice."

PROSECUTIONS.

During 1945 there were no prosecutions for infractions of the "Coal-mines Regulation Act."

GOVERNMENT MINE-RESCUE STATIONS.

The Department of Mines mine-rescue stations at Nanaimo, Cumberland, Princeton, and Fernie were all maintained during 1945 for the service of the mining industry in their respective areas, and the training of organized mine-rescue teams.

As in the earlier years of the war, very few new men presented themselves for training as a very large number of the younger men had left the mines for the armed forces, and the arduous nature of mine-rescue training and work is such that it can be undertaken only by the younger men who are in the best physical condition.

It is hoped that 1946 will see a large number of young men entering the mining industry, and efforts will be made to have as many as possible take the mine-rescue training.

During the war there was considerable improvement of the oxygen apparatus developed for the use of the armed forces, particularly for airmen and navy personnel, and there is no doubt that many of the advances made in this field will have application to oxygen mine-rescue apparatus.

Some of these newer devices have already been demonstrated at the different mine-rescue stations, and steps have been taken to have units of one of the new self-generating oxygen machines installed at each station as soon as possible so that all those who have taken training in the past may familiarize themselves with this new development, which is about one-third of the weight of the machines now in use and has fewer parts, with consequent less danger of failure under mining conditions.

It is very probable that the new type of self-generating oxygen machines will displace the present heavy and cumbersome oxygen mine-rescue apparatus now in general use, and the above rescue-stations will all be equipped with the best type of such machines as soon as they are fully approved and available.

During 1945, in addition to the regular teams in training, thirteen new men took the full training and were granted certificates of competency:—

Cert. No.	Name.	Where trained.	Cert. No.	Name.	Where trained.
1205	Siggie Goodmanson	Cumberland.	1212	Bayard Ormond Iverson	Kimberley.
1206	George Lyons	Cumberland.	1213	Phillip Olsen	Kimberley.
1207	Frank Dixon	Cumberland.	1214	Eric Olof Hallstrom	Kimberley.
1208	John W. Scott	Copper Mountain.	1215	Alf Merril Ingebrigtsen	Kimberley.
1209	Robert H. Roblin	Copper Mountain.	1216	Thomas John Sweeney	Kimberley.
1210	Harry A. Shannon	Copper Mountain.	1217	John Smith	Kimberley.
1211	Edward H. Pickard	Copper Mountain.			

SUPERVISION OF COAL MINES.

During 1945 twenty-three companies operated twenty-nine mines, employing 1,927 men underground. In the supervision of underground employees there were ten managers, sixteen overmen, and ninety-two firebosses and shotlighters, or one official for every seventeen men underground.

"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 Names of Coal.	Colliery and District.	Producing Company.
Comox	Nos. 5 and 8 mines, Comox Colliery (Cumberland)	Canadian Collieries (D.), Ltd.
Old Wellington	No. 9 mine (Wellington)	Canadian Collieries (D.), Ltd.
Ladysmith-Wellington	No. 10 mine (South Wellington)	Canadian Collieries (D.), Ltd.
Hi-Carbon	Mixture of Canadian Collieries' coal and B.C. Electric coke	Canadian Collieries (D.), Ltd.
Lantzville-Wellington	Lantzville (Lantzville)	Lantzville Colliery.
Chambers-Extension	Chambers' (Extension)	R. H. Chambers.
Wellington Big Flame	Richardson mine	A. B. Richardson.
Biggs-Wellington	Biggs' mine (Wellington)	Biggs' mine.
Berkley Creek-Little Wellington	Berkley Creek Colliery (Extension)	Hugh McLean Davidson.
Cassidy-Wellington	Cassidy mine (Cassidy)	A. H. Carroll.
Middlesboro	Middlesboro (Merritt)	Middlesboro Collieries, Ltd.
Tulameen Valley Coal, Princeton	Tulameen (Princeton)	Princeton Tulameen Coal Co.
Granby Tulameen	Granby (Princeton)	Granby Consolidated M.S. & P. Co., Ltd.
Hat Creek	Hat Creek (Lillooet)	Canada Coal and Development Co., Ltd.
Tulameen Gem	Tulameen Collieries (Princeton)	Tulameen Collieries.
Bulkley Valley	Bulkley Valley (Telkwa)	Bulkley Valley Colliery, Ltd.
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.
Black Yale	Black mine (Princeton)	Inland Collieries, Ltd.
Jackson Tulameen	Jackson Colliery (Princeton)	British Lands, Ltd.
Merritt Diamond Vale	Diamond Vale Colliery (Merritt)	Merritt Coal Mines, Ltd.
Telcoal	Telcoal Colliery (Telkwa)	Telkoal Co., Ltd.

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS.

FIRST-, SECOND-, AND THIRD-CLASS CERTIFICATES AND MINE-SURVEYORS' CERTIFICATES.

BY

JAMES STRANG.

The Board of Examiners which was formed on July 10th, 1919, now consists of James Dickson, Chief Inspector of Mines, chairman; H. E. Miard, member; and James Strang, member and secretary of the Board.

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 of Mines on September 28th, 1929.

Two examinations were held in 1945, the first on May 30th, 31st, and June 1st, and the second on November 14th, 15th, and 16th.

The total number of candidates at the examinations was as follows: For first-class certificates, 1 (1 passed); for second-class certificates, 2 (2 passed); for third-class certificates, 14 (6 passed and 8 failed). There were no candidates for mine surveyors. The following is a list of the candidates who successfully passed in the various classes:—

First-class Certificate.—James Cochrane.

Second-class Certificate.—William W. Johnstone and James Weir.

Third-class Certificate.—Frank B. Dixon, Hugh Bankhead, Michael S. Wakulchik, Harold D. Brodrick, John C. Southern, and James J. E. Anderson.

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. By miner is meant any person employed underground in any coal mine to cut, shear, break, or loosen coal from the solid, either by hand or machinery. Examinations are held regularly in all coal-mining districts.

No certificate has been granted in any case 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 1945 there were 116 candidates for coal-miners' certificates; of these, 115 passed and one failed to qualify.

In addition to the certificates granted above, substitute certificates were issued to those who had lost their original certificates.

The Board of Examiners desires to thank the different coal-mining companies for the use of their premises for holding examinations when necessary.

The Inspector of Mines in each district has authority under the "Coal-mines Regulation Act" to grant, after a satisfactory examination, a provisional certificate as a coal-miner to applicants, which entitles the holder to follow the occupation of a coal-miner for a period not exceeding sixty days or until the date of the next examination before the Board.

NOTES ON COAL MINES.

VANCOUVER ISLAND INSPECTION DISTRICT.

NANAIMO.

BY

JOHN MACDONALD.

Canadian Collieries (Dunsmuir), Ltd.

J. A. Boyd, President, Montreal, Que.; H. R. Plommer, Vice-President, Nanaimo, B.C.; P. S. Fagan, Secretary, Nanaimo, B.C.; S. V. Isaacson, Treasurer, Nanaimo, B.C.; R. K. Smart, General Superintendent, Nanaimo, B.C.; James A. Quinn, District Superintendent, Cumberland, B.C. Harold Baird, formerly general superintendent of the company, with headquarters at Cumberland, resigned and returned to Scotland in August to accept the appointment of agent for the Weemyss Coal Company in Fifeshire, with which company he was mine manager before joining the Canadian Collieries (Dunsmuir), Limited, in 1938. As a result of this move, R. K. Smart assumed the duties of general superintendent, with headquarters at Nanaimo, while James A. Quinn was appointed district superintendent, with headquarters at Cumberland. This company operated three mines in the Nanaimo district during 1945: No. 10, White Rapids, and Extension Prospect.

No. 10 Mine, South Wellington.—(49° 123° S.W.) W. Frew, Manager; Joseph Wilson, Overman; A. Hannah, T. Jordan, F. Bell, W. Roper, D. McMillan, E. Heyes, J. McArthur, F. Johnson, and T. McCann, Firebosses. This mine is situated in the Cranberry district, about half a mile south of the old No. 5 mine and approximately 7 miles south of Nanaimo.

No additions were made to the surface plant during 1945 but a new electric pump was being installed in the main pumping-station underground in the latter part of December. This extra unit is required to handle the increase in the volume of water entering the mine resulting from heavy breaks in the strata following pillar-extraction over a large area.

This mine operates in the Douglas seam and has retained its position as the premier producing mine in the Vancouver Island District, with a total of 219,985 long tons being mined in a working period of 257 days by an average crew of 220 men underground and thirty-five on the surface. The major portion of this tonnage, as in the past two years, has come from pillar-extraction and the remainder from driving the necessary roadways incidental to total extraction. The usual high percentage of recovery has been maintained, frequently under adverse conditions prevailing at the faces. Both officials and workmen are to be commended for the care and skill exercised while attending to their daily work under the admittedly treacherous roof conditions in many areas in this mine.

The pillar-extraction has now reached the following points measured from the main boundary pillar adjacent to the old Granby No. 1 mine abandoned workings: Main slope section, fully 2,000 feet; No. 2 diagonal slope district, 1,000 feet; and 1,000 feet in the No. 7 right section off No. 1 diagonal slope. New development-work in 1945 included 2,000 feet of roadways in the No. 2 left district off No. 2 diagonal slope to open up an area that was by-passed in the first working, and 2,000 feet of new drivage in the No. 5 left district off No. 1 diagonal slope in an attempt to prove the continuity of the seam in this locality. This work has been attended with a fair measure of success considering the irregularities encountered in the Douglas seam. The development of these sections will help to prolong the life of this mine.

First-aid requirements have received close attention at all times, nine emergency stations being maintained at strategic points underground in addition to the main station on the surface where a large supply of first-aid material is kept. All emergency stations are inspected regularly by a competent first-aid attendant who checks supplies and replenishes same as required. The management reports a total of thirty employees who have received the necessary training and are qualified to render first aid to the injured. Two mine-rescue teams of six men each have kept up regular training of one two-hour period monthly; this consists of assembling the apparatus and working out practical problems at the experimental mine adjacent to the mine-rescue station at Nanaimo.

No blow-outs or other dangerous occurrences were reported during 1945, with the exception of an outbreak of fire which occurred on April 29th in the rock-dust storage building adjacent to the tipple. Before being brought under control, the fire spread to the tipple proper, damaging the machinery to such an extent as to compel a suspension of mining operations for a period of eight days while repairs were being made.

With the exception of heavy squeezing on certain roadways as a direct result of total extraction, general working conditions have been found fairly satisfactory in the course of inspection. The ventilating conditions generally have been kept at a high standard. Measurements taken at the last inspections in December showed a quantity of 110,240 cubic feet of air a minute passing in the Main returns for the use of ninety-two men. Twenty-four samples of air were collected in the Main return airways, the methane content of these varying from 0.14 per cent. in the main West return to 0.34 per cent. in the main East return. One hundred and thirteen samples of dust were gathered from the various roadways, all of which were well above the minimum standard of incombustible content as set by the Coal-dust Regulations. Limestone-dust, amounting to 125 tons, was used in treating 24,000 feet of roads, while 25 tons of this material was used for tamping in blasting operations. One hundred and seven accidents were reported during 1945 and were investigated: One accident was fatal; three were of a serious nature; while the remainder were classed as minor, notwithstanding the fact that some of the men who suffered a so-called minor accident lost considerable working-time before reporting fit for duty.

White Rapids Mine.—(49° 123° S.W.) A. Newbury, Manager; J. T. Brown, Overman; A. Bennett, J. Marrs, and T. McCourt, Firebosses. This mine is situated in Sections 3 and 4, Range 1, in the Cranberry district, approximately 9 miles by road south of Nanaimo. It operates in the Wellington seam and produced 35,433 long tons in a working period of 269 days, with an average crew of eighty-five men employed underground and ten on the surface.

No additions were made to the main surface plant during the year but the tipple and approaches thereto have all been covered in as a protection from the weather. A new pumping-station was built underground and an electric hoist installed to handle the haulage on the No. 1 diagonal slope, both units being enclosed in fully fire-proof buildings. New development-work in 1945 included 900 feet of drivage to the outcrop on the main heading; two walls, 600 feet in all, were opened out on the left side of the heading, while three walls with a total length of 900 feet were developed on the right side. The diagonal slope was driven for a distance of 400 feet, from which a sump road, 300 feet in length, was driven back underneath the slope to connect with the main-heading side of the mine. The pumping-station referred to above is located on this roadway adjacent to the diagonal slope. Two walls were developed on the left side of the slope and one on the right side, making a total of eight long-walls, amounting to approximately 3,000 feet of face-line opened up for production during 1945.

The Wellington seam in this area varies from 28 to 42 inches in height and is mined by means of Anderson-Boyes coal-cutting machines with Meco shaking conveyers transporting the coal from the long-wall faces to the loading-points on the various levels. The roof in this mine is a very soft shale and the time and care required to timber this properly has an important bearing on the total time required to complete the regular cycle of operations which includes cutting, mucking, panning, and loading.

A fully equipped first-aid room has been established in a part of the main building which also houses the manager's office, firebosses' office, lamp-cabin, and warehouse. One mine-rescue team has trained regularly once each month at the mine-rescue station in Nanaimo, the training being similar to that undertaken by the No. 10 mine teams. As stated above, the main first-aid station is located on the surface but the men engaged as "chunkers" carry a bag containing emergency first-aid supplies which is taken into the mine on each shift to serve the areas in the vicinity of the main loading-points. The management reports that seventeen of the employees at this mine are qualified to render first-aid to the injured.

General working conditions have usually been found satisfactory in the course of inspection, excepting when unusually bad roof conditions prevailed. The latter demand constant vigilance on the part of officials and workmen to prevent accidents on the face-lines. The ventilation has been found adequate, the quantity passing in the Main return at the last inspection in December, 1945, showed 14,520 cubic feet of air a minute for the use of forty-five men and one horse. Eleven samples of air were taken in the Main return airway, all of which were under 0.3 per cent. methane. Although most of the roadways in this mine are naturally damp throughout, twelve samples of dust were gathered at loading-points on the levels, and all were well above the minimum standard of incombustible content as set by the Coal-dust Regulations. Limestone-dust, used to treat the above places, amounted to 2½ tons, and the quantity used for tamping in blasting operations was 2 tons. Searches were made regularly for matches, etc., but no articles of a prohibited nature were found. Forty-four accidents were reported and investigated; of these, four were serious while the others were classed as minor.

Prospect Mine, Extension.—(49° 123° S.W.) M. Brodrick, Fireboss. This mine is situated at Extension, on the southern end of the Harewood Ridge, and operates in the Wellington seam. Production during 1945 amounted to 3,525 long tons in a working period of 271 days, with an average crew of six men employed. No new development-work was undertaken in 1945, all operations being confined to skipping and the extraction of pillars. General working conditions have been found fairly satisfactory in the course of inspection. Three accidents of a minor nature were reported and investigated.

Lake Road Mine. (49° 123° S.W.) A. Dunn and Associates, Operators; A. Dunn, Fireboss. This mine is situated in the vicinity of the old Beban mine and in a portion of the Wellington seam outcrop which was left in this locality when Extension No. 1 mine was abandoned. Production in 1945 amounted to 2,052 long tons in a working period of 243 days, with an average crew of four men employed. General working conditions have always been found fairly satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

Chambers' No. 4 Mine. (49° 123° S.W.) R. H. Chambers and Associates, Operators; R. H. Chambers, Fireboss. This mine is situated in the Extension district and is operating in the barrier pillar which was left in to protect the workings of Extension No. 3 mine from the submerged area in the original Extension No. 1 mine. This area of coal is reached by a slope driven from the surface in the immediate vicinity of Chambers' No. 3 mine, the abandoned workings of the old No. 1 mine being reached by means of exploratory drill-holes kept ahead

and on the flanks of the 1st right level driven off the above slope. A large area of old workings was drained and the level was then continued into the barrier pillar, finally making contact with the Extension No. 3 mine gob. This provided excellent drainage as all the water entering the Chambers' No. 4 mine now passes on down through the old gobs, eventually reaching the surface through the old Extension haulage-tunnel which is serving as a drainage-level for the whole of the Extension district. Production for 1945 amounted to 1,915 long tons in 240 working-days, with an average crew of six men employed. General conditions have usually been found fairly satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

Deer Home No. 2 Mine. (49° 123° S.W.) R. Hamilton and Associates, Operators; R. Hamilton, Overman. This mine is situated approximately 1,500 feet in a south-easterly direction from the old Vancouver slope and is operating in a portion of the Wellington seam left in this area when the old Extension No. 3 mine was abandoned. Since operations were begun in this locality, several roadways have been driven through old gobs with a view to locating pillars presumably left intact when the No. 3 mine was abandoned, but the results achieved to date have fallen far short of expectations and most of the output has been mined from the outcrop barrier pillar. Production in 1945 amounted to 2,187 long tons in 212 working-days, with an average crew of six men employed. Working conditions have been found generally satisfactory in the course of inspection. No accidents were reported from this mine during the year.

Lewis' No. 3 Mine. (49° 123° S.W.) This mine was situated in the Harewood district and was operated by G. Lewis and the late Thomas Lewis; G. Lewis, Fireboss. Operations were suspended in February, 1945, following a fatal accident to Thomas Lewis who was struck on the head with a post that was dislodged by falling coal and rock. Production in 1945 amounted to 101 long tons in 34 working-days, with a crew of two men employed. Following the above regrettable fatal accident, this mine was abandoned as almost all the available coal in the vicinity of the slope had been extracted.

***Furnace Portal* Mine.** (49° 123° S.W.) James Biggs, Operator and Fireboss. This mine is situated on the Harewood Ridge and is being developed to recover some coal left in this locality in the immediate vicinity of the old Furnace Portal return airway. This area was originally worked in 1864 but no records or plans are available to throw any light on the extent of these early workings or what pillars were left. A truck-road has been built up the side of the ridge from the Nanaimo Lakes highway and a small tipple and coal-bunker built close to the old outlet; this work was completed and production was begun in October. Present operations are confined to driving a skip down along the rib of the old airway, but the amount of coal available for recovery is problematical for reasons already stated. Production for 1945 amounted to 146 long tons in 52 working-days, with a crew of two men employed. General conditions have been found satisfactory in the course of inspection. No accidents were reported from this mine.

Old No. 8 Mine, Timberlands. (49° 124° S.E.) Joseph Wilson and G. Lewis, Operators; Joseph Wilson, Fireboss. This mine is operating in a section of outcrop coal left intact in this area when Wellington mine was abandoned by the Canadian Collieries (Dunsmuir), Limited. Messrs. Wilson and Lewis graded and built a new road, almost 2 miles in length, from the Timberlands Highway through the bush to the No. 1 incline surface outlet of the old Wellington mine. A small tipple and coal-bunkers were built adjacent to the old airway which is now being utilized as a haulage-slope. The seam, which is of excellent quality, is the Wellington and varies from 30 to 40 inches in height with a strong roof and floor. Active mining was commenced in July, the total production for the year amounting to 447 long tons in

149 working-days, with two men employed. Working conditions have generally been found satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

No. 5 Mine, Cassidy. (49° 123° S.W.) J. McKellar and Associates, Operators; Thomas Robson, Fireboss. This mine is situated in the Cassidy district and is operating in a portion of the Douglas seam lying to the south of the abandoned Granby No. 2 mine. Production in 1945 amounted to 1,295 long tons in 228 working-days, with an average crew of four men employed. Working conditions in general have been found fairly satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

Loudon's No. 5 Mine. (49° 124° S.E.) W. Loudon and Associates, Operators; W. Loudon, Fireboss. This mine is situated on the opposite side of the ridge from the old No. 9 mine in the Wellington district and is operating in a portion of the upper Wellington seam. The Main level is now connected with the old No. 9 slope which is being utilized as an airway. Production in 1945 amounted to 1,428 long tons in 222 working-days, with an average crew of five men employed. Working conditions have been found generally satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

Carruthers and Wakelam No. 3 Mine. (49° 124° S.E.) R. B. Carruthers and W. Wakelam, Operators; R. B. Carruthers, Fireboss. This mine also is situated on the opposite side of the ridge from the old Wellington No. 9 mine and operates in the upper Wellington seam in the vicinity of the Loudon No. 5 mine with a barrier pillar 35 feet in width separating the two mines. The Main level is now within 100 feet of making contact with the old No. 9 slope which will act as an airway for this mine when the break-through is completed. Production for 1945 amounted to 651 long tons in 251 working-days, with a crew of two men employed. General working conditions have been found fairly good in the course of inspection. No accidents were reported from this mine during 1945.

Pacific No. 2 Mine. (49° 124° S.E.) F. John and H. Gerloch, Operators; F. John, Overman. This mine is situated in the Wellington district and is operating in some small outcrop pillars in the lower Wellington seam which were left when the old Wellington slope was abandoned. Production in 1945 amounted to 432 long tons in 223 working-days, with a crew of two men engaged. Working conditions have generally been found satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

Stronach No. 2 Mine. (49° 124° S.E.) C. Stronach, Operator; L. Dickie, Fireboss. This mine is situated in the Wellington district and operates in a section of the upper Wellington seam adjacent to the old No. 9 mine abandoned workings which were reached by three levels driven to the right off the Stronach slope. As a result of these connections, a good current of natural ventilation is always available for this mine. Production for 1945 amounted to 1,437 long tons in 212 working-days, with an average crew of five men employed. Working conditions in general have been found satisfactory in the course of inspection. No accidents were reported from this mine during 1945.

At all the larger mines in the district regular inspections were made by inspection committees appointed by the workmen, copies of these reports being forwarded to the Inspector's office through the courtesy of the various committees. All report-books required to be kept at the mines have been frequently examined and found in good order.

COMOX.

BY

R. B. BONAR.

Canadian Collieries (Dunsmuir), Ltd.

No. 8 Mine, Comox Colliery.—(49° 125° N.E.) John S. Williams, Manager; Arthur W. Watson, Overman; Daniel Morgan and William Johnstone, Shiftbosses; William Bennie, Frank Coates, Alexander Dean, Muir Frame, Alfred Maxwell, John Queen, Peter Queen, Thomas Shields, John W. Smith, Daniel Waddington, Sidney Hunt, James Weir, and Thomas Robertson, Firebosses.

The mine is adjacent to the Lake Trail road which runs from Courtenay to Comox Lake, and is about 2 miles east of the mine camp at Bevan. The seams are reached by two shafts, each 1,000 feet in depth, but the upper or No. 2 seam,, which lies at a depth of 700 feet, is the only one being operated at the present time. The lower or No. 4 seam workings are being kept unwatered with the view to future development, and a rock slope has been started from the present No. 2 seam workings, just inby No. 1 incline, to contact the lower or No. 4 seam. In the No. 2 seam, before opening out on the long-wall advance system, a circular shaft pillar 1,000 feet in diameter was left, only narrow roadways being driven through it. Most of the active workings are at present confined to the south side of the shaft where seven long-wall faces are in operation, five in the main south level district, one in the No. 1 incline district, and one in the No. 2 slope district. On the north side of the shaft there are two active walls advancing along the strike. Altogether there are nine long-walls in operation, one tandem unit, and seven single units, their total length aggregating 2,400 feet. The seam thickness varies from 2 to 3½ feet, excluding bony coal or rock. Most of the walls in this mine are being advanced along the strike, but several have been worked advancing up the pitch, and this method has proved to be more advantageous both for roof-control and continuance of operations.

The long-walls and levels are undercut by means of Anderson-Boyes compressed-air long-wall machines and the solid places are cut by radial type punching machines. Shaking pan-conveyers of the compressed-air Meco type are used to convey the coal down the long-wall faces and to load it into 1¼-ton capacity mine-cars. Owing to the numerous slips encountered, to the varying thickness of cap-rock, and to the slow advance of the walls, the roof conditions are not the best and require the closest supervision and care. The average daily output of coal during the month of December was 650 long tons, with 270 men employed underground and thirty-five on the surface. A 7-stage centrifugal pump directly connected to a 150-horse-power electric motor and housed in a fire-proof pump-room near the shaft-bottom handles the mine water.

The haulage in the main south level district is by an Ironton storage-battery locomotive which is serviced in the fire-proof charging-station located on the main south level, just inby No. 1 incline.

The mine ventilation is supplied by a Sullivan fan and at the time of the December 13th inspection gave a total quantity of 187,450 cubic feet of air per minute against a 6.8-inch water-gauge. Each wall has a separate split and where tandem walls are in operation the middle or escape road is used as a common return. Fifty-eight samples of mine-air were taken and analysed and served as a check on safety-lamp readings. The analyses of the air samples taken in the Main returns on December 13th showed a methane content of 0.66 per cent. in the No. 1 main south return airway, 0.52 per cent. in the No. 2 main south return airway, and 0.43 per cent. in the north return. A total of 314,800 lb. of limestone-dust was used underground during the past twelve months, approximately one-third being used in tamping shots and two-thirds in treating the roadways and face-lines of the mine to combat the coal-dust

hazard. As an additional precaution the coal is subjected to a water spray as it is discharged from the conveyers into the mine-cars; also several sprays of the atomizing type are in use on the lower portion of No. 1 incline to allay the coal-dust. Two hundred and sixteen samples of mine-dust were collected and analysed during 1945 for the purpose of ascertaining the percentage of incombustible matter and moisture in the dust collected from the roof, floor, and sides of the mine roadways.

The compressed air for the underground machinery is supplied by three electrically driven compressors having a rated capacity of 4,970 cubic feet of air per minute, and are located on the surface near the main hoisting-shaft engine-room.

The wash-house, put into operation on August 1st, 1943, has a capacity of 400 lockers with thirty sprays and a drying-room for wet clothes. A first-aid station is located on the surface and is fully equipped to comply with the requirements of the Workmen's Compensation Board. All the report-books required to be kept at the mine were examined regularly and found to be in order.

No. 5 Mine, Comox Colliery.—(49° 125° N.E.) Stanley Lawrence, Manager; John Christie, Overman; Alexander Somerville and Thomas Eccleston, Shiftbosses; A. G. Jones, Magnus Brown, Robert Littler, Sr., J. H. Vaughan, R. O'Brien, J. Cochrane, C. Williams, L. Hutchinson, and L. Cooper, Firebosses. This mine is in the No. 2 seam which is reached by a shaft 280 feet in depth. All the workings lie to the dip from the shaft and are accessible by four parallel slopes driven from the level of No. 1 seam on which the shaft-bottom is located. All the output is produced from advancing long-walls and their accompanying development levels. At the end of 1945 there were five active long-walls, their total length aggregating 1,080 feet, with an average seam thickness of 3 feet 4 inches plus 7 inches of rock. The average daily output of coal during the month of December was 460 long tons, with 200 men employed underground and thirty on the surface.

The long-wall faces are equipped with compressed-air Meco type pan-conveyers which convey the coal from the face-lines to 1-ton capacity mine-cars on the haulage-levels. The slopes and levels are either top- or bottom-brushed to give the necessary height and most of the rock is stowed in the gob on both sides of the roadways. All the coal-cutting on the face-lines is done by means of Anderson-Boyes compressed-air machines.

Because of the gassy nature of the seam, the closest attention is at all times required in maintaining efficient ventilation, and while it was necessary on several occasions during 1945 to prohibit temporarily the blasting on some of the walls, in only one instance was protracted prohibition necessary. The mine is ventilated by two electrically driven exhausting fans which have separate returns but common intakes. The No. 1 fan, which ventilates the abandoned No. 1 seam workings, stables, and No. 1 west slope district, gave a reading of 70,200 cubic feet of air per minute at the December 14th inspection; and the No. 2 fan, which ventilates the No. 4 west district, main slope district, No. 6 east slope, and abandoned workings of No. 5 east slope district, gave a reading of 129,000 cubic feet of air per minute against a 3.8-inch water-gauge. The methane content was 0.27 per cent. in the No. 1 fan return airway and 0.9 per cent. in the No. 2 fan return at the time of the above inspection.

A total of 280,000 lb. of limestone-dust was used underground during 1945 to combat the coal-dust hazard. It was distributed by hand on the roadways and face-lines, and was used exclusively for tamping shots. As an added precaution, the coal coming off the conveyers was sprayed with water to dampen the coal-dust. One hundred and sixty-eight samples of mine-dust were collected and analysed during the year to determine the percentage of incombustible matter and moisture in the dust on the roof, floor, and sides of the mine roadways.

A man-trip is run up the upper main slope and, as a safeguard, the hoist is equipped with an automatic cut-off which shuts off the power and applies the brake if anything should happen to the hoistman. This cut-off is commonly known as the "deadman control." An additional man-trip is run up the upper portion of the lower main slope to connect with the above-mentioned man-trip. Each man-trip is equipped with a safety-car which is attached to the rear of the trip.

The compressed air for the underground machinery is supplied by three electrically driven compressors which are situated at the top of No. 3 intake drift and have a rated capacity of 4,950 cubic feet of air per minute.

The bath-house at the mine is equipped with 512 lockers and sixty sprays. All the report-books required to be kept at the mine were examined regularly and were found to be in order.

Tsable River Prospect.—(49° 124° N.W.) James A. Quinn, District Superintendent. Early in 1945 a new coal prospect was started on the east bank of the Tsable River, approximately 7½ miles south-east of the city of Cumberland. This district is a new coalfield, in the sense that the only operations to date have been confined to drilling and prospecting. The field is fairly large but because of faulting and erosion the productive areas are likely to be limited in extent.

The prospect consists of a slope driven in the coal and paralleling the outcrop for a considerable distance. At the December inspection the coal was found to average about 6 feet in thickness and to show considerably greater regularity and freedom from rock-bands, etc., at the face than it does closer to the portal.

NICOLA-PRINCETON INSPECTION DISTRICT.

BY

E. R. HUGHES.

PRINCETON.

Tulameen Collieries, Ltd.—Head office, 716 Hall Building, Vancouver, B.C.; Thomas M. Wilson, Manager; Thomas Cunliffe, Overman; Thomas Bryden, Arthur Hilton, F. Bond, and J. Yard, Firebosses.

Tulameen No. 3 Mine.—(49° 120° S.W.) This mine is situated about 2 miles west of Princeton. The tipple is beside the Kettle Valley Railway, from which a short siding-spur is extended. The ground being worked at this mine consists of approximately 24 acres which had been left from the former operations of the abandoned Nos. 1 and 2 mines. This piece of coal land has been fully developed and the only work being done during 1945 was the extraction of pillars. The coal yet remaining should be exhausted early in 1946.

Most of the coal mined was shipped to the Granby Company's steam electric power plant near Princeton; power from this plant is supplied to the Tulameen Colliery and replaces the small steam plant previously in use.

Mine ventilation is adequately provided by an electrically driven Sheldon fan. No explosive gas was found during any inspection.

Monthly inspections were made by the miners' inspection committee, and copies of their inspection reports were received through the courtesy of the committee members. All report-books required to be kept at the mine were examined regularly and found to be in order. Weighting, as a result of pillar-extraction, caused the breakage of roadway supports in the lower workings; this necessitated constant repair-work in order that the roadways could be maintained in safe condition.

Pleasant Valley No. 4 Mine.—(49° 120° S.W.) This new mine is operated by the Tulameen Collieries, Limited, and is situated on the opposite side of the Tulameen

River Valley from the Tulameen No. 3 mine. The mine is being developed by a cross-measure rock slope being driven at an inclination of 25 degrees from the south end of the old Pleasant Valley Colliery tipple. On December 6th the slope had been advanced to a point 420 feet from the portal. It is expected that this mine will be developed in sufficient time to replace the Tulameen No. 3 mine which is being rapidly exhausted.

British Lands, Ltd.

Jackson No. 1 Mine.—(49° 120° S.W.) C. H. Jackson, Kelowna, B.C., Agent; James Taylor, Princeton, B.C., Manager. This small mine is about 6 miles south-west of Princeton and about a half mile north of the Black coal mine. Owing to lack of trade, the mine remained idle throughout 1945. One man was employed in maintaining the mine and plant.

Hayes and Vittoni Prospect.

(49° 120° S.W.) Formerly owned by J. Delprato and E. Hayes, this property, now held by E. Hayes and V. Vittoni, is situated between Blakeburn and Coalmont. Some intermittent prospecting was done by E. Hayes, who is endeavouring to prove the value of the coal-measures in this area.

Burr Prospect.

(49° 120° S.W.) Elmer Burr employed a crew of three men prospecting for coal on Lots 292, 103, and 102, located on the Similkameen River south of Princeton. The only underground work done was in extending an old adit-level located on Lot 292, situated about 4 miles south-west of Princeton. This old tunnel, which was found to have been driven 33 feet during some former prospecting operation, was extended a further 32 feet with the object of ascertaining whether or not the seam improved. The coal-seam was found to be approximately 8 feet thick, including nine bands of rock, clay, shale, and bone, having an aggregate thickness of about 15 inches. These bands were so interspersed through the seam that the thickest layer of clean coal was not more than 12 inches. James Taylor, Princeton, B.C., was in charge of the underground work.

Taylor Prospect.

(49° 120° S.W.) On obtaining a coal licence under the provisions of the "Coal Act," James Taylor, Princeton, B.C., commenced during December, 1945, to prospect for a coal-seam on the North Half of Lot 88 in the Yale Division, of Yale District, 4 miles west of Princeton. This half-section of coal land adjoins the property held by the British Lands, Limited, and on which their Jackson No. 1 mine is situated.

MERRITT.

Coldwater Colliery.

(50° 120° S.W.) A. D. Allan and Partners, Operators; A. D. Allan, Overman. Following the closing of the Middlesboro Colliery on March 31st, 1944, A. D. Allan and partners, old employees of the Middlesboro Collieries, Limited, were given the coal rights of the old colliery. Activities during 1945 were concentrated on rehabilitation of, and extraction of pillars from, the old main level of the abandoned Middlesboro Colliery No. 2 mine. This mine, which is situated in the Coldwater Hill, about half a mile east of the old Middlesboro Colliery office, was abandoned in July, 1914. The present operators intend to extract all available pillars from the old main level. For this reason the level was cleaned up and retimbered as far as the first fault, a distance of about 650 feet from the portal. Pillar-extraction was commenced at this point, and the pillars beyond the first fault definitely abandoned because of the expense that would be involved in rehabilitating the caved fault area. No work was done on the old No. 3 mine nor in the newly discovered seam of coal 500 feet west of the No. 3 mine portal. Another new seam was found to the west of No. 3 mine, and this is believed to be the No. 6 seam, hitherto unworked in this area. Because of the small local demand for coal, no further development was done.

Ventilation at this property is by natural means and was found to be adequate. Where the old workings had been penetrated a good flow of air was encountered. The crew was limited to the four co-owners, until two returned servicemen, sons of two of the co-owners, were added in November.

Merritt Coal Mines, Ltd.

Diamond Vale Colliery.—(50° 120° S.W.) George Murray, President; P. Malone, Vice-President; J. Sisco, Director; George Murray, Colliery Manager; Robert Murray and James Fairley, Firebosses. This company operated the Diamond Vale Colliery, near the city limits of Merritt. On June 21st, 1945, the colliery closed and all equipment was withdrawn from the underground workings.

No. 4 Mine.—(50° 120° S.W.) This mine was developed by a main slope dipping 25 degrees in a south-westerly direction. Five levels had been turned off to the right (west) and four levels to the left (east) of the main slope. The slope had been advanced to a point 450 feet from the portal. At the time the mine closed about half the pillars had been extracted from the inside end of the upper three east levels.

No. 3 Mine.—(50° 120° S.W.) The only work done at this mine was the pumping of water from the main slope and the retimbering of the slope as the water subsided. When the mine was abandoned unwatering of the main slope had been almost completed, although the west diagonal remained full of water.

Hat Creek.

Hat Creek Coal Mine.—(50° 121° S.W.) Owned by the St. Eugene Mining Corporation, Limited. After being worked for fourteen days and having produced 103 tons of coal, underground operations were suspended in January, 1945.

EAST KOOTENAY INSPECTION DISTRICT.

BY

H. E. Miard.

Crow's Nest Pass Coal Co., Ltd.

H. P. Wilson, President, Fernie, B.C.; Thomas Balmer, Vice-President, 305 Great Northern Railway Building, Seattle, Wash., U.S.A.; Thomas G. Ewart, Secretary, Fernie, B.C.; A. L. McPhee, Treasurer, Fernie, B.C.; Thomas H. Wilson, General Manager, Fernie, B.C.; William C. Whittaker, General Superintendent, Fernie, B.C.; Harold A. White, Chief Engineer, Fernie, B.C.; B. L. Montgomery, Mining Engineer, Fernie, B.C. Capital, $6,212,666.66. Value of plants and equipment, $8,262,069.03. This company operates the Elk River and Michel collieries.

Elk River Colliery.—(49° 114° S.W.) James Littler, Manager; John Caufield, afternoon shift supervisor. Underground operations are under the immediate supervision of two overmen and eleven firebosses.

No. 1 East, No. 4, and 9 mines were operated throughout 1945, but inadequacies of labour prevented the development of No. 3 seam, beyond the partial construction of a surface track leading to its outcrop at the same elevation as the portal of No. 4 mine. Additions to the plant included a small fire-proof building, used for the distribution of explosives, and an extension of the coal-storage bin. Repair of the main powder-magazine was also undertaken but was interrupted by the strike called in October and could not be completed before weather unfavourable to construction-work intervened. A 3,000-cubic-foot Belliss and Morcom 2-stage compressor was put in service at the power-house, bringing the capacity of the plant to 9,000 cubic feet of free air per minute.

No. 1 East Mine.—Carmichael McNay, Overman. While still having the highest output per man employed, this operation has now lost to No. 9 mine its rank as the

largest producer at the colliery. Without modern equipment other than pneumatic picks, with a track to every working-face, and with horses hauling the entire output, the mine is an anachronism in a district in which mechanization makes constant progress, but the results amply justify its existence. In the normal course of events the area in which the operations are now concentrated will be exhausted in not much more than a year.

Under the natural conditions met here, any method of working must provide a gradual release of ground stresses. In the mine this is sought through the slow advancement of places driven in pairs without the formation of pillars sufficiently large to interfere seriously with the expansion of the adjoining measures. Owing to the high output per miner, slow advance can be attained only by limiting production to one shift per day and, by virtue of a local custom, it is also restricted to five days per week.

Severe bumps occurred on June 26th, 27th, and 30th. Most of the shocks were felt on the surface as strong earth tremors, particularly that of the 30th. Coming after a long period of quiescence, they were particularly violent but, although the damage caused was sufficient to justify their being classed major bumps, their effects did not reach the importance of some of those experienced in former years. Serious heaving of the floor in the return airway and in the two roadways parallel to it, in the vicinity of the No. 10 West entry, and two heavy falls of roof were the most noticeable damage caused by the shocks of the 26th and 27th. Unfortunately the shock on the 26th took one life. In this case signs of the disturbance could be found over an area of approximately 11 acres. Another bump, probably that of June 30th, wrecked a part of the Main return airway about 1,900 feet inby the area affected by those which had preceded it. As the mine was idle during the week following the 27th, the effects of this shock were not discovered until some time after its occurrence.

It seemed evident that the series of shocks experienced over a period of five days was due to disturbance of stratal equilibrium far more widespread than could be caused by the mining done since operations were resumed in the outer section of the mine. Nevertheless, it was thought prudent to abandon the district in which the bump of the 26th had occurred and to establish a new boundary following approximately the No. 8 West and No. 7 East entries. Any work done beyond this was limited to the re-establishment of the ventilation and the recovery of equipment. With the exception of a narrow zone on the East side, in which caution is still necessary as a shoulder of the mountain extends over it, all working-places are now at vertical depths of less than 1,000 feet from the surface.

The earth tremors did not leave the large abandoned 11, 14, and 16 East sections entirely undamaged. Some emergency repairs had to be done there in order to assure the circulation of a certain volume of air and to permit regular inspections of the area. Otherwise there was little change in the general conditions prevailing in these parts of the mine during 1945.

With the progressive retreat towards the surface, the mine haulage has been greatly simplified. The entire output is brought from main gathering-points by a compressed-air hoist to the head of the endless rope system, now only 450 feet from the portal, by means of which it is lowered on the surface incline to the level of the old Coal Creek tipple. From there it is taken to the Elk River preparation plant, 4,000 feet away, by a steam-locomotive.

The ventilation is good. Very little methane is given off in the course of mining operations and the greater part of that found in the Main return air issues from the abandoned area on the East side. However, the amount of coal-dust liberated is considerable. At the end of 1945 the total quantity of air passing at the foot of the fan-shaft was 93,000 cubic feet per minute, this carrying 0.31 per cent. of methane,

and the percentage of the same gas present in the 30,000 cubic feet return air-current from the East side was 0.85 per cent. At that time eighty-two men were employed in both splits and eighteen horses on the haulage.

No. 4 Mine.—Daniel Chester, Overman. During 1945 all operations were limited to development-work, on a single shift, with a crew of nineteen men at the most. In the part of the mine now active the seam gives off a considerable volume of methane, particularly in the vicinity of small ground displacements which are rather numerous, the coal being usually more or less crushed in these zones. Pneumatic picks are in general use but radial coal-cutting machines are also brought into service occasionally and very little blasting is necessary. The entire output is hauled by horses to the mine portal, only a very short distance from the tipple.

The mine is ventilated by a double inlet Sirocco fan, 5 feet in diameter, driven by an A.C. motor and passing 39,000 cubic feet of air per minute against a water-gauge of 0.8 inch when exhausting and 28,000 cubic feet per minute when operated as a blower. In winter it is advantageous to operate the fan on the plenum system, notwithstanding its decreased volumetric efficiency, in order to avoid the formation of ice on the haulage-road. The volume of air circulating has always been found sufficient and the presence of small quantities of inflammable gaseous mixtures, occasionally observed in inspections, seemed invariably to result from some disarrangement of the bratticing in the places affected.

No. 9 Mine.—Daniel Chester, Overman. This is now the most important operation at the colliery in regard to number of men employed and daily output, although the output per man is not yet as great as at the No. 1 East. Some unfavourable geologic conditions, met with while the mine was still in the development stage, are being circumvented. Rapid progress has been made with the development of No. 10 seam since it was reached at the beginning of June by two inclined rock-raises which had been started in the month of February.

The Slope district, a small area opened to assist in maintaining production while the rest of the mine was being developed, has been finally abandoned. The fact that it underlies a section of the old Coal Creek No. 1 South mine made the extraction of pillars inadvisable in this part of the workings. Some faults, pinch-outs, and rock-intrusions have retarded the advancements of the main roadways in No. 9 seam but rapid progress was made with the extension of a haulage-road intended to reach the inner part of the field and driven on a gradient permitting the use of locomotives. At the inner part, the coal is loaded directly into cars at the faces and is dumped near the portal on to a belt carrying it to the retarding conveyer. Eventually this will become the main artery for the lower workings while the belt system will be transporting the output of only the overlying seam.

In the part of No. 10 seam now being penetrated, most of the development-work is driven in the lower bench where the coal is 9 feet thick and of excellent quality. The upper bench, with a thickness of 11 feet, consists of alternating bands of coal and coaly shale, and is carried as a roof, demanding care in the selection and setting of the timber. The workings of this seam will eventually constitute an entirely separate operation, and development is planned with this end in view.

The coal is mined with the help of pneumatic picks or of radial machines and, with the exception of that obtained from the haulage-road already mentioned and its counter, the entire output is carried away from the faces by trough conveyers and transferred to a system of conveying-belts which bring it to the surface. In the more steeply inclined parts of the seams, the downward movement of the coal has been very satisfactorily controlled by means of chain conveyers.

The mine is ventilated by an 8-foot reversible Jeffrey fan with steel casing. The fan, making 140 revolutions per minute, is driven by a 100-horse-power A.C. motor sup-

plied with current at 2,200 volts. In December it was passing through the workings 78,000 cubic feet of air per minute under a water-gauge of 1.22 inches. The highest percentage of methane observed in the course of inspections was about 0.5 at the face of a working-place in No. 10 seam in September. However, the firebosses have discovered small accumulations of inflammable gaseous mixtures in the same seam on two occasions after temporary disturbances of the ventilation. Ordinarily, only the presence of faint traces of Monobel fumes and occasionally of hydrogen sulphide could be detected.

At the time of the December inspection 11,300 cubic feet of air per minute were supplied to twenty-four men in No. 10 seam and 34,000 cubic feet to sixty men employed in the workings of No. 9 seam.

At the end of 1945 thirteen radial coal-cutting machines and 133 pneumatic picks were in service at the colliery. The transportation equipment included thirty-two trough and two chain conveyers, delivering the coal from the faces to five 30-inch compressed-air-driven Goodman conveying-belts. These in turn brought it to a 36-inch Dodge belt, driven by a 50-horse-power A.C. motor, which carried nearly the entire output to the surface. The coal from the new haulage-road is dumped near the portal on an electrically driven transfer belt which brings it to the retarding conveyer.

During 1945 nearly 5,000 lb. of CXL-ite, 30,650 lb. of Polar Monobel No. 4, and 31,800 electric detonators were used at the colliery in coal and rock blasting operations. Six misfires were reported, all apparently having resulted from the use of detonators which had deteriorated while stored under unfavourable conditions at some time. The remainder of the shipment of detonators was destroyed and no further trouble of this kind was experienced. In 1945 a total of 274,000 lb. of limestone-dust was applied to the underground roadways of the colliery to neutralize the coal-dust.

Michel Colliery.— (59° 114° N.W.) William Chapman, Manager. Underground operations are under the immediate supervision of four overmen and twenty-five firebosses; five shotlighters are also employed. During 1945 areas of the "A" and "B" seams' workings in which intensive extraction was practicable were the principal sources of the output principally because the supply of labour was insufficient to meet the requirements of more widely spread operations. Old No. 3 mine was finally abandoned at the end of 1944, as were also the small districts opened in Nos. 1 and 2 seams on the Sparwood side of the syncline, and the underground workings of the colliery are now divided into five main sections known as "A" East, "A" West, "A" South, "B" East, and "B" South.

"A" East.—Walter McKay, Overman. Early in 1945 this part of the colliery was chosen for an experiment in large-scale mechanization. The thickness of the seam, 10 feet or more, was an advantage but weak roof often encountered and the influence of small blocks of coal abandoned in the worked-out areas of the overlying "B" seam were evidently unfavourable. However, these did not prevent the successful application of the chosen method of working, and a daily output of approximately 1,200 tons has been maintained for some time. Short-wall coal-cutting machines and Goodman "duck-bill" loaders permitted the rapid advancement of the narrow work, with the extraction of pillars immediately following its completion. In the latter operation scrapers have also been used with satisfactory results in removing the coal mined from the retreating faces.

The coal is undercut by short-wall or radial machines and is subsequently brought down with light charges of explosives if necessary, but in some parts of the section and in pillar-work pneumatic picks are generally sufficient. The coal is carried away from all faces, except that of the main entry, by conveyers delivering it either directly to mine-cars or to transporting-belts which bring it down the inclines to central loading-points on the main entry. From these points it is hauled away by compressed-air locomotives.

The decision to make this part of the colliery one of the chief sources of production required an increase in the volume of air circulating, which was difficult, considering the length already attained by the main airways. After a careful study of the local topography had led to the selection of No. 6 incline as a new intake, it was driven to the surface mostly in the shale roof of the seam, which was much better ground for the purpose than the glacial drift covering the greater part of the mountain. The work was completed in October. The section is now divided into two ventilating districts, receiving 12,000 and 22,000 cubic feet of air per minute respectively, and having a total of 100 men and two horses employed. Another 11,000 cubic feet per minute is passing directly from the seam intake into the "B" workings. With improvements of the return airways, to which some attention is being given at present, the total quantity entering through No. 6 incline may be greatly increased.

With steadily expanding mechanization, the liberation of coal-dust presents a problem differing somewhat from that which confronted the managements twenty-five years ago. Then, most of it was thrown into the air-current at the working-faces, but now, excepting places in which radial machines are being operated, most of it is liberated at the discharge ends of conveyers and transporting belts. Heavy and constant spraying would be required to abate the dust liberated there, and water could be used only to a restricted extent in winter in some parts of the workings and would be difficult to supply in sufficient quantity. The solution seems to lie in reducing the distance through which the coal drops at transfer points, the volume of dust set free varying directly as the square of this distance, and appropriate modifications of the present transporting and loading arrangements have been under consideration for some time. The foregoing remarks find general application, but the conditions discussed have perhaps attracted more attention in "A" East than in other parts of the colliery.

"A" West.—William Gregory, Overman. This section remained idle throughout 1945, the work done being limited to some emergency repairs and to the removal of equipment needed elsewhere. With the exception of a pair of rooms which deteriorated to a considerable extent, the condition of the roadways was still good at the end of 1945, although the effects of dry-rot were becoming increasingly evident.

"A" South.—William Gregory, Overman. This section has probably suffered more damage from the destruction of timber by saprophytic fungi than any other area at the colliery, essential roadways being maintained only by constant repairs, and many roadways driven as part of the original development have now been irretrievably lost. For the reason already stated, the extension of existing roadways was discontinued at the beginning of 1945 and a new method of extraction was introduced experimentally in a small district already opened. Its practicability now having been established, the system will be applied shortly on a larger scale in another part of the section in which considerable progress has already been made with the preliminary work.

Two natural difficulties have to be overcome when complete extraction is contemplated, one being the thickness of the seam, sometimes exceeding 22 feet, and the other being the high inclination of the measures, 30 degrees or more. These difficulties were met by driving rooms 12 feet wide and 8 feet high in the lower bench and on the approximate direction of the strike, connected at intervals by narrow break-throughs in the intervening 23-foot pillar. Upon reaching the boundary, each room begins to retreat, the upper bench and the rise side pillar are blasted down in sections, and the broken coal is removed by "duck-bill" loaders. Very high output per man with a comparatively low consumption of explosives and a recovery amounting to 80 per cent. of the seam have been attained in this manner.

In the district now being prepared for the application of the same method on a larger scale, the coal is brought down by a chute in the upper and steeper part of one

of the raises and is then transferred to a retarding belt which carries it to the loading-point on the main entry. This arrangement has proved satisfactory, except that small coal and dust accumulate in the steel trough under the descending part of the belt and have to be removed periodically.

Some progress is being made in repairing two of the roadways abandoned temporarily at the beginning of 1945, which will permit the driving of raises to the surface as rapidly as possible in order to provide more efficient ventilation for the area that it is intended to develop. The volume of air now circulating is sufficient to meet immediate requirements but would not permit any important expansion of the present active workings. At the time of the December inspection 17,500 cubic feet of air per minute were supplied to twenty men employed in the section.

All the workings of "A" seam are ventilated by an 8-foot double-inlet reversible Keith fan, with steel casing and housing, passing 72,000 cubic feet of air per minute against a water-gauge of 1.92 inches at present.

"B" East.—Thomas O. Heyes, Overman. Although in the greater part of this section the seam is only 5 feet in thickness and occasionally less, the average daily output per miner is about 15 tons. In a zone extending across all the Slope district, ground pressures assist greatly in mining the coal but also promote heaving of the floor shale and slabbing of the roof as soon as it is exposed. A considerable volume of methane is given off and the return air often carries 1 per cent. or even slightly more of the gas. No explosives are used at the faces except in the few roadways in which brushing of the floor is necessary.

For both haulage and ventilation, this section is practically divided into two separate districts. The coal from the inner end of it is hauled to "A" East through a short cross-measures tunnel which also serves as intake for the outer part of the workings. The latter area embraces one of the slopes and a part of the main level in which a block of coal left on the upper side of this roadway is now being extracted. The inner district, temporarily the less important producer, is ventilated by a current of air brought from the surface through a long roadway following the outcrop, now seriously damaged by weight thrown upon it by neighbouring worked-out areas. An effort to provide a new intake opening had to be abandoned when glacial till was met unexpectedly about 200 feet from the surface. The nature of this deposit being well known, it was thought that any attempt to pass through such a thickness of it would entail considerable difficulty and probably end in failure. An alternative would be the establishment of another connection between this and the underlying "A" East, thus taking further advantage of the potential capacity of the intake serving the latter section. As the thickness of the intervening measures is only 35 feet, this would not be a very difficult matter and would probably offer the most practical solution of the problem.

The method of working is one which has been followed in this seam for the past twelve years. The coal is divided into blocks 300 feet long and 100 feet wide by single roadways known locally as "splits," each one of which eventually becomes the starting-point for a long-wall face which retreats until only a narrow pillar, abandoned to regulate the descent of the roof, is left between it and the next split outby, the same operation being repeated there. The coal is mined with long-wall or radial cutting-machines and afterwards brought down with pneumatic picks or pinch-bars if necessary. It is removed from the faces by conveyers except in the main entry and the rooms driven off the slopes, in which it is loaded directly into mine-cars. A conveying-belt is also in service on a short incline.

Heavy falls of roof have been followed on two occasions by inflows of water continuing for some time and, on one occasion, by emission of a considerable volume of methane. The origin of either the water or gas is not positively known, but some

porous outcropping stratum overlying the seam is possibly responsible for the water and either a band of coal in the overlying measures, known to be particularly gaseous, or small pillars being crushed in the goaf area may have been the source of the gas.

At the time of the December inspection 23,000 cubic feet of air per minute was supplied to this section for the use of forty-five men and four horses.

"B" South.—Irving Morgan, Overman. This section extends from the lowest to the highest points reached by the present workings of the colliery and the natural conditions differ widely. In the Slope district the dip of the measures is moderate; the coal gives off a considerable amount of methane and ground pressures of some magnitude are encountered, with the effects already described in the case of the East section of the same seam. In the upper or No. 3 Incline district the dip is much steeper, reaching 50 degrees in one part of the workings; the coal is somewhat thicker, it gives off little gas, and the influence of stratal stresses is negligible. In former years the area on the rise side of the main level had proved difficult to ventilate adequately in winter owing to the resistance to the action of the fan offered by ascending currents of air warmer than those entering the intakes. This difficulty was finally solved by driving additional openings to the surface, at one of which a 4-foot single-inlet Sirocco fan was put in service towards the end of 1945, thus providing entirely separate ventilation for this part of the colliery. The Slope district remains a division of the group of workings ventilated by No. 3 fan.

The method of working followed is that already described in the part of this report referring to the East section of the same seam, but now it is going to be supplanted by another which is better adapted to mechanical loading and which is expected to permit very nearly complete extraction. At present the retreating long-wall faces, usually 300 feet in length, extend on the full dip of the seam and the coal slides down to conveyers carrying it to chutes by means of which it is delivered to transporting-belts operated in rooms with moderate gradients. Formerly it was then loaded into mine-cars and lowered to the main level by a large compressed-air hoist now used solely for the transportation of men and supplies. Under the new arrangement the coal is brought down by a system of belts, with an aggregate length of 3,100 feet, set up in roadways separate from that used until now for hoisting.

The coal is undercut with radial machines in narrow work and with long-wall machines at the retreating faces, being blasted afterwards if necessary. Faults, met occasionally, while sometimes troublesome, have not interfered seriously with the general plan of operations. The roof is moderately strong and single props set in rows are the only form of timbering required.

In the Slope district only development-work, progressing on a single shift and employing a small number of men, has been carried on up to the present. There the coal is undermined with radial machines and then loosened with pneumatic picks, no blasting being necessary. In splits conveyers carry it to the rooms where it is loaded directly into mine-cars.

At the end of 1945, 24,000 cubic feet of air per minute were supplied to the No. 3 Incline district for the use of fifty men and two horses, while 11,700 cubic feet per minute passed through the Slope workings for the use of twelve men and one horse.

The mechanical mining equipment in use at the colliery includes five long-wall, four short-wall, and thirty radial coal-cutting machines besides eighty-six pneumatic picks. There are also in service nine Goodman conveyers, types G 12½ and G 20, equipped with "duck-bill" loading heads, fifty-one Meco and Mavor & Coulson trough conveyers, one chain conveyer, and twenty transporting-belts. The entire output is hauled from the main gathering-points to the mine portal by six compressed-air locomotives.

In 1945 the consumption of explosives at the colliery amounted to 3,269 lb. of Polar CXL-ite and 52,269 lb. of Monobel No. 4 in a total of 57,932 shots, with no misfires reported. In the same period a total of 697,300 lb. of ground limestone was applied to the roadways and working-places to neutralize the coal-dust.

In 1945, 1,077 samples of dust collected on roadways at the Elk River and Michel collieries were submitted to incineration tests, all but two leaving solid residues amounting to more than 50 per cent. of the original weight. As the ash content of a few of these samples appeared surprisingly high, some tests were made at the assay offices of both collieries to determine the exact quality of the rock-dust applied. Upon prolonged ignition at 1,000 degrees C., the samples treated left from 56.8 per cent. to 57.34 per cent. of solid residue and dissolved to the extent of at least 99.9 per cent. in 50 per cent. hydrochloric acid, which proved that they represented limestone of good quality, very well adapted to the purpose for which it is used underground.

In the same period eighty-nine samples of mine-air were collected in various parts of the two collieries (thirty-one at Elk River and fifty-eight at Michel) and sent to Ottawa for analysis.

Upper Elk Valley Coalfield.

(50° 114° S.W.) This part of the district, in which considerable interest was displayed nearly forty years ago, had remained almost forgotten since 1909 but came into prominence again recently. Some hunters reported that a fire in an outcropping coal-seam had attained considerable importance. A forest fire which swept through this territory in 1936 seems to have ignited the coal in one of the prospect openings on Crown-granted land held by the Canadian Pacific Railway syndicate (Lot 6825) on the south side of Aldridge Creek, about 41 miles on an air line north of the confluence of the Elk River and Michel Creek. The prospect opening was originally an adit about 70 feet in length with a shaft driven to the surface at its inner end, probably for ventilation, an excellent arrangement to promote combustion once started. A part of the outcrop was reduced to ashes and the sandstone roof and the overburden were caved in on top of the burning coal. At the beginning of November the fire extended 152 feet along the strike of the seam and 69 feet down the dip, which there is 22 degrees.

Following an arrangement made by the Department of Natural Resources of the Canadian Pacific Railway and the Consolidated Mining and Smelting Company of Canada, Limited, a small party under the direction of W. F. Marleau, of Kimberley, went to Aldridge Creek in the early part of November and attempted to dampen the fire by a process of combined flooding and silting. However, the arrival of winter compelled a retreat before the intended object had been attained and the work is to be resumed in the spring.

Smoke rising out of the ground on the north side of the creek attracted the attention of Mr. Marleau's party to another outcrop fire, this on the property of the Northern Coal and Coke Company (Lot 6826). There the coal is covered with detrital soil and the men who attempted to dig down to it were driven away by the heat. This will also have to be investigated in the coming summer.

When these prospects were active a wagon-road ran up the valley as far as Weary Creek, some 6 miles beyond the site of the fires, but the last 25 miles are now impassable for any sort of wheeled conveyance, so that all equipment and supplies must be taken in by pack-horses. This is a serious hindrance, for to make any impression on a fire of this kind a pump capable of handling at least 200 gallons of water per minute against a head of 157 feet would have to be brought in. Owing to the slow rise of the creek-bed and the elevation at which the burning outcrop is situated, about 3,000 feet of ditching would be necessary to bring water to the fire by gravity, by no means an insignificant undertaking but a solution of the problem which may have to be adopted.

NORTHERN INSPECTION DISTRICT.

BY

CHARLES GRAHAM.

TELKWA.

The markets for Telkwa coal were sharply curtailed during 1945. After the cessation of hostilities in August, all contracts to supply the United States and Canadian armed forces were cancelled. The Canadian National Railways, moreover, have converted their steam plants at the Smithers and Prince George roundhouses to oil. This company uses oil on all motive power between Prince Rupert and Jasper and most of the coal used for heating stations is being imported from Alberta.

The market for Telkwa coal is now confined to businesses and homes between Prince George and Prince Rupert where a comparatively short freight-haul permits competition with coals from other fields. Although this market is probably larger than it was in 1941, it is still insufficient to maintain two operating mines in this district.

As a result of the reduction in markets during 1945, the Telkoal mine was closed on September 6th. Moreover, in spite of the small output of slack coal from the Bulkley Valley Collieries, and in spite of the low price, $3 per ton f.o.b. railroad-cars at the Telkwa siding, the demand for this product has become so limited that it is now being dumped at the mine.

Bulkley Valley Collieries, Ltd. (54° 127° N.E.) A. H. Dockrill, Overman; Hugh Bankhead, Fire-boss. The property is on Goat Creek, 7 miles by road south-west of Telkwa. Coal is hauled by truck to the railroad at Telkwa. The mine was operated continuously during 1945, with two shifts working whenever labour was available. The production was seldom up to the capacity of the mine. One small fault was encountered in the development of the main slope. Although this fault has now been crossed and the slope is again in coal, operating conditions are not yet normal.

No gas was observed in the mine and general conditions were satisfactory.

Telkoal Co., Ltd. (54° 127° N.E.) A. M. Richmond, General Manager; T. O. Davis, Manager. This company has been operating in the Betty seam which outcrops on the north bank of the Telkwa River about 6½ miles west of Telkwa. The mine was closed on September 6th, 1945, following cancellation of orders for the United States and Canadian armed forces, and there is no indication of production being resumed.

Coal was being obtained principally from a section above the fault which runs parallel with No. 5 left level. No development-work of any importance was done during 1945.

Small quantities of gas were reported at various times, usually in pot-holes in the roof or at the back of cuts after blasting. The fan used for ventilation had a capacity of 11,000 cubic feet a minute. General conditions were satisfactory.

HUDSON HOPE.

During the winter of 1944–45 Packwood Mines had a contract to supply 9,000 tons of coal to the airport at Fort Nelson which was then being operated by the United States Army. Because of operating difficulties at the mine, these requirements were not fulfilled; consequently, the contract for the winter of 1945–46 was given to Alberta mines, and coal was hauled to Fort Nelson from the rail-head at Dawson Creek during the summer of 1945.

The local market for Hudson Hope coal at Fort St. John is estimated at 1,680 tons per year.

Packwood Mines.*

(56° 122° S.E.) This mine was formerly operated under a coal permit by George Packwood, of Fort St. John, to whom a licence to work coal-seams on the property was granted on September 17th, 1945. The property is on a southern spur of Butler Ridge, about 83 miles from Fort. St. John. After several thousand tons of coal had been mined and shipped, the workings penetrated to a part of the seam in which the coal was so badly crushed that marketable sizes could no longer be recovered and the operation had to be abandoned.

Prospecting has been carried out in the area to the north-west of the mine, and showings of two seams, possibly the same as those at the mine but repeated by faulting, were located. These were not developed in time for operation during the winter of 1945–46.

King Gething Mine.*

(56° 122° N.E.) This mine has been worked by Q. F. (King) Gething, of Hudson Hope, under a coal permit. A coal licence for this property was granted on November 7th, 1945. The property is on the east slope of Portage Mountain, about 12 miles by road from Hudson Hope and 72 miles from Fort St. John.

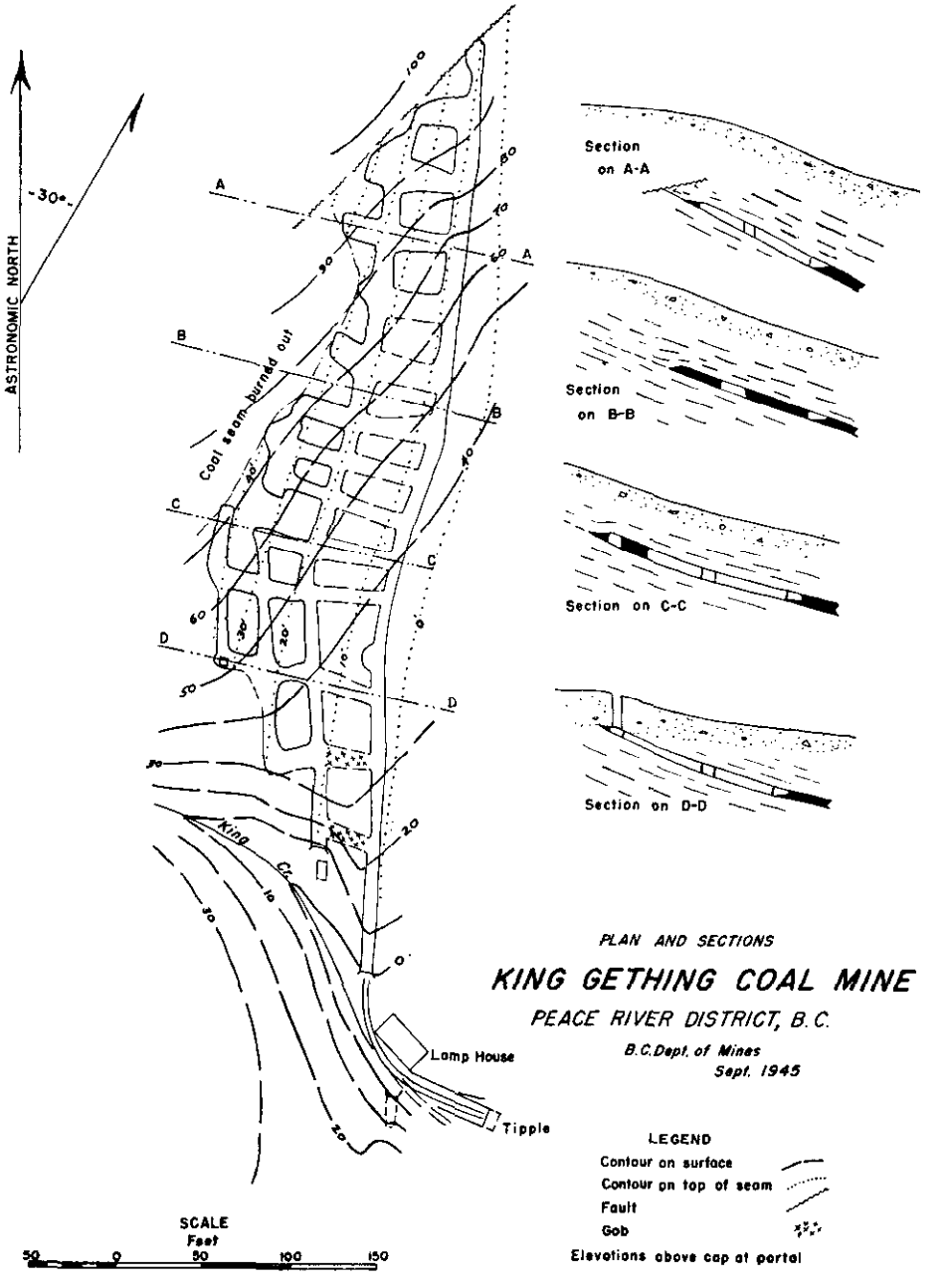
The seam worked in the mine is known as the King seam, named after its discoverer, King Gething, and occurs in the lower part of the Gething formation. This seam has not been correlated with those outcropping in the Peace River Canyon. In the mine the seam has a total thickness of 5.2 feet, including a 0.3-foot shale parting in the middle of the seam; it strikes northerly and dips eastward at angles of from 15 to more than 30 degrees. The hillside in the vicinity of the mine rises toward the north-west, hence the depth of cover increases northerly along the strike of the seam. The hill slopes south-easterly at an angle somewhat less than the dip of the seam, hence the depth of cover decreases gradually to the rise.

The main entry of the mine was started on the seam at the point where it crosses King Creek, and the lowest point known on the outcrop of the seam. The counter is driven on the seam 30 to 40 feet up the dip from the main entry. Rooms have been worked to the rise for almost the full length of the workings, 530 feet. The first few rooms encountered glacial drift from 50 to 100 feet above the main entry. In the next rooms a burnt-out part of the seam was encountered about 125 feet to the rise of the main entry, and at progressively shorter distances in subsequent rooms. Finally in the last two rooms and at the face of the main entry a fault was encountered.

The initial flow of water along this fault was so great that operations were suspended. By September, 1945, although the flow had largely subsided, operations had not been resumed. The fault strikes easterly and dips northward at about 25 degrees. No development has been carried on beyond the fault to determine the direction or amount of displacement.

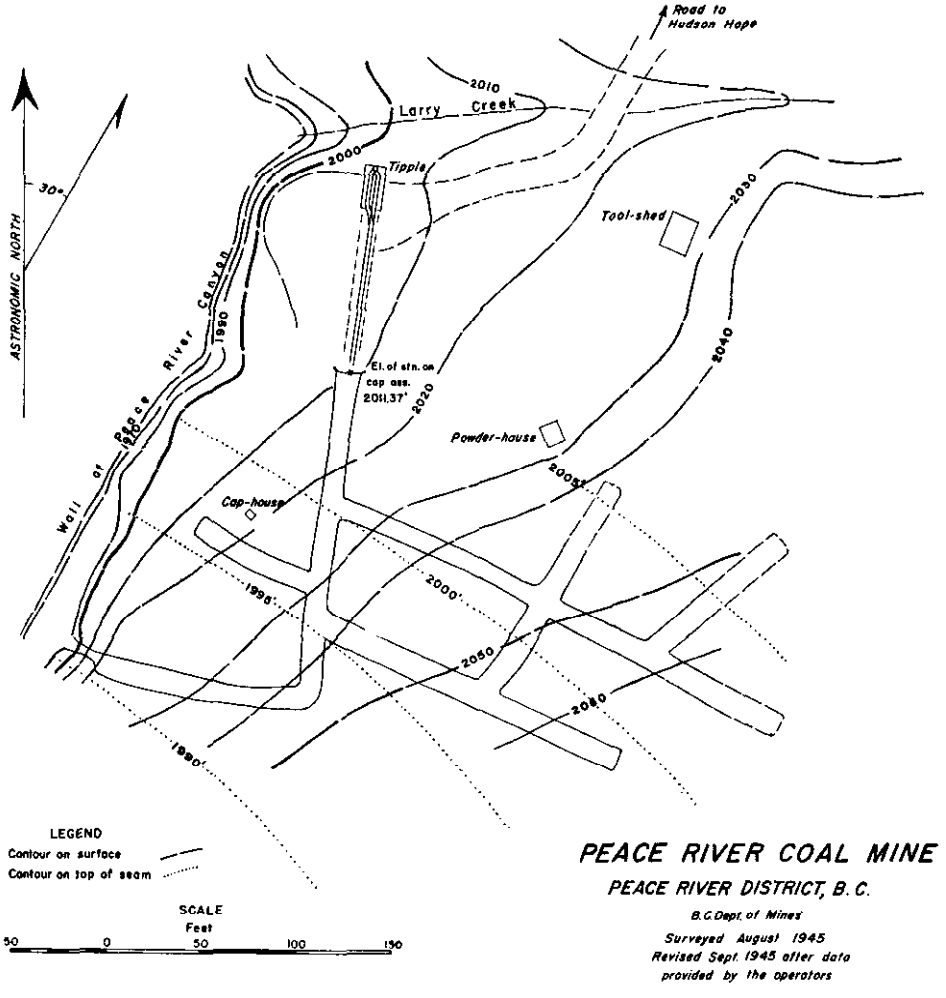
Mr. Gething was uncertain whether to continue the entry through the fault or to abandon the present mine entirely and open the seam either by a slope from the present tipple or by a crosscut entry. The crosscut entry would intersect the seam beyond the present entry face and would entail the construction of several hundred feet of new road and the erection of a new tipple.

* By W. H. Mathews and Charles Graham.


ASTRONOMIC NORTH
-30°-
A
B
C
D
Coal seam burned out
King Ck.
Lamp House
Tipple
Section on A-A
Section on B-B
Section on C-C
Section on D-D
SCALE
Feet
50 0 50 100 150
PLAN AND SECTIONS
KING GETHING COAL MINE
PEACE RIVER DISTRICT, B.C.
B.C. Dept. of Mines
Sept. 1945
LEGEND
Contour on surface
Contour on top of seam
Fault
Gob
Elevations above cap at portal

Peace River Coal Mines, Ltd.

(55° 122° N.E.) Lloyd Gething, Managing Director; Nick Schneider, Fireboss (under permit). The property is on Larry Creek, on the west slope of Portage Mountain, at the upper end of the Peace River Canyon, about 18 miles from Hudson Hope and 78 miles from Fort St. John. The mine is operating in the so-called Murray seam situated in the lower



part of the Gething formation. No correlation has been made between this seam and those exposed farther south in the canyon, but it is thought to lie at or below the horizon of the Grant seam.

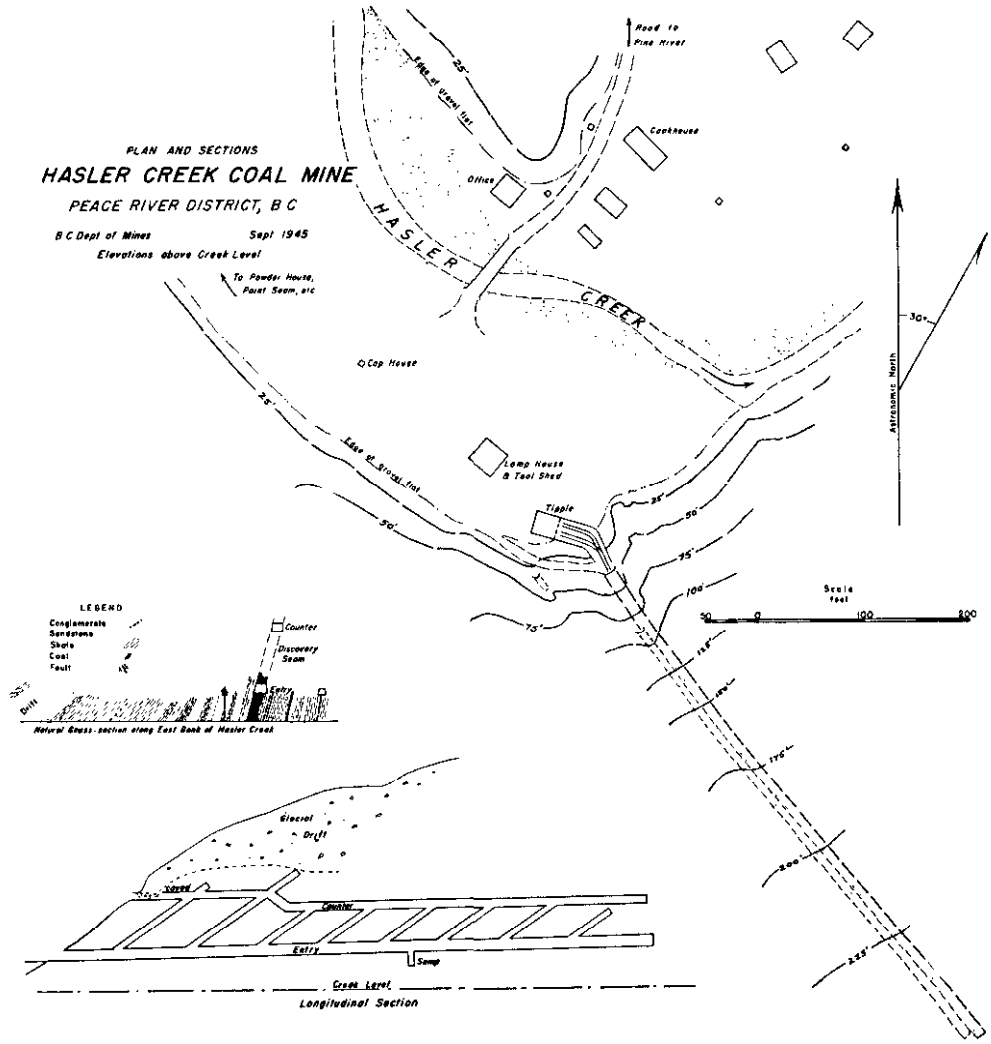
The main slope was driven down south 9 degrees west for 178 feet and a crosscut was driven west 125 feet from the lower end of the slope to the wall of the Peace River Canyon. This crosscut provides drainage and good natural ventilation for the mine. Two levels have been driven to the left (east) from the main slope.

As the present slope location is unsatisfactory, it is proposed to drive a new slope and erect a new tipple at a more suitable site.

The seam dips about 3½ degrees south-westward. A section measured on No. 1 left level is as follows: Roof—shale; coal, 2 feet 1 inch; clay ironstone, 4½ inches; coal, 2 feet 3 inches; clay ironstone, 6 inches; coal, 2 feet. Floor—shale.

The analysis of a sample taken at a point on No. 1 left level is as follows: Moisture, 1.5 per cent.; volatile matter, 19.3 per cent.; fixed carbon, 72.7 per cent.; ash, 6.5 per cent.; B.T.U. content, 13,830 (analysis by Department of Mines, Victoria).

No gas has been detected at any time and general conditions underground were satisfactory. Only three men were employed underground in the fall of 1945.



PINE RIVER.

Hasler Creek Coal Co., Ltd.*

(55° 121° N.W.) J. Gordon Wilson, Managing Director. The property is on Hasler Creek, about 8 miles south of its junction with Pine River and 94 miles from Dawson Creek. Operations at this mine have so far been confined, for the most part, to the winter months, at which time it is possible to haul coal across the ice of the Pine River on the Dawson Creek Road. A ferry service across the river during the summer months is not suitable for heavily laden coal-trucks. Construction of a bridge across the Pine River is proceeding and will make the markets of the Dawson Creek area accessible to the mine at any time.

* Includes information supplied by W. H. Mathews.

The Hasler Creek Coal Company supplied coal during the winter of 1944–45 to the Northern Alberta Railways at Dawson Creek for use in locomotives. The coal was apparently very satisfactory for this purpose. The company also supplied the Royal Canadian Air Force airport at Dawson Creek as well as businesses and homes in that vicinity.

All the workings at the mine, with the exception of some stripping and one short adit, have been on the so-called Discovery seam in the upper part of the Gething formation. The seam has been opened by a pair of entries which have been driven about 550 feet south-easterly from the outcrop on Hasler Creek.

Over the full length of the workings the Discovery seam strikes south-easterly and dips at about 75 degrees north-eastward. It is overlain by siltstone and underlain by several feet of dirty coal and carbonaceous shale, much of which is badly sheared and is known to the miners as "black-jack." The thickness of the seam between the well defined roof and the poorly defined floor is about 7½ to 9 feet. A sample across 8 feet 11 inches taken at the face of the lower entry gave the following analysis: Moisture, 1.0 per cent.; volatile matter, 19.8 per cent.; fixed carbon, 73.9 per cent.; ash, 5.3 per cent.; B.T.U., 14,280 (analysis by Department of Mines, Victoria).

The second of the two crosscuts between the entries was continued above the upper entry and encountered glacial debris within 30 feet. As the ground rises gently to the south-east of this point, permission to drive additional raises above the upper entry has been refused until such time as the entry has been driven another 500 feet.

Nothing was done at the property from March, 1945, until October, and no information was then available on plans for the winter. Several small bridges on Hasler Creek were washed away by spring freshets and the road is in poor condition. There is a cave-in at the portal of the counter-entry which will have to be cleaned up before production can be resumed.

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, Vancouver, and Nelson.

PRICES.

Paper bound copies of Annual Reports of the Minister of Mines and of Bulletins are distributed free of charge, except that a charge may be made if the stock is low. If a charge is made, application for the Annual Report or Bulletin should be made to the office of the Department of Mines, Victoria, B.C.

INDEXES.

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.

Index to Annual Reports of the Minister of Mines, 1937–43. And Bulletins Nos. 1–17. (By H. T. Nation.) Paper bound copies, 50 cents each. Cloth bound copies, $1 each.

Corrigenda, Index to Annual Reports of the Minister of Mines, 1874–1936.

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.
1874–1896			1924	50c.	
1897	50c.		1925	50c.	
1898–1900			1926		
1901	50c.		1927	Free	
1902–1906			1928	Free	$1.00
1907	50c.		1929	Free	
1908	50c.		1930	Free	1.00
1909	50c.		1931	50c.	1.00
1910	50c.		1932		
1911			1933	Free	1.00
1912			1934	Free	1.00
1913	50c.	$1.00	1935	Free	1.00
1914	50c.	1.00	1936	Free*	1.00
1915	Free	1.00	1937	Free*	1.00
1916	Free	1.00	1938	Free*	1.00
1917	Free		1939	Free	1.00
1918	Free		1940	Free	1.00
1919	Free	1.00	1941	Free	1.00
1920	Free		1942	Free	1.00
1921	Free		1943	Free	1.00
1922	Free		1944	Free	1.00
1923	Free		1945	Free	1.00

* Parts A to F, bound separately in paper, are available for the years 1936, 1937, and 1938. Part G, "Inspection of Mines," is not available for these years.

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.) (Out of print.)

MISCELLANEOUS.

Special Reports on Coal-mine Explosions. (By George Wilkinson, Thomas Graham, and James Ashworth.) 1918.

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.

Elementary Geology Applied to Prospecting. (By John F. Walker.) 1937. 35 cents. (Out of print; new edition to be printed.)

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.

Notes on Placer-mining in British Columbia. (By Officers of the Department.) 1938, reprinted in 1943. (Out of print; *see* Bulletin No. 21, new series.)

Preliminary Investigations into Possibilities for Producing Silica Sand from British Columbia Sand Deposits. (By J. M. Cummings.) 1941.

Prospectors' Guide for Strategic Minerals in Canada. (Third Edition.) (By Mines and Geology Branch, Department of Mines and Resources, Ottawa, Canada.) 1942.

BULLETINS, NEW SERIES.

(Free, except as noted.)

1940.

Bulletin No. 1: Aiken Lake Area, North-Central B.C. (By Douglas Lay.)

Bulletin No. 2: Placer-gold Deposits, Wheaton (Boulder) Creek, Cassiar District. (By Stuart S. Holland.)

Bulletin No. 3: Fraser River Tertiary Drainage-history in relation to Placer-gold Deposits. I. (By Douglas Lay.)

Bulletin No. 4: Saline and Hydromagnesite Deposits of British Columbia. (By J. M. Cummings.)

Bulletin No. 5: Mercury Deposits of British Columbia. (By John S. Stevenson.) 50 cents.

Bulletin No. 6: Geology of Camp McKinney and the Cariboo Amelia Mine. (By M. S. Hedley.) 50 cents.

Bulletin No. 7: Lode-gold Deposits of the Upper Lemon Creek Area and Lyle Creek-Whitewater Creek Area, Kootenay District. (By R. J. Maconachie.) 50 cents.

Bulletin No. 8: Preliminary Report on the Bedwell River Area. (By H. Sargent.)

Bulletin No. 9: Molybdenite in British Columbia. (By John S. Stevenson.) (Out of print.)

1941.

Bulletin No. 10: Tungsten Deposits of British Columbia. (Revised.) (By John S. Stevenson and Staff of Department of Mines.)

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.)

1942.

Bulletin No. 15: Hydraulic Mining Methods. (By Stuart S. Holland.)

Bulletin No. 16: Dragline Dredging Methods. (By Stuart S. Holland.)

1943.

Bulletin No. 17: An Introduction to Metal-mining in British Columbia. (By Officers of the Department.)

1944.

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.)

Part IV.: South-western British Columbia—exclusive of Vancouver Island. (By J. S. Stevenson.)

Part V.: Vancouver Island. (By J. S. Stevenson.)

Part VI.: North-eastern British Columbia and Cariboo and Hobson Creek Areas. (By S. S. Holland.)

1945.

Bulletin No. 20: Lode-gold Deposits—

Part III.: Central Southern British Columbia. (By M. S. Hedley and K. DeP. Watson.)

1946.

Bulletin No. 21: Notes on Placer-mining in British Columbia. (By Officers of the Department.)

SPECIAL REPORTS.

Special reports on certain properties were advertised in the Annual Reports 1936 to 1941, inclusive, as available on application. A list of those still available will be supplied on request. The text of a report is either in mimeographed or typewritten form, and ozalid prints can be made of maps or other drawings. Copies of reports still available will be supplied at 10 cents per page of typewritten or mimeographed copy, excepting that the charge for any mimeographed report shall not exceed 25 cents. Additional charges will be made for prints of maps. Requests for these Special Reports, accompanied by the proper sum, should be addressed to the Chief Mining Engineer.

NOTICES *RE* PUBLICATIONS.

Applications are invited from those who wish to receive notices when new publications become available.

PROSPECTORS' SETS.

On request, collections, each consisting of about fifty specimens, including rocks and minerals, are supplied to prospectors and to schools teaching subjects relating to mining or prospecting. Because it is difficult to obtain the material for these sets, only requests from those actively prospecting in the Province and from schools in British Columbia can be considered. A charge of 50 cents is made for each set; the price should be remitted with a request addressed to the Chief Mining Engineer.

LIST OF LIBRARIES.

All Department publications are being sent to the following Government departments and Legislative, University, and Public Libraries:—

CANADA.

Government Departments—

- Department of Secretary of State, Ottawa—Library.
- Department of Mines and Resources, Ottawa—Library of the Bureau of Geology and Topography.
- 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, Regina, Saskatchewan.
- Department of Lands and Mines, 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.

University Libraries—

- Dalhousie University, Halifax, Nova Scotia.
- Acadia University, Wolfville, Nova Scotia.
- Laval University, Quebec, Quebec.
- McGill University, Montreal, Quebec.
- Queen's University, Kingston, Ontario.
- University of Toronto, Toronto, Ontario.
- University of Manitoba, Winnipeg, Manitoba.
- University of Saskatchewan, Saskatoon, Saskatchewan.
- University of Alberta, Edmonton, Alberta.
- University of British Columbia, Vancouver, B.C.

Public Libraries—

- Public Library, Halifax, Nova Scotia.
- Public Library, Montreal, Quebec.
- Public Library, Toronto, Ontario.
- Public Library, Winnipeg, Manitoba.
- Public Library, Regina, Saskatchewan.
- Public Library, Edmonton, Alberta.
- Public Library, Calgary, Alberta.
- Public Library, New Westminster, B.C.
- Public Library, Nelson, B.C.
- Public Library, Prince Rupert, B.C.
- Public Library, Prince George, B.C.
- Public Library, Vancouver, B.C.
- Public Library, Victoria, B.C.

ENGLAND.

British Columbia House, Regent Street, London, England.
Canada House, 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, D.C.
- Bureau of Mines, Washington, D.C.
- United States Geological Survey, Washington, D.C.
- California State Division of Mines, Ferry Building, San Francisco, California.
- Oregon State Bureau of Mines, Salem, Oregon.
- Washington State Bureau of Mines, Olympia, Washington.
- Idaho State Bureau of Mines, Boise, Idaho.

University Libraries—
- Columbia University, New York, N.Y.
- University of California, Berkeley, California.
- Oregon State College, Corvallis, Oregon.
- University of Washington, Seattle, Washington (College of Mines).
- University of Nevada (Mackay School of Mines), Reno, Nevada.

Public Libraries—
- New York Public Library, New York, N.Y.
- Free Library, Philadelphia, Pa.
- Public Library, Boston, Mass.
- Public Library, Los Angeles, California.
- Public Library, San Francisco, California.
- Library Association of Portland, Portland, Oregon.
- Public Library, Seattle, Washington.
- Public Library, Spokane, Washington.

SYNOPSES OF MINING LAWS AND LAWS RELATING TO MINING.

(The complete Acts may be obtained from the King's Printer, Victoria, B.C.)

DEPARTMENT OF MINES ACT.

The "Department of Mines Act" empowers the Minister of Mines to organize the Department or to reorganize it from time to time to meet changing conditions in the mining industry. It provides for examination and certification of assayers; for the conducting of short courses of lectures in practical geology and mineralogy; and for the purchase of ore from the Provincial sampling plants. The Act also provides for the expenditure of public moneys for the construction, reconstruction, or repair of trails, roads, and bridges to facilitate the exploration of the mineral resources of any mining district, or in the operation and development of any mining property.

MINERAL ACT AND PLACER-MINING ACT.

Free Miners' Certificates.

Free miners' certificates must be obtained before any person can prospect for mineral and locate and record mineral claims in British Columbia.

Any person over the age of 18, and any joint-stock company incorporated or registered in British Columbia, may obtain a free miner's certificate on payment of the required fee.

The fee to an individual for a free miner's certificate is $5 for one year. To a joint-stock company having a capital of $100,000, or less, the fee for a year is $50; if capitalized beyond this, the fee is $100. If the company has no stated capitalization, the fee is $100.

The free miners' certificates run from date of issue and expire on the 31st day of May next after its date, or some subsequent 31st day of May (that is to say, a certificate may be taken out a year or more in advance if desired). Certificates may be obtained for any part of a year, terminating on May 31st, for a proportionately less fee.

The possession of this certificate entitles the holder to enter upon all lands of the Crown, and upon any other lands on which the right to so enter is not specially reserved, for the purpose of prospecting for minerals, locating claims, and mining.

In the event of a free miner allowing his certificate to lapse, his mining property (if not Crown-granted) reverts to the Crown (subject to the conditions set out in the next succeeding paragraph), but where other free miners are interested as partners or co-owners the interest of the defaulter becomes vested in the continuing co-owners or partners *pro rata*, according to their interests.

Six months' extension of time within which to revive title in mining property which has been forfeited through the lapse of a free miner's certificate is allowed. This privilege is given only if the holder of the property obtains a special free miner's certificate within six months after the 31st of May on which his ordinary certificate lapsed. The fee for this special certificate in the case of a person is $15 and in that of a company $300.

It is not necessary for a shareholder, as such, in an incorporated mining company to be the holder of a free miner's certificate.

Mineral Act.

All minerals occurring in place are acquired under the "Mineral Act," but limestone, marble, clay, sand, gravel, earth, building or construction stone, coal, petroleum, and natural gas are not considered as mineral.

A mineral claim is a piece of land not exceeding in area fifty-one and sixty-five one-hundredths acres. The angles must be right angles unless the boundaries, or one of them, are the same as those of a previously recorded claim.

No special privileges are allowed for the discovery of new mineral claims or districts.

A mineral claim is located by erecting two "legal posts," which are stakes having a height of not less than 4 feet above ground and squared 4 inches at least on each face for not less than a foot from the top. A tree-stump so cut and squared also constitutes a legal post. A cairn of stones not less than 4 feet in height and not less than 1 foot in diameter 4 feet above the ground may also be used as a legal post. Upon each of these posts must be written the name of the claim, the name of the locator, and the date of location. On No. 1 post, in addition, the following must be written: "Initial post. Direction of Post No. 2 [*giving approximate compass-bearing*] ——— feet of this claim lie on the right and ——— feet on the left of the line from No. 1 to No. 2 posts." Numbered metal identification tags must be attached to both posts at the time of staking.

The location-line between Nos. 1 and 2 posts must be distinctly marked—in a timbered locality by blazing trees and cutting underbrush, and in bare country by monuments of earth or rock not less than 2 feet in diameter at the base, and at least 2 feet high—so that the line can be distinctly seen.

Mineral claims must be recorded in the Mining Recorder's office for the mining division in which they are situate within fifteen days from the date of location, one day extra being allowed for each 10 miles of distance from the recording office after the first 10 miles. If a claim is not recorded in time it is deemed abandoned and open for relocation, but if the original locator wishes to relocate he can only do so by permission of the Gold Commissioner of the district and upon the payment of a fee of $10. This applies also to a claim abandoned for any reason whatever. A free miner can hold, by location, during any period of twelve months, eight mineral claims within a radius of 10 miles, and may acquire others by purchase.

Mineral claims are, until the Crown grant is issued, held practically on a yearly lease, a condition of which is that during such year assessment-work be performed on the same to the value of at least $100, or a payment of such sum be made to the Mining Recorder. Such assessments must be recorded before the expiration of the year, or the claim is deemed abandoned. If, however, the required assessment-work has been performed within the year, but not recorded within that time, a free miner may, within thirty days thereafter, record such assessment-work upon payment of an additional fee of $10. The actual cost of the survey of a mineral claim, to an amount not exceeding $100, may also be recorded as assessment-work. If, during any year, work is done to a greater extent than the required $100, any further sum of $100—but not less—may be recorded and counted as further assessments; such excess work must be recorded during the year in which it is performed. All work done on a mineral claim between the time of its location and recording may be counted as work done during the first period of one year from the recording. As soon as assessment-work to the extent of $500 is recorded and a survey made of the claim, the owner of a mineral claim is entitled to a Crown grant on payment of a fee of $25, and giving the necessary notices required by the Act. Liberal provisions are also made in the Act for obtaining mill-sites and other facilities in the way of workings and drains for the better working of claims.

PLACER-MINING ACT.

In the "Placer-mining Act" "mineral" is defined as in the "Mineral Act," but includes only mineral occurring in any natural unconsolidated material, excluding mineral in place.

Under the "Placer-mining Act" a free miner may locate, in any period of twelve consecutive months, one placer claim or leasehold in his own name and one placer claim or leasehold for each of three free miners for whom he acts as agent on any separate creek, river-bed, bar or dry diggings. Other placer claims or leaseholds may be acquired by purchase. Placer claims are of four classes, as follows:—

"'Creek diggings': any mine in the bed of any stream or ravine:

"'Bar diggings': any mine between high- and low-water marks on a river, lake, or other large body of water:

"'Dry diggings': any mine over which water never extends."

The following provisions as to extent of the various classes of claims are made by the Act:—

"In 'creek diggings' a claim shall be two hundred and fifty feet long, measured in the direction of the general course of the stream, and shall extend in width one thousand feet, measured from the general course of the stream five hundred feet on either side of the centre thereof:

"In 'bar diggings' a claim shall be:—

"(*a.*) A piece of land not exceeding two hundred and fifty feet square on any bar which is covered at high water; or

"(*b.*) A strip of land two hundred and fifty feet long at high-water mark, and in width extending from high-water mark to extreme low-water mark:

"In 'dry diggings' a claim shall be two hundred and fifty feet square."

The following provision is made for new discoveries of placer-mining ground:—

"If any free miner, or party of free miners, discovers a new locality for the prosecution of placer-mining and such discovery be established to the satisfaction of the Gold Commissioner, placer claims of the following sizes shall be allowed to such discoverers, namely:—

"To one discoverer, one claim ..... 600 feet in length;

"To a party of two discoverers, two claims amounting together to ..... 1,000 feet in length;

"And to each member of a party beyond two in number, a claim of the ordinary size only.

"The width of such claims shall be the same as ordinary placer claims of the same class: Provided that where a discovery claim has been established in any locality no further discovery shall be allowed within five miles therefrom, measured along the watercourses."

Every placer claim shall be as nearly as possible rectangular in form, and marked by four legal posts at the corners thereof, firmly fixed in the ground. On each of such posts shall be written the name of the locator, the number and date of issue of his free miner's certificate, the date of the location, and the name given to the claim. In timbered localities boundary-lines of a placer claim shall be blazed so that the posts can be distinctly seen, underbrush cut, and the locator shall also erect legal posts not more than 125 feet apart on all boundary-lines. In localities where there is no timber or underbrush, monuments of earth and rock, not less than 2 feet high and 2 feet in diameter at base, may be erected in lieu of the last-mentioned legal posts, but not in the case of the four legal posts marking the corners of the claim.

A placer claim must be recorded in the office of the Mining Recorder for the mining division within which the same is situate, within fifteen days after the location thereof, if located within 10 miles of the office of the Mining Recorder by the most direct means of travel. One additional day shall be allowed for every 10 miles additional or fraction thereof. The number of days shall be counted inclusive of the days upon which such location was made, but exclusive of the day of application for record. The application for such record shall be under oath and in the form set out in the

Schedule to the Act. A claim which shall not have been recorded within the prescribed period shall be deemed to have been abandoned.

To hold a placer claim for more than one year it must be rerecorded before the expiration of the record or rerecord.

A placer claim must be worked by the owner, or some one on his behalf, continuously, as far as practicable, during working-hours. If work is discontinued for a period of seven days, except during the close season, lay-over, leave of absence, sickness, or for some other reason to the satisfaction of the Gold Commissioner, the claim is deemed abandoned.

Lay-overs are declared by the Gold Commissioner upon proof being given to him that the supply of water is insufficient to work the claim. Under similar circumstances he has also the power to declare a close season, by notice in writing and published in the Gazette, for all or any claims in his district. Tunnel and drain licences are also granted by him on the person applying giving security for any damage that may arise. Grants of right-of-way for the construction of tunnels or drains across other claims are also granted on payment of a fee of $25, the owner of the claims crossed having the right for tolls, etc., on the tunnel or drain which may be constructed. These tolls, however, are, so far as the amount goes, under the discretion of the Gold Commissioner.

PLACER-MINING LEASES.

Under the "Placer-mining Act" a free miner may locate, in any period of twelve consecutive months, one placer claim or leasehold in his own name and one placer claim or leasehold for each of three free miners for whom he acts as agent on any separate creek, river-bed, bar or dry diggings. Other placer claims or leaseholds may be acquired by purchase.

Leases of unoccupied Crown lands approximately 80 acres in extent may be granted by the Gold Commissioner of the district after location has been made by staking along a "location-line" not more than one-half a mile (2,640 feet) in length. In this line one bend, or change of direction, is permitted. Where a straight line is followed two posts only are necessary—namely, an "initial post" and a "final post." Where there is a change of direction a legal post must be placed to mark the point of the said change. The leasehold is allowed a width not in excess of one-quarter mile (1,320 feet), and the locator, both on his "initial post" and in his notice of intention to apply, which is posted at the office of the Mining Recorder, is required to state how many feet are included in the location to the right and how many feet to the left of the location-line.

That section of the Act dealing with the staking of placer-mining leases follows:—

"105. (1.) For the purpose of locating a placer leasehold, a line to be known as the 'location-line' shall be marked on the ground by placing a legal post at each end, one post to be known as the 'Initial Post' and the other as the 'Final Post.' The direction of the location-line may change at not more than one point throughout its length, and an intermediate legal post shall be placed at the point at which the direction changes. The total length of the location-line, following its change of direction (if any), shall not exceed two thousand six hundred and forty feet.

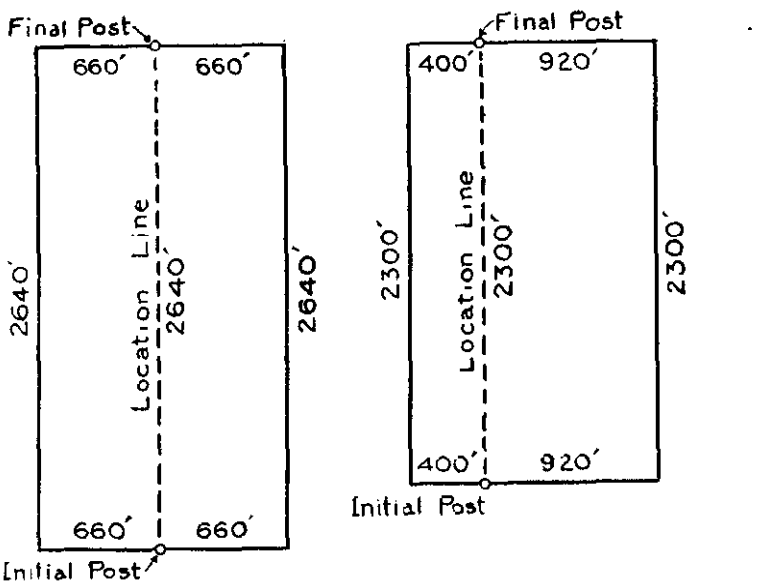
"(2.) Upon the initial post and the final post shall be written the words 'Initial Post' and 'Final Post' respectively, together with the name of the locator and the date of the location. On the initial post shall also be written the approximate compass-bearing of the final post, and a statement of the number of feet of the leasehold lying on the right and on the left of the location-line, as viewed from the initial post, not exceeding in the aggregate a width of thirteen hundred and twenty feet, thus: 'Direction of Final Post, . feet of this claim lie on the right and feet on the left of the location-line.' In addition to the foregoing, where there is a change of direction in the location-line as marked on the ground, the number '1' shall be

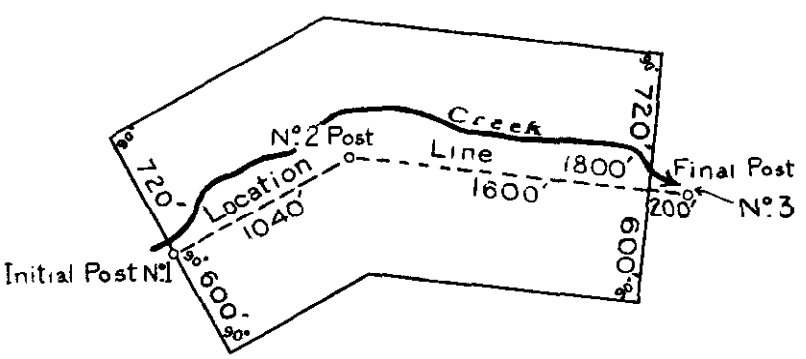
written on the initial post; the number '2' shall be written on the intermediate post; and the number '3' shall be written on the final post. There also shall be affixed to the initial post a notice to the following effect, namely: "Application will be made under the "Placer-mining Act" for a lease of the ground within this location.'

"(3.) The location-line shall at the time of location be marked between the legal posts throughout its length so that it can be distinctly seen; in a timbered locality, by blazing trees and cutting underbrush, and in a locality where there is neither timber nor underbrush, by placing legal posts or monuments of earth or stones not less than two feet high and not less than two feet in diameter at the base, so that the location-line can be distinctly seen.

"EXAMPLES OF VARIOUS METHODS OF LAYING OUT PLACER LEASEHOLDS.

"*Showing Areas secured with Location-lines of Various Lengths.*





"(4.) Where, from the nature or shape of the surface of the ground, it is impracticable to mark the location-line of a leasehold as provided by this section, the leasehold may be located by placing legal posts as witness-posts, as near as possible to the location-line, and writing on each witness-post the distance and compass-bearing of some designated point on the location-line from the witness-post; and the distances

and compass-bearing so written on the witness-posts shall be set out in the application for the lease and in any lease granted thereon.

"(5.) The locator shall, within thirty days after the date of the location, post a notice in Form I in the office of the Mining Recorder, which notice shall set out:—

"(*a.*) The name of the intending applicant or each applicant if more than one, and the numbers of their free miners' certificates:

"(*b.*) The date of the location:

"(*c.*) The number of feet lying to the right and left of the location-line, and the approximate area or size of the ground.

The words written on the initial post and final post shall be set out in full in the notice; and as accurate a description as possible of the ground to be acquired shall be given, having special reference to any prior locations it may join, and the general locality of the ground to be acquired."

Another provision is that there must be affixed to the "initial post" and to the "final post" a numbered metal identification tag furnished by the Mining Recorder with each free miner's certificate issued. These tags must be attached to the posts or placed in a container within a cairn, at the time of location.

The annual rental on a placer-mining lease is $30, and the amount to be expended annually on development-work is $250.

Authority also has been given for the granting of special placer-mining leases in locations other than has been defined.

For more detailed information the reader is referred to the complete "Placer-mining Act," which may be obtained from the King's Printer, Victoria, B.C.

TABLE OF FEES, MINERAL ACT AND PLACER-MINING ACT.

Individual free miner's certificate, annual fee	$5.00
Company free miner's certificate (capital $100,000 or less), annual fee	50.00
Company free miner's certificate (capital over $100,000), annual fee	100.00
Recording mineral claim	2.50
Recording certificate of work, mineral claim	2.50
Recording abandonment, mineral claim	10.00
Recording abandonment, placer claim	2.50
Recording any affidavit	2.50
Records in "Records of Conveyances" (for each claim or lease)	2.00
For each additional claim or lease in the same document	.50
Filing documents, "Mineral Act"	.25
Filing documents, "Placer-mining Act"	1.00
Recording certificate of work, placer-mining lease	2.50
For Crown grant of mineral rights under "Mineral Act"	25.00
For Crown grant of surface rights of mineral claim under "Mineral Act"	10.00
For every lease under "Placer-mining Act"	5.00

PROVISIONAL FREE MINERS' CERTIFICATES (PLACER) ACT.

This Act provides for the issuance of "provisional free miners' certificates" for the locating, recording, representing, and working of placer claims of a size, and according to the terms, and in the manner set out in Parts II. and III. of the "Placer-mining Act." Any person over 18 years of age who has resided in the Province continuously for a period of not less than six months prior to date of his application may, on application accompanied by a statutory declaration or other satisfactory evidence as to his age and period of residence in the Province, obtain from any Gold Commissioner or Mining Recorder a provisional free miner's certificate. No fees are payable in respect of such certificate, and it abolishes the fees payable in respect of the recording or

rerecording of placer claims, but no record or rerecord of a claim shall be granted for a longer period than one year without the payment of fees. It should be pointed out that the provisional free miner's certificate does not carry the privileges of an ordinary free miner's certificate as to the staking and working of placer-mining leases or mineral claims.

The Act also gives the Lieutenant-Governor in Council, as a means of unemployment relief, power to make provision for the establishment, equipment, maintenance, and operation of one or more placer training camps at suitable locations, at which unemployed persons who hold provisional free miner's certificates and are British subjects may acquire knowledge and training in the art of placer-mining and may be afforded gainful work in the recovery of minerals by placer-mining. Reserves for the location of such camps shall not exceed one mile in length by one-half mile in width, and the right is given to enter into agreements with private holders under the Act for the development of their ground by means of unemployment relief camps.

METALLIFEROUS MINES REGULATION ACT.

This Act is designed to provide for the safe working of mines by practical regulations which govern the main phases of mining, such as hoisting installations, ropes, shaft and cage equipment, mine examination, transportation systems, electrical installations, use of explosives, approaching abandoned workings, and the connection of adjacent mines.

Shaft-hoists are required to be equipped with overwind devices and approved braking systems, and all hoistmen in charge must have an annual medical examination and certificate testifying their fitness to perform this work. Hoisting-ropes where men are hoisted must have a static factor of safety of at least 10 for depths of 1,000 feet, with an allowable decrease of one for each 500 feet additional depth with a minimum factor of safety of 6. The working-life of a hoisting-rope when men are hoisted or lowered is limited to two years.

Cages must be provided with safety-catches, properly designed covers, and safety-gates where men are hoisted. Safety-catches must be tested at stated intervals.

The manager of the mine or some qualified person appointed by him must make a daily examination of all places in the mine where persons are at work and report the conditions found in regard to safety in a book kept at the mine for that purpose.

All persons handling or using explosives must hold a certificate of competency for blasting. This certificate is issued by the district Inspector of Mines to miners who show by an oral examination that they are qualified to use explosives safely. This certificate may be cancelled for cause.

Where the workings of any mine are approaching any abandoned workings, whether belonging to that mine or to an adjacent mine, the manager of the present workings shall report the circumstance to the Inspector of Mines if the abandoned workings cannot be examined before the live workings are closer than 300 feet to the abandoned workings, and no work shall be done within this distance until a definite method of approach has been submitted to and approved by the Inspector.

Where it is considered necessary, the Minister of Mines may order a connection to be made and maintained between adjacent mines, and determine the conditions under which such a connection must be maintained.

All electrical installations must comply with the requirements of the "Electrical Energy Inspection Act" of British Columbia.

In addition to the Act and General Rules applicable to all mines, each mine which employs fifty or more men must have a code of Special Rules covering the details of operation at that mine. These Special Rules are drafted by the mining company and its employees and, when approved by the Minister of Mines, have the full force of law.

The Inspectors of Mines in the different districts have discretionary authority on a number of points that may arise in the course of mining operations.

COAL-MINES REGULATION ACT.

This Act, like the "Metalliferous Mines Regulation Act," is designed to provide for the safe working of mines by practical regulations. It is, however, broader in scope than the "Metalliferous Mines Regulation Act" in that it provides for the examination and licensing of coal-mine officials and miners.

WAR-TIME COAL-MINE EMPLOYMENT ACT.

Under this Act it is lawful during the continuance of the war to employ in a coal mine, where not more than twelve men are working underground, as manager, overman, shiftboss, fireboss, shotlighter, or coal-miner a person who is not registered as a holder of a certificate of competency or service under the "Coal-mines Regulation Act," providing he is competent to carry out his duties in the opinion of the Chief Inspector of Mines or of an Inspector of Mines. A permit in writing must be obtained.

EXPLOSIVES.

Under the provisions of Dominion Order in Council No. 2903, issued July 4th, 1940, no person or company may own or purchase explosives, except under a special permit prescribed and issued under this order. Each purchase of explosives requires a separate permit, except in the case of mining and quarrying operations, in which cases the Provincial Inspector of Mines has authority to issue the explosives purchase permit for one calendar year.

Only the owner of an explosives factory or a licensed magazine may sell explosives, but an exemption is made in the case of any mining company to the extent that such a company may be permitted, on applying for the necessary authority, to resell small quantities of explosives to properly qualified prospectors in their district.

MINES RIGHT-OF-WAY ACT.

This Act provides for access to mining property. It provides for the obtaining of a right-of-way for any road, railway, aerial, electric, or other tramway, surface or elevated cable, electric or telephone pole-line, chute, flume, pipe-line, drain, or any right or easement of a like nature.

IRON AND STEEL BOUNTIES ACT.

The Lieutenant-Governor in Council may enter into an agreement with any person whereby the Crown will pay to that person, out of the Consolidated Revenue Fund, bounties on pig-iron and steel shapes when manufactured within the Province, as follows:—

(*a.*) In respect of pig-iron manufactured from ore, on the proportion produced from ore mined in the Province, a bounty not to exceed three dollars per ton of two thousand pounds:

(*b.*) In respect of pig-iron manufactured from ore, on the proportion produced from ore mined outside the Province, a bounty not to exceed one dollar and fifty cents per ton of two thousand pounds:

(*c.*) In respect of steel shapes of commercial utility manufactured in the Province, a bounty not to exceed one dollar per ton of two thousand pounds.

Bounty, as on pig-iron under this Act, may be paid upon the molten iron from ore which in the electric furnace, Bessemer or other furnace, enters into the manufacture of steel by the process employed in such furnace; the weight of such iron to be ascertained from the weight of the steel so manufactured.

Bounty on steel shapes under this Act shall be paid only upon such steel shapes as are manufactured in a rolling-mill having a rated productive capacity per annum of at least twenty thousand tons of two thousand pounds per ton. The total amount of bounties paid under clauses (*a*) and (*b*) is limited to $200,000 in any one year or $2,000,000 in the aggregate; and the total amount of bounties paid under clause (*c*) is limited to $20,000 in any one year or $200,000 in the aggregate.

INDIAN RESERVES MINERAL RESOURCES ACT.

This Act validates an agreement between the Dominion and the Province whereby mineral rights on Indian reserves, upon surrender by the Indians, shall be administered by the Province, subject to the laws of the Province. A free miner wishing to prospect on Indian reserves must obtain the approval of the Gold Commissioner for the mining division in which the reserve is situated and also of the Indian Agent for such reserve.

ALLIED FORCES EXEMPTION ACT, 1939; WAR MARINERS' BENEFITS ACT; CORPS OF CANADIAN FIRE-FIGHTERS ACT.

According to the provisions of the "Allied Forces Exemption Act, 1939," any person who joined since the 3rd day of September, 1939, "for service in the present War, any of the Naval or Military Forces of His Majesty or of any Power being at the time an Ally of His Majesty," for active (full-time) service, was exempt from the performance of assessment-work and from paying recording fees and rentals for the duration of the War and six months thereafter on any mineral claim and placer-mining lease recorded in his name at the time of his enlistment.

Under the "War Mariners' Benefits Act" a person qualifying as a mariner was entitled to the same benefits accorded members of the Allied Forces under the "Allied Forces Exemption Act, 1939." A "mariner" means a person who served in deep-sea waters in a war zone during the present War in any ship whose port of registry was during such service in a part of the British Commonwealth of Nations; but does not include a person whose domicile during his period of service was not in British Columbia.

Every member of the Corps of (Civilian) Canadian Fire-fighters who proceeded overseas was entitled to the same benefits accorded members of the Allied Forces under the "Allied Forces Exemption Act, 1939."

The "Allied Forces Exemption Act, 1939," the "War Mariners' Benefits Act," and the "Corps of Canadian Fire-fighters Act" were repealed on April 11th, 1946, and replaced by the "Allied Forces Exemption Act, 1946," which provides that if a person entitled to the protection of those Acts:—

(1.) Desires to obtain the protection of the 1946 Act, he must notify the Chief Gold Commissioner, Victoria, B.C., on or before the 31st day of December, 1946, giving particulars of his mining property or of his interest in it and evidence of his qualification for exemption. If notification is not given by December 31st, 1946, the mining property of the member will forfeit on the anniversary date preceding the 31st day of December, 1946:

(2.) Was discharged before the 11th day of April, 1946, his claim or lease remains in good standing until the first anniversary date after the 31st day of May, 1946:

(3.) Is discharged after April 11th, 1946, his claim or lease remains in good standing until the first anniversary date after the 31st day of May, 1946, or after the date of his discharge, whichever date is later:

(4.) Transfers to the permanent forces of Canada, his claim or lease remains in good standing until the first anniversary date after the 31st day of May, 1946, or after the date of transfer, whichever date is later.

FREE MINERS' EXEMPTION ACT.

The operation of the "Free Miners' Exemption Act" will cease on the 31st day of December, 1947, subject to the following limitations:—

Every person who holds a mineral claim or placer-mining lease under the provisions of this Act to the anniversary date of the mineral claim or lease in 1947, or who obtains renewal of exemption to the anniversary date of the claim or lease in 1947, and who desires to maintain it in good standing to its anniversary date in 1948, must, before the anniversary date in 1947:—

(*a.*) In the case of a mineral claim, perform and record assessment-work or make payment in lieu thereof in accordance with the "Mineral Act":

(*b.*) In the case of a placer-mining lease, make the necessary payment of rental and perform and record the necessary development-work or make payment in lieu thereof in accordance with the provisions of the "Placer-mining Act."

PROSPECTORS' GRUB-STAKE ACT.

In this Act "grub-stake" means money, food supplies, clothing, powder, tools, or any other thing necessary to the business of prospecting. "Prospector" means any person who is a British subject and who is the holder of a valid free miner's certificate; who has been honourably discharged from any of His Majesty's Services or has been resident in the Province during the year preceding any application for a grub-stake.

Information regarding grub-stakes may be obtained from the Department of Mines, Victoria, B.C., or from any Mining Recorder, Mining Engineer, or Inspector of Mines of the Department.

No grub-stake granted to one applicant shall exceed $300 in value in any one year, but the grub-stake may be increased if an applicant is required to travel to or from the area in which he is to prospect by an amount sufficient to cover such travelling expenses. *The total in no case shall exceed $500 in any year. Applicants are required to identify* some of the commoner rocks and minerals.

Provision has been made for the establishment and operation of one or more mining training camps at suitable locations within the Province.

COAL ACT.

The new Act provides for a licence to develop coal and to mine coal not in excess of 10,000 tons per annum. The licence is renewable yearly and the licensee has the first right to a lease over the same ground when he can produce more than 10,000 tons of coal per annum. If an applicant can show the Department that he has a market for more than 100,000 tons of coal per annum he may obtain an additional licence for every 100,000 tons of coal he plans to develop and produce. A licence is 1 square mile in area. The yearly rental is 50 cents per acre and the fee for issuing or renewing a licence is $25. If development-work to the value of $7.50 per acre is done the rental may be rebated.

When a licensee is producing more than 10,000 tons of coal per annum he may obtain a twenty-year lease and if he is producing more than 100,000 tons of coal per annum he may obtain an additional lease for each 100,000 tons of coal being produced. The rental for a lease is $1 per acre and the fee for issuing a lease is $25.

The royalty on coal produced under a licence or lease will be 25 cents per short ton. All mining operations carried on beyond the perimeter of presently active workings

must have the approval of the Chief Inspector of Mines and the plan of operations must provide for the maximum possible extraction of coal contingent upon good mining practice and safety of operation.

No Crown grants of coal land can be obtained under the new Act.

TAXATION ACT.

(Procedure in applying for Reverted Crown-granted Mineral Claims.)

"161. (1.) Where property which consists of a mineral claim has been forfeited to and vested in the Crown under the provisions of this Part, it shall be lawful for the Gold Commissioner for the mining division in which the mineral claim is situate to grant a lease thereof to any person for the term of one year upon payment of the sum of twenty-five dollars, and, upon payment of a further sum of twenty-five dollars, to grant a renewal of the lease for a further term of one year commencing on the expiration of the former lease, but for no longer period.

"(2.) No person shall be entitled to hold as lessee under this section more than eight claims in the same mining division at the same time.

"(3.) No lease granted under this section shall be transferable.

"(4.) Subject to the rights of any person to the surface or a portion of the surface of the mineral claim, the lessee shall, during the continuance of his lease, but no longer, have the right to enter, prospect, and mine upon the claim for all minerals, precious and base, save coal and petroleum, and for that purpose shall have the rights of a free miner under the 'Mineral Act.'

"(5.) Where the Gold Commissioner has granted a lease to any person under this section, he shall forthwith notify the Surveyor of Taxes, giving the name of the mineral claim, the name of the lessee, and the date of the lease, and the Surveyor of Taxes shall enter the particulars furnished him by the Gold Commissioner in a proper book to be kept by him for that purpose.

"(6.) The lessee may at any time before the expiration of his lease apply for and obtain a Crown grant of the mineral claim upon payment of all taxes, costs, expenses, interest, and penalties which remain due and unpaid on the mineral claim on the date of its forfeiture to the Crown, together with a sum equal to all taxes, interest, and penalties which would have accrued due in respect thereof from the date of the lease to the date of the application for a Crown grant had the claim been regularly assessed in like manner as it appeared upon the assessment roll for the year last preceding the date of the forfeiture and also with a fee of twenty-five dollars for a Crown grant: Provided that if the lessee establishes to the satisfaction of the Gold Commissioner that he has expended upon the claim in mining-development work a sum of not less than two hundred dollars a year during the continuance of the lease, then the payment of the sum in respect of taxes and penalties from the date of the lease to the date of application for a Crown grant shall not be required.

"(7.) The lessee shall be entitled to a Crown grant according to the acreage and description of the claim specified in the original Crown grant thereof under which the claim was held prior to the date of forfeiture, but subject to the prior rights of any other person.

"(8.) Where the lessees under this section of a number of adjoining mineral claims, not exceeding eight, file with the Gold Commissioner a notice of their intention to perform on any one or more of the claims all the mining-development work that otherwise might be required in respect of all the claims, and where the lessees thereafter establish to the satisfaction of the Gold Commissioner that a sum equal to two hundred dollars a claim of the full number of the adjoining claims has been expended upon one or more of the adjoining claims in mining-development work for each year

during the continuance of the leases, then the payment of the sum in respect of taxes and penalties from the date of each of the leases to the date of the application for a Crown grant shall not be required."

A list of the Gold Commissioners and their respective mining divisions may be found on page 47.

TAXATION OF MINES.

Crown-granted mineral claims are subject to a tax of 25 cents per acre. The tax becomes due on April 1st in each year, and if unpaid on the following June 30th is deemed to be delinquent.

All mines, other than coal, are subject to an output tax (payable quarterly) of 2 per cent. on gross value of mineral, less cost of transportation from mine to reduction-works and the cost of treating same at reduction-works or on the mining premises.

Any such mine, not realizing on ore shipments a market value of $5,000 in any one year, is entitled to a refund of the output tax paid.

Coal is subject to a tax of 10 cents per ton of 2,240 lb., except coal shipped to coke-ovens within the Province. Tax payable monthly.

Coke is subject to a tax of 10 cents per ton of 2,240 lb., except in respect of coke produced from coal upon which this tax has already been paid. Tax payable monthly.

Coal land from which coal is being mined (Class A) is taxed at 1 per cent. upon the assessed value, in addition to any other tax.

Unworked coal land, known as "Coal Land, Class B," is subject to a tax of 2 per cent. upon the assessed value.

For further particulars *see* the "Taxation Act," also the "Public Schools Act," which are obtainable from the King's Printer, Victoria, B.C.

The Federal Government now collects the income tax for all Provincial Governments.

FOREST ACT.

In 1939 the "Provincial Parks Act" was repealed and the administration of Provincial parks brought under the "Forest Act." Under this Act the Lieutenant-Governor in Council may constitute any portion of the Province a Provincial park and may also extend, reduce, or cancel any park created before or after the amendment to this Act.

The Act provides for three classes of parks to be known as "A," "B," and "C" Class parks.

Lands included in Class "A" and Class "C" parks are reserved from pre-emption, sale, lease, or licence under the "Land Act" and with respect to mining are so reserved unless the consent of the Lieutenant-Governor in Council is obtained, and then only subject to further provisions of the Act.

No holder of any mineral claim in a Class "A" or "Class "C" park may obtain a Crown grant of the surface rights of a mineral claim.

All mineral claims in any Class "A" or Class "C" park shall be subject to such terms and conditions and restrictions, including cutting and use of timber, as the Lieutenant-Governor in Council may from time to time prescribe.

The restrictions on prospecting and mining in Class "A" and Class "C" parks do not apply in the case of Class "B" parks.

Where, in the opinion of the Minister of Lands, the safety of life and property is endangered through the hazardous condition of the forest-cover or the occurrence or spread of forest fire the Minister may declare a district closed for travel and prospecting so long as the hazard exists.

LIST OF PRICES CHARGED FOR ACTS.

	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
Provisional Free Miners' Certificates (Placer) Act	.25
Iron and Steel Bounties Act	.15
Indian Reserves Mineral Resources Act	.15
Allied Forces Exemption Act	.15
Corps of Canadian Fire-fighters Act	.15
War Mariners' Benefits Act	.15
Free Miners' Exemption Act	.15
War-time Prospectors' Grub-stake Act	Free
Coal Act	.15
Taxation Act	.75
Forest Act	.80
Garibaldi Park Act	*
Strathcona Park Act	.15
Greater Vancouver Water District Act	.40
Coal and Petroleum Products Control Board Act	.15
Security Frauds Prevention Act	.30
Coal Sales Act	.15
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VICTORIA, B.C.:
Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1946.

2,655-346-3553